ISN 84/291

PN-ABP-828

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CONFERENCE AGENDA

CONFERENCE ON THE PROTECTION OF
THE WORLD'S CHILDREN

AGENDA

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R. McNamara, J. Salk, H. Mahler
J. Grant, T. Clausen, B. Morse
- Brief general discussion

Wednesday, March 14 — Chair: K. Warren
Rapporteur: S. Joseph

09.00 am	-	Opening, adoption of agenda
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	-	Immunization services: state of the art (R.H. Henderson)
09.35	-	Simplified Immunization Schedules: West Africa (P. Stoeckel)
09.55	-	The Biotechnology Revolution and New Vaccines (G. Nossal)
10,15	-	Coffee Break
10.45	-	Childbased Immunization as an Impetus to Primary Health Care (D.A. Henderson)
11.05	-	Discussion
12.00	-	Oral Rehydration Therapy (P. McPherson)
12.20	-	Discussion
12.30	-	Lunch
02.00 pm	-	Protecting the World's Children: Strategies for Attaining the Goal (W.H. Foege)
03.30	-	Tea Break
05.00	-	Resume of discussion, and issues for Thursday (J. Kostrzewski)

Thursday, March 15 — Chair: J. Kostrzewski
Rapporteur: S. Joseph

09.00 am	-	Formation of a Consultative Group to Protect the World's Children
	-	General strategies
10.30		Coffee Break
	-	Objective and functions
	-	Organization and structure
	-	Financial and administrative requirements
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	-	Rapporteur's summary
	-	Closing remarks

SUGGESTED COMMENTS

March 9, 1984

MANAGER-TO-MANAGER

MEMORANDUM

TO: S&T/HP, Franz Herder

FROM: S&T/H/CD, James Erickson

SUBJECT: Comments on Working Papers for Bellagio Conference, March 13-15, 1984

As the project manager for the Agency's Malaria Vaccine Development Program these past six years, I would like to make the following points and observations about the subject conference.

A. Specific Comments on Article by Dr. G. Nossel (Pages 38-65)

1. Overall an excellent article, especially the discussion of the pros and cons of genetic engineered vs. synthesized vaccines.

2. Particularly for malaria vaccine, the Administrator should be reminded of the following:

A.I.D.'s Interest in Vaccines

a. We have a long-standing research commitment in the area of vaccine development, with early work on a heat-stable measles vaccine, and now the malaria vaccine.

b. A.I.D. support to malaria vaccine research now spans 17 years and exceeds $37 million

c. The Administrator has raised the budget by about double in order to accelerate the completion of a malaria vaccine against the four species of human malaria.

d. A.I.D. currently supports 16 projects conducting research to identify protective antigens against the red blood cell phases of the malaria parasite (= merozaite or erythrocytic stage).

e. A.I.D. supports a unique project to study the potential to develop a vaccine against the liver stage of the malaria parasite (= exoerythrocytic stage).

f. Dr. Nossel specifically mentions the mosquito stage research conducted by the Nussensweigs at New York University. We are well aware of this project as we (A.I.D. and the USG) have supported that program since 1975 with the following cost breakdowns in millions:

*USG (A.I.D./NIH)	=	$4,581
Private US	=	1,120
WHO	=	752
Total		$6,453

*Does not include overhead figures which are 60% of TDC.

g. A.I.D. has already initiated the development of a special advisory committee to assist in planning the clinical field trials of malaria vaccine. Its second meeting is scheduled for March 22, 1984, in Washington.

B. General Comments on Meeting

1. The general tenor and agenda of the meeting seem to parallel greatly the events that occurred with the worldwide malaria eradication program (1955-1970). That program encountered myriad administrative and technical problems, and we are now faced with a current resurgence of 400 million cases. Specific proposed program interventions need to be analyzed carefully--in technical, financial, and administrative terms--before we commit substantial sums.

2. Everything proposed by the creation of another administrative structure (i.e., the Consultative Group) could easily be done by and with the existing multilateral and bilateral donor organizations (WHO, UNICEF, etc.) if the same resources were funneled in that direction.

3. Technically it is neither easy nor perhaps even feasible to go out and blanket the globe with the existing technology with the six EPI vaccines--and cure

the world like was done with DDT and small-pox. The papers generally ignore issues such as immune suppression, nutrition, ecological questions of significantly reduced mortality rates, etc., and probably the most important, the interplay of these diseases with other disease problems, i.e., vector borne diseases, helminth infection, ARI, and diarrheas. Considerable analysis and planning should be carried out prior to the launching of major program interventions.

4. The program to be presented suggests enormous "cold-chains," etc. to be put in place. Why don't we spend some research money up front and fully develop and improve vaccines to make them heat-stable, etc., before we go out and spend billions?
5. The background papers are not consistent or clear in their handling of research. The need for and role of research needs to be clarified. At the same time, we need to consider what portion of this research can/should be done with existing organizations/ mechanisms--rather than starting anew.

INITED STATES INTERNATIONAL DEVELOPMENT COOPERATION AGENCY
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C 20523

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February 27, 1984

MEMORANDUM

TO: S&T/HP, Franz Herder

FROM: PPC/PDPR/EP, Maureen Lewis

SUBJECT: Comments on "Protecting the World's Children: Strategies for attaining the Goal"

In response to your request, I have reviewed the subject paper and have summarized my reactions to it here. I think it is worth further discussion, however.

The paper prepared for the March 1984 Bellagio Conference by W.F. Foege makes a case for establishing a broad program for establishing and expanding worldwide immunization networks to reduce childhood morbidity and mortality. While both a noble goal and highly needed, the practical issues pose serious impediments.

There is no question that existing technologies are not being applied to alleviate pain and suffering, but is is unclear from the paper ,or for that matter other evidence, that the answer is immunizations. There is no clear cut case that immunizations are the best, cheapest or most efficient place to start. On economic grounds it can be argued that immunizations are a logical investment because they are public or merit goods -- they affect the society as much or more than the individual. On epidemiological grounds they are a proven means of saving lives. However the costs are high in developing countries, which siphons off resources from other worthy investments.

The proposed plan is flawed in a number of respects, including: (1) the cost effectiveness of immunizations hinges on the ability to piggyback existing PHC networks; (2) the management and absorbtive capacity is already reached in most LDCs, particularly those in greatest need of immunization programs; (3) the estimated costs are unrealistically low; (4) the fundamental problems are not addressed by the proposed program; and (5) the long term viability of the programs is not considered. Each of these is discussed here.

1. The success of WHO's smallpox eradication program was an aberration, as it was a disease that lent itself to swarming teams of innoculators. Few other diseases can be addressed as readily and many of them leave no extermal marks but require

more than one vaccination to be effective. Existing studies indicate that vertical immunization programs are costly undertakings because of the cold chain requirements and the need to locate population settlements on a somewhat random basis.

Building on a PHC system is critical in ensuring both effectiveness of delivery and reasonable costs; however the approach raises the overall cost to the government while lowering the per immunization costs of the immunization effort. It also should be kept in mind that PHC programs are least effective and most geographically restricted in the poorest countries where the mortaltiy among infants and childldren is highest and the immunization campaign most appropriate.

In addition to the lack of PHC systems, the costs associated with establishing such networks are exceedingly hig both in terms of investment and recurrent costs. As LDC government budgets shrink, less will be allocated to health, suggesting that additional commitments and/or planned PHC expansion may have to be curtailed. Moreover, for every dolla invested in PHC, something else will have to be given up; this fact applies to immunizations as well. What health investment are of lesser importance that can be terminated so that human and financial resources can be allocated to establishing/strengthening PHC and building immunization system?

2. Currently there are immunization efforts underway in every developing country under various auspices. It is unclear whether the managers, administrators and service delivery mechanisms can absorb any additional resources. It has been difficult to introduce fiscal discipline and minimal managemen in existing systems. Expanding these or establishing new vehicles may strain ministries further, reducing the overall effectiveness of donor and LDC government investments. In Africa, for instance, little additional funds can be absorbed without additional management and delivery resources and expertise. And, again, it is in Africa where the needs are greatest.

3. The cost estimates provided are exceedingly low due to a number of factors, some indicated and some not. The underestimates are due to the following:

- costs are based on controlled trials where technical assistance minimizes wastage and procedures are undertaken with particular care. Moreover, in most cases technical advisors implement the trial and the salaries of their replacements are ignored; salaries constitute anywhere between 50 and 80 percent of total costs;

- costs of reaching and immunizing children and pregnant women do not decrease as a program develops since more remote and more costly populations are reached as the program matures; economies of scale (where the per capita cost falls as the scale of the program grows) are therefore unlikely;

- the most costly and intractable problem facing ministries of health is the establishment of a viable PHC networks. To be operational, the proposed immunization effort would have to build on that existing structure. The investment and recurrent costs of PHC systems are astronomical and suggest a high opportunity cost for any country;

- costs vary by the terrain, infrastructure, population density and competency of immunization teams. The reported cost ranges are based on relatively more accessible, and therefore less expensive areas, assume no wastage in storage or delivery and therefore severely underestimate actual costs;

- the wastage of vaccines in transport to the country, storage in-country, and distribution within country is also exceedingly costly and an area where simple logistics and management skills need to be developed and firmly established before an all out immunization effort can be undertaken with any justification.

4. As already mentioned, the fundamental issues of an oeprational PHC system are not addressed by the paper. Although there is some indication that a PHC network is desirable, there is also reference to the fact that the immunization program will help to establish a PHC system. Before launching a program to immunize all children, some basic management, training and technical problems need to be resolved within the PHC systems including: importing, storing and distributing vaccines; establishing an operational cold chain; training and hiring competent personnel to handle the storage, distribution and innoculation of the vaccines; and, allocating

sufficient resources to sustain the program. These investments must precede the immunization program proposed and it is unlikely that such infrastructure will be available in the short run.

The proposed system would respond to well defined and argued country plans, further biasing the effort toward further the well-staffed, better off countries who have the technical expertise and existing PHC capacity to absorb and apply the resources. Because this is a second stage issue, it is not useful to dwell on it, but it is worth noting.

5. Because even the estimated costs are high, some means of financing the program needs careful consideration before the significant investments suggested are made. The opportunity cost to the government in terms of financial and human resources, the alternatives for recovering some costs (this is difficult where little or no demand exists for immunizations and/or shots are seen as a curative measure unnecessary for a health individual), and the cost of gearing up for a program that only lasts a short time with minimal expectations for future external resources to continue the program, together suggest that continued financing will be difficult to obtain and sustain, on both political and economic grounds. Needless to say, the PHC costs will not be borne by donors either.

These are all difficult issues that cannot be ignored if donors are to encourage the health investments suggested in the Foege paper. Indeed, discussion of an expanded immunization effort only makes sense if the issues raised can be realistically assessed/resolved beforehand. The paper obviously does not attempt this.

It is unclear whether the proposed investment would have any long term impact on host country institutions or even build a capacity to efficiently deliver immunizations. Based on the proposals in the paper, the most rational proposals were those suggesting investments in improved cold chain methods and materials, and development of more stable and appropriate vaccines. In the long run they probably would have the highest payoffs, and they are far more amenable to short term infusions of funds.

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October 31, 1984

ACTION ACTION ACTION

NOTE FOR JIM HEIBY, CARL KENDALL, JIM ERICKSON, ROBERT CLAY

SUBJECT: Response to McPherson query

Bill Foege has suggested that the critical problems in immunization research are 3:

/ coordination and promotion of application research (Heiby)

-adequate funding of the vaccine research priorities which have been identified (Clay, Kendall)

/ difficulties between vaccine development and commercial availability (manufacture, field testing, etc.) (Erickson)

McPherson has asked Brady what he thinks of ~~these~~ this assessment, and we have been asked to prepare a response quickly. Could you give me your comments on the attached by COB Thursday?

Thanks,

Ann Van Dusen

cc: Janet Ice (for the logs)

Key Questions

What are the vaccine research priorities?

What funds would be adequate?

~~Where~~ What are the current funding levels?

Where would additional funds come from?

AGENCY FOR INTERNATIONAL DEVELOPMENT

EXECUTIVE SECRETARIAT - MAIL ACTION REQUEST

TO	ROOM	DATE REC'D
Van Dusen S/S/H		

ACTION

	PREPARE REPLY FOR SIGNATURE OF
	Route Reply via EXSEC
	~~For Necessary~~ Action By You
	For Your Information
	Route to Interested Individuals
	Initial for Clearance

DUE DATE

	Interim
	Final

REMARKS:

URGENT

Ref No/030-05
Action: S/S/H
info memo
to MPM fyi.
NCB
Due Date ASAP
Copies To: Beasley Eikelen Herder Saxon Oh

FROM: Mary Wills, ES, X-22564 (Ext.) (Date) 10/30

AID-3-191 (2-60)

AGENCY FOR INTERNATIONAL DEVELOPMENT
Office of the Executive Secretary

October 26, 1984

TO: Nyle Brady, AA/S&T

FROM: Patty Pettit, ES

SUBJECT: Ltr from Foege, UNICEF
dtd 10/22

The attached was returned from Peter McPherson with:

"Dr. Brady...What do you think?"

SUSPENSE: ASAP

TELEPHONE PLAZA 4-1234

CABLE ADDRESS UNICEF

4 Mr Pherson by

S4T

OCT 22 12 18 PM '84

UNICEF

UNITED NATIONS CHILDREN'S FUND · FONDS DES NATIONS UNIES POUR L'ENFANCE

UNITED NATIONS, NEW YORK

MEMO TO: ALL BELLAGIO PARTICIPANTS

FROM: WILLIAM H. FOEGE, M.D.

DATE: OCTOBER 17, 1984

SUBJECT: UPDATE ON IMMUNIZATION ACTIVITIES

You have received the report developed by Colombia on their immunization activities. An evaluation of the program is currently being planned with the help of PAHO. They will share this evaluation with the Bellagio participants. In addition, of tremendous importance is that Colombia is now looking at how best it can learn from the immunization experience to expand primary health services in general. This is a most exciting exercise that will take place over the next months.

Senegal has requested the services of a technical operations officer and this person is currently in Dakar assisting in the detailed development of their national plan. Dr. Phillip Stoeckel arranged for a consultant from Management Services for Health to assess, with a Sengalese counterpart, the status of health projects involving the government of Senegal and outside groups. This investigation has provided a very useful background for the development of a detailed country plan.

India has a large amount of immunization activities taking place and the national commitment is obvious. The Secretary of Health, Mr. C.R. Vaidyanathan, has outlined their plans to have a national immunization program immunizing 20 million children under the age of 14 months by 1988. Various studies are underway in the country on vaccine delivery schemes and on different cold chain approaches. India is particularly interested in assistance to develop their own vaccine production capabilities and assistance in improving the cold chain. Short term assistance with vaccines will obviously be required until internal production meets the demand.

During the recent meetings in Calgary, a number of people (including Drs. Assaad, Lucas, Henderson, Halstad and Nossal) summarized the current immunization research initiatives in the world. Our interest was to

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identify the gaps which require special attention from our Task Force. It was felt that the selection of vaccine development priorities and the coordination of vaccine development research is now well addressed by the combination of The Expanded Programme of Immunization, The Tropical Disease Research Programme, The Diarrheal Disease Control Programme and The SAGE Group organized by Dr. Assaad. The true gaps appear to be:

(1) Coordination and promotion of application research.

(2) Adequate funding of the vaccine research priorities which have been identified.

(3) Difficulties between vaccine development and commercial availability (manufacture, field testing, etc.).

Proposals to address these gaps are being developed.

The Task Force is now functional with the arrival of Mr. Bill Watson who has retired as Deputy Director of the Centers for Disease Control to devote full time to the objectives outlined in March 1984 at Bellagio. We are now in a position to more actively respond to needs and requests in the three countries and the research areas mentioned. We welcome your ideas at:

1989 North Williamsburg Drive
Suite I
Decatur, Georgia 30033
Telephone: (404) 325-2452/2453

Finally, noting the results in Colombia, the Inter-American Development Bank has been discussing possible roles in Primary Health Care development with PAHO. This is a most exciting prospect.

Bill

William H. Foege, M.D.

BELLAGIO CONFERENCE

TO

PROTECT THE WORLD'S CHILDREN

13-15 MARCH 1984

SPONSORS

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UNITED NATIONS DEVELOPMENT PROGRAM

WORKING PAPERS

WORKING PAPER

Bellagio Conference, 13-15 March 1984

VACCINE PREVENTABLE DISEASES OF CHILDREN: THE PROBLEM

Expanded Programme on Immunization
WHO/Geneva

Contents

1. EXECUTIVE SUMMARY

In 1983, some 5 million children in developing countries died and another 5 million were crippled, blinded, or otherwise disabled from 6 diseases preventable through immunization. Social costs to families were significant, including lost work time for adults and lost school time for older siblings caring for the sick and disabled. Uncertainty about child survival has led many families to have more children than they really desire.

This situation should be remedied. Vaccines and the means to deliver them are readily available and inexpensive. They need to be used. Costs in established programmes average only US$ 5.00 per fully immunized child, although may be double or triple that amount during programme development. As infants comprise 4% or less of the population, a national immunization programme can be implemented for US$ 0.20-0.60 per capita.

Recognition of these facts led in 1974 to the establishment of the Expanded Programme on Immunization, with the goal of reducing morbidity and mortality by providing immunization for all children of the world by 1990. The task is challenging for, although immunization is one of the most simple and cost-effective of health services, it does demand planning, management and the existence of a health infrastructure. Vaccines must be ordered in advance in the appropriate quantities, supplied regularly to the health units, and kept potent in an unbroken "cold chain" which keeps them at safe temperatures from the point of manufacture to the point of use. There must be sufficient service delivery points so that communities have convenient access, and communities must be able to understand the benefits of immunization if they are to be expected to use the services offered.

Although much has been accomplished since 1974, acceleration of the programme is required if the 1990 goal is to be attained. In 1983, from data which remain incomplete, it was estimated that only about 30% of children under the age of 1 year had received a third dose of DPT vaccine, and a still smaller proportion had received a third dose of polio or a measles immunization. The two major constraints faced by the programme are insufficient political will to provide the needed financial and human resources, and insufficient management capacity to translate available resources into effective programmes.

2. INTRODUCTION

This paper describes the morbidity and mortality being caused by 6 vaccine preventable diseases of children and the implementation problems being faced by the Expanded Programme on Immunization (EPI) in achieving its goal of reducing morbidity and mortality by providing immunization for all children of the world by 1990.

3. THE TARGET DISEASES

Six vaccine preventable diseases of childhood are included in the EPI: measles, pertussis (whooping cough), tetanus, poliomyelitis, diphtheria and tuberculosis. These diseases are all of universal importance in developing countries. They are all preventable with vaccines which are safe, effective and inexpensive, and which are in widespread use in industrialized countries. During 1983 it is estimated that these six diseases killed some five million children per year - 10 per minute - and disabled an equal number by crippling, blinding or causing mental retardation.

In the developing world up to one-third of all childhood deaths are associated with vaccine preventable diseases. They tend to be severe, as the resistance of many of the children is already compromised by other infections and malnutrition. They occur early in life, making protection during the first year of life a priority. The prevention of tetanus, which often strikes during the newborn period, requires that pregnant women be adequately immunized so that their antibodies can safeguard the newborn during its first weeks of life. Programmes using vaccines against these diseases can focus on reaching two specific groups in the population: children in their first year of life and women of childbearing age (especially pregnant women). This clarifies and simplifies the management tasks, and makes immunization against these diseases the natural partner of other primary health care programmes seeking to reach children and mothers with preventive and curative care.

3.1 Measles

Without immunization, virtually 100% of the children of the developing world will contract measles between the ages of six months and three years - the youngest infants being protected by maternal antibodies. The age at which a child becomes infected varies with social and economic conditions: where there is overcrowding and poor housing,

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Complications occur in about 30% of all cases, the most important of which may lead to pneumonia, blindness and deafness. These are more frequent and more severe in malnourished children who may have case-fatality rates of 10% or more. In the developing world, measles is also a significant cause of malnutrition and diarrhoea. Overall, it is estimated that some 3% of children in developing countries who acquire measles will die from it or from its complications. Young age at the time of infection, malnutrition, intercurrent diseases such as diarrhoea, and limited access to medical care, act synergistically to make measles one of the major causes of childhood mortality in the developing world. During famine or among refugee children death rates may approach 40%.

3.2 Pertussis (whooping cough)

Pertussis is an acute bacterial infection affecting the respiratory tract. It is highly contagious in the first week or two of infection to the extent that at least 80% of the children in an unimmunized population will contract the disease. The cough may last a considerable period as indicated by its description as the 'hundred day cough'. The disease is common to all climates and as protective antibodies do not pass through the placenta to the foetus, infants are susceptible from birth. Pneumonia is a common complication. In some geographic areas, pertussis is identified as a major cause of mortality; directly through damage to the respiratory tract or indirectly as a precipitating cause of severe malnutrition. It is estimated that some 1.5% of children in developing countries who acquire pertussis will die from it or from its complications.

3.3 Tetanus

Tetanus is caused by a toxin of the tetanus bacillus and causes painful muscular contractions and generalized spasms which in severe cases may reach the larynx and respiratory system. The disease can occur at any age, but is particularly dangerous during the neonatal period. Neonatal tetanus results from the contamination of the umbilical stump by unsterile methods of cutting the cord or by application to the stump of matter such as cow dung or mud. The infected newborn will first be unable to suck and then be unable to swallow or breathe. Some 85% of untreated cases die in the first few weeks of life. One million newborns die from this disease each year in the developing world and with the

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persistence of unhygienic living conditions and traditional birth practices, immunization of women of childbearing age presents the best possibility in the short run for prevention. Neonatal tetanus disappeared from industrialized countries several decades ago.

3.4 Poliomyelitis

Poliomyelitis is not so much of a killer as it is a crippler. It is a viral disease principally spread by contact with food or water contaminated with excreta. In an unprotected population, it is universally infectious. However, infection with one or more of the three polio virus types is not tantamount to illness. Perhaps only one out of every two hundred children infected develops paralysis. Some 15% of those paralysed may recover completely within six weeks, but the remainder will have persistent weakness of the affected muscles which in time leads to wasting. It is estimated that some 400 000 cases of paralytic poliomyelitis occurred in developing countries in 1983.

Where housing and sanitation are poor, poliomyelitis may not be a very noticeable disease to the community. Infection spreads rapidly and continuously, and infection occurs under the cover of waning maternal antibodies which reduce the risk of paralysis. As living standards improve, spread is less common and children are infected at older ages when they are more susceptible to being paralyzed. Instead of being continuous, virus spread occurs only when a large enough number of susceptibles has accumulated. In more developed countries, therefore, poliomyelitis strikes in epidemic form, highly visible to the communities concerned. Immunization has nearly eliminated poliomyelitis from the developed world.

3.5 Diphtheria

A major child killer in the past in temperate countries, diphtheria has been virtually eliminated over the past 30 years in these areas through immunization. In the developing world it is the least well documented of the six diseases although it is known that mild cutaneous diphtheria infections commonly occur, thus stimulating natural immunity to the more serious throat infections in which toxins secreted by the bacteria may attack the cardiovascular and nervous systems and frequently prove fatal. As living standards rise, the frequency of skin infection

3.6 Tuberculosis

Tuberculosis is most commonly a disease of adolescents and adults. The total number of tuberculosis deaths in children under the age of five years is not known with precision, but is thought to be some 30 000 annually. Two-thirds of these deaths are attributable to TB meningitis, to which young children are particularly susceptible. Although the protective effect of immunization against TB in older persons is presently an unresolved question, its efficacy in young children has not been put in doubt.

3.7 Social impact

The numbers of cases and deaths do not adequately reflect the misery and suffering caused by these diseases. Also not reflected in these numbers is the real cost in monetary terms to the family and community. Parents may have to forego several days of hard needed income to care for a sick child, or older siblings lose education for the same reason. Children who become disabled require additional care. Although it is difficult to assign a monetary value to a human life; every child who dies represents a sizeable investment for which there is no return. Also, each family desires a certain minimum number of children. Uncertainty about the chances that their children will live often results in larger number of births than really desired.

4. CURRENT STATUS OF THE EXPANDED PROGRAMME ON IMMUNIZATION

In 1977, the Member States of WHO unanimously endorsed the goal of the EPI. All developing countries are currently engaged in efforts to expand their immunization services, although these efforts are of variable effectiveness. For many years, UNICEF has been supporting national immunization programmes by providing needed vaccines, supplies and cold chain equipment. With the advent of the EPI, WHO joined UNICEF in strengthening national programmes, particularly by helping to train national staff in planning and management techniques, by collaborating in the evaluation of national programmes, and by helping to develop improved methods and materials through applied research and development. Over 14 000 senior and mid-level managers have been trained in WHO and UNICEF sponsored courses; over 500 surveys of immunization coverage, over 80 surveys of disease incidence and over 50 comprehensive reviews of national programmes have been conducted; and

The test of programme effectiveness, however, is provided not by descriptions of activities, but by current levels of immunization coverage and by data on the impact of immunization in reducing the morbidity and mortality from the target diseases. Data concerning the first point are summarized in Table 1 which shows that in 1983 coverage for a third dose of DPT vaccine among infants in the developing world was in the order of 30%, falling to 24% for a third dose of polio and to 14% for measles immunization*. While this represents progress since 1974, when essentially no data were available and the coverage for any of the vaccines was estimated to be less than 5%, programme acceleration is required if the 1990 goal is to be reached.

The information systems for reporting the EPI target diseases are less well developed than are the systems for reporting immunization coverage. Most of the actual incidence of these diseases is not being reported and is occurring in developing countries where immunization coverage remains low. Immunization coverage levels are now reaching levels where an impact of the programme should be reflected in decreases in disease incidence, but documentation of this fact at global level will require further strengthening of national, regional and global disease surveillance systems.

Since officially reported cases and deaths are known to represent only a portion of actual occurrence in most developing countries, Table 2 provides estimates of deaths and cases of selected EPI target diseases, based on disease incidence survey data, knowledge of the epidemiology of the diseases in the absence of immunization and estimates of current immunization coverage levels. Not surprisingly, the results closely reflect the population distribution in developing countries, revealing that from a global perspective the major burden of disease preventable through vaccines used in the EPI rests within a few large developing countries.

* The People's Republic of China has not been included in these estimates, as immunization coverage is already high and further programme improvement is not primarily dependent on resources received from the international community.

Table 1

Estimated immunization coverage with DPT, poliomyelitis, measles, BCG, and tetanus vaccines in developing countries (excluding China), ranked by number of infant births, 1982

Country	Total no. of newborns (millions)	Cumulative % of births	Immunization coverage (%)				
			Children under 1 year of age				Pregnant women
			DPT III	Polio III	Measles	BCG	Tetanus
1. India	24.84	27	39	18	0	18	24
2. Indonesia	5.30	33	29*	3	2	55	15
3. Brazil	4.41	38	53	99+	64	61	...
4. Bangladesh	4.21	42	2	2	2	3	1
5. Pakistan	4.11	47	4	4	6	1	1
6. Nigeria	4.07	51	...	...	...	...	...
7. Mexico	2.93	54	23	73	8	25	...
8. Viet Nam	2.18	57	...	...	...	...	...
9. Philippines	1.87	59	51*	44	...	61	...
10. Thailand	1.78	60	53*	33	0	73	30
11. Iran	1.69	62	35	62	46	8	3
12. Turkey	1.60	64	64	69	52	47	...
13. Ethiopia	1.54	66	6	6	7	10	...
14. Egypt	1.51	67	...	...	...	...	...
15. Burma	1.37	69	9	1	0	19	10
16. Zaire	1.34	70	18	18	20	34	...
17. South Africa	1.09	71	...	...	...	...	...
18. Morocco	0.98	73	44	44	...	...	...
19. Rep. of Korea	0.96	74	61	62	5	99+	...
20. Algeria	0.95	75	33	30	17	59	...
21. Tanzania	0.92	76	58	56	82	84	35
22. Sudan	0.89	77	2	4	4	2	1
23. Kenya	0.88	78	...	...	...	...	...
24. Colombia	0.85	78	21	22	22	53	...
25. Afghanistan	0.70	79	5	5	8	10	1
Total	72.97		28	24	9	25	11
All other developing countries	19.20	21	42	23	32	31	10
Grand total	92.17	100	31	24	14	26	11

* Coverage for DPT II is given for those countries using a 2 dose immunization schedule.

... Data not available to WHO/Geneva.

Source: From data routinely provided to EPI/WHO

Table 2

Estimated deaths from vaccine preventable diseases in developing countries (excluding China), ranked by number of infant births, 1983

Country	Estimated number of annual deaths					Estimated number of annual cases	
	Neonatal tetanus[1] (000's)	Measles[2] (000's)	Pertussis[3] (000's)	Total deaths (000's)	Cumulative % of total deaths	Polio[4] (000's)	Cumulative % of polio cases
1. India	298	782	189	1 269	28	107	27
2. Indonesia	71	218	63	352	35	28	35
3. Brazil	28	34	18	80	37	0	35
4. Bangladesh	119	173	69	361	45	22	40
5. Pakistan	132	163	66	361	53	21	46
6. Nigeria	64	171	68	303	60	21	51
7. Mexico	31	57	19	107	62	4	52
8. Vietnam	12	46	19	77	64	11	55
9. Philippines	12	39	12	83	65	6	56
10. Thailand	10	57	11	78	67	6	58
11. Iran	17	19	9	45	68	3	59
12. Turkey	8	16	5	29	69	3	59
13. Ethiopia	16	60	25	101	71	8	61
14. Egypt	16	32	13	61	72	8	63
15. Burma	20	43	16	79	74	7	65
16. Zaire	21	45	19	85	76	6	68
17. South Africa	11	25	14	60	77	6	69
18. Morocco	10	21	5	36	78	3	70
19. Rep. of Korea	5	10	2	17	78	2	70
20. Algeria	10	25	8	43	79	4	71
21. Tanzania	6	7	6	19	80	2	72
22. Sudan	8	36	15	59	81	4	73
23. Kenya	9	37	15	61	82	5	74
24. Colombia	9	14	6	29	83	4	75
25. Afghanistan	11	27	11	49	84	4	76
Total	954	2 187	703	3 844	84	295	76
All other developing countries	181	411	139	731	16	96	24
Grand total	1 135	2 598	842	4 575	100	391	100

1. Based on survey data or in the absence of survey data, neonatal tetanus deaths are estimated from countries with similar socio-economic conditions.

2. Based on immunization coverage data (Table 1), assuming vaccine efficacy of 95% and that 90% of unimmunized children will acquire measles. Coverage is assumed to be zero in countries from which data are not available.

3. Based on immunization coverage data (Table 1) assuming vaccine efficacy of 80% and that 80% of unimmunized children will acquire pertussis. Coverage is assumed to be zero in countries from which data are not available.

4. In view of narrow limits of variation of results of poliomyelitis surveys, a fixed

5. PROBLEMS OF PROGRAMME IMPLEMENTATION

The continuing death and disability from vaccine preventable diseases in the developing world results from two fundamental causes: lack of sufficient political will to furnish the financial and human resources required, and lack of management skills to translate resources into results.

Political will is, of course, fundamental to the success of any programme, and should extend from international to national to community level. With respect to immunization services, efforts have been made to emphasize to health leaders attending meetings of WHO Regional Committees and the World Health Assembly, through progress reports and resolutions the importance of immunization as an essential component of maternal and child health and of primary health care. Immunization is regarded as an essential element of WHO's strategy to achieve health for all by the year 2000. UNICEF, in particular through its State of the World's Children reports of the past two years, has emphasized the importance of immunization among other immediately applicable measures to reduce infant mortality. Nevertheless, in few developing countries at present has a level of political commitment been made which will assure that universal access to immunization services will be achieved by 1990 or which will assure that communities will be sufficiently informed and educated so as to make effective use of the services which are provided.

Immunization is one of the most cost-effective measures to reduce childhood mortality. This in itself provides a powerful justification to provide the necessary financial resources. Furthermore the resources required are not large. WHO estimates that it costs US$ 5.00-15.00 to fully immunize a child, and as infants generally comprise 4% or less of the population, a national immunization programme could be fully implemented for an investment of approximately US$ 0.20-0.60 per capita. Some 80% of these costs will be borne by the developing country itself, as they largely represent the salaries of staff and operating costs. The items most readily supplied by the international community, comprising vaccines, vaccination supplies, cold chain equipment, vehicles and training, account for 20% or less of the costs.

Even if modest, however, such costs do pose problems. Although immunization services for children and mothers are affordable within the national resources of all but a handful of the world's poorest countries, most national health budgets are typically consumed by the operating expenses of hospitals and the purchase of drugs which benefit only a small proportion of

the total population. It has proved difficult to increase the support available for immunization and other preventive services by decreasing the current investments in curative services. Rather, increases have been sought by increasing the proportion of newly available resources allocated to prevention. The current world economic situation has not facilitated the growth of resources, however.

Other financial problems include the fact that senior government health staff are often salaried at levels which require they hold other jobs, adversely affecting their performance. National health administrations typically use budget and finance procedures which make it difficult to make small emergency purchases of needed items, and which result in long delays in payment of travel allowances and out of pocket expenses. Even with financing available, some commodities may not be available, particularly in rural areas, and these may include fuel, spare parts and maintenance and repair services for vehicles and cold chain equipment.

Providing the required human resources may pose a more difficult challenge to political will than providing financial resources. Capable health staff are in short supply throughout most of the developing world, and these shortages are compounded by weaknesses in training programmes, poor supervisory practices and high staff turn-over rates. Solutions in the short run must focus on existing staff, supplementing their knowledge and skills through short, practical training courses and improving their performance through better monitoring and supervision. For the long-term the aim should be to establish permanent delivery systems which are able to address priority health problems. This calls for improving institutional training of new staff and in improving the personnel systems in which they are to work.

Constraints with respect to human resources mean that most developing countries have limited capacities to absorb new resources from outside donors. Unless matched by improvements in the numbers of available health staff and improvements in their performance, donated vaccines may spoil before use and donated refrigerators may fail within weeks because of lack of maintenance and repair.

The weakness of the health infrastructure in developing countries results not only in limited absorbtive capacity, but also limits the access of the users. There are too few health service delivery points, and the problem is compounded by staff who make too little use of the resources at their

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disposition. Building additional health centres will take time and money, but some increase in access can be offered immediately if staff will leave the existing centres to visit outlying communities on a weekly or monthly basis offering a limited range of high priority services, including immunization. But increases in coverage can also be expected even without establishing additional delivery points. Coverage with a third dose of DPT of 30% suggests that coverage with the first dose must be on the order of 50%. Better management alone should have a substantial effect on raising coverage for the third dose.

An important part of better management should involve improving the integration of immunization with other health services and improving the involvement of communities.

Immunization will have most impact when provided with other services addressing problems of infection and malnutrition which account for a high proportion of morbidity and mortality in the developing world. Oral rehydration therapy, malaria treatment and prophylaxis, and counselling with respect to nurrition during pregnancy, breast-feeding, weaning, child spacing, clean water and sanitation are examples of such services. Each acts in synergy with the others, and the availability of each helps promote the utilization of the health services and helps to improve coverage. Health managers need to appreciate the importance of providing such services together and to receive the training and supplies to make this possible.

There are few developing countries where members of the community are being involved as full partners in the development of health services. Dialogue with the community is needed to establish a mix of services which best responds to community needs and to assure that services are provided in ways which are as convenient as resources will permit. It is also required if the community itself is to be expected to contribute its own resources for services. The high drop-out rates between the first and third doses of DPT and poliomyelitis vaccines bear witness to the fact that the mother has not understood the importance of returning and/or has been discouraged by the long waiting times or other inconveniences experienced during her first visit. Dialogue requires time and patience, however, and these are frequently in short supply to hard pressed health staff. Remedies will need to be sought in part through the development of an effective communications strategy, involving health and other sectors, through which communities can be engaged in improving the convenience and utilization of immunization and other primary health care services.

The Director-General of WHO presented a progress and evaluation report on the EPI to the World Health Assembly in 1982. In its resolution relating to the report (Annex 1), the Assembly warned that programme progress would have to be accelerated to meet the 1990 goal and, toward that end, urged Member States to take action on a five-point programme. This action programme represents a summary of the issues discussed above and will constitute the basis for a followup report from the Director-General in 1986.

ANNEX 1

THIRTY-FIFTH WORLD HEALTH ASSEMBLY

WHA35.31

14 May 1982

EXPANDED PROGRAMME ON IMMUNIZATION

The Thirty-fifth World Health Assembly,

Noting the report of the Director-General[1] on the Expanded Programme on Immunization and the Executive Board's discussion on the report;

Noting further the five-point action programme contained in the Director-General's report calling for the promotion of the Expanded Programme on Immunization within the context of primary health care, the investment of adequate human and financial resources in the Expanded Programme, the continuous evaluation and adaptation of immunization programmes, and the pursuit of appropriate research;

1. RECOGNIZES that the goal of the Expanded Programme on Immunization, to provide immunization for all children of the world by 1990, is an essential element of WHO's strategy to attain health for all by the year 2000;

2. WARNS that progress will have to be accelerated if this goal is to be met;

3. URGES Member States to take action on the five-point programme annexed to this resolution;[2]

4. EXPRESSES warm appreciation to national agencies and individuals, the United Nations Children's Fund, the United Nations Development Programme, the World Bank and other international organizations whose collaboration has contributed so much to the success of the programme so far;

5. URGES Member States and international organizations that are in a position to do so to commit long-term support to countries unable fully to underwrite the costs involved in complete immunization of their infant populations;

6. URGES Member States to collaborate, especially through technical cooperation among developing countries, in all programme aspects in order to accelerate the achievement of the objectives of the Expanded Programme and in the continuous evaluation of the progress of the programme through appropriate information support;

7. REQUESTS the Director-General:

(1) to intensify collaboration with Member States to increase the effectiveness of national immunization programmes;

(2) to promote dissemination of the results of significant research findings and programme developments;

(3) to continue to keep the Health Assembly informed of the progress of the programme as required.

Fourteenth plenary meeting, 14 May 1982
A35/VR/14

[1] Document A35/9.

ANNEX

FIVE-POINT ACTION PROGRAMME

(1) Promote EPI within the context of primary health care:

- develop mechanisms to enable the community to participate as an active partner in programme planning, implementation and evaluation, providing the technical and logistical resources to support these functions; and

- deliver immunization services with other health services, particularly those directed towards mothers and children, so that they are mutually supportive.

(2) Invest adequate human resources in EPI: Lack of these resources in general and lack of management skills in particular represent the programme's most severe constraints. Capable senior and middle-level managers must be designated and given authority and responsibility to carry out their tasks. They require training, not only to be effective with respect to EPI, but also to contribute to the understanding and strengthening of the primary health care approach. Reasons for low motivation and performance in the areas of field supervision and management need to be identified in order that appropriate measures can be taken to encourage managers to visit, train, motivate and monitor the performance of those for whom they are responsible.

(3) Invest adequate financial resources in EPI: For the programme to expand to reach its targets, current levels of investment in EPI, estimated now at US$ 72 million per year, must be doubled by 1983 and doubled again by 1990 when a total of some US$ 300 million (at 1980 value) will be required annually. Over two-thirds of these amounts must come from within the developing countries themselves, the remaining one-third from the international community.

(4) Ensure that programmes are continuously evaluated and adapted so as to achieve high immunization coverage and maximum reduction in target-disease deaths and cases: Such adaptation depends on the development of adequate information and evaluation systems. By the end of 1985 at the latest, each country should be able to:

- estimate reliably immunization coverage of children by the age of 12 months with vaccines included in the national programme;

- obtain timely and representative reports on the incidence of EPI target diseases included within the national programme; and

- obtain information on the quality of vaccine so that it is known that the vaccines employed for EPI meet WHO requirements and are potent at the time of use.

In addition, countries should promote the use of periodic programme reviews by multidisciplinary teams comprised of national and outside staff to ensure that operational problems are identified and that a wide range of experience is reflected in the recommendations which are made.

(5) Pursue research efforts as part of programme operations: The objectives should be to improve the effectiveness of immunization services while reducing their costs and to ensure the adequate supply and quality of vaccines. Specific concerns include the development of approaches for delivering services which engage the full support of the community, the improvement of methods and materials relating to sterilization and the cold chain, the acquisition of additional knowledge concerning the epidemiology of the target diseases,

WORKING PAPER

Bellagio Conference, 13-15 March 1984

PROVIDING IMMUNIZATION: THE STATE OF THE ART

Expanded Programme on Immunization
WHO/Geneva

Contents

1. EXECUTIVE SUMMARY

The basic materials and methods are available for providing immunization against diphtheria, pertussis, tetanus, tuberculosis, measles and poliomyelitis for all children of the world.

Five vaccines (DPT, BCG, measles, polio and tetanus toxoid) are currently being used in the Expanded Programme on Immunization (EPI). They may be delivered through a mix of strategies based on fixed health facilities, on outreach clinics which depend on the fixed facilities and on mobile teams. Many variations with respect to delivery strategies are possible and appropriate, so long as they are properly evaluated and meet the criteria of epidemiologic relevance, technical validity and affordability.

The supply of vaccines used in the EPI which meet WHO standards is adequate to meet world needs, provided that producers can be given sufficient lead times on orders. With international help, most of the large developing countries are strengthening their own vaccine quality control and production capacities.

Improvements in materials and methods for transporting and storing vaccines at correct temperatures from the point of manufacture to the point of use now make it possible to maintain an unbroken "cold chain" to reach more than 95% of the world's children, although application of the available knowledge remains unsatisfactory. Improving current sterilization techniques for needles and syringes is an urgent priority for health services in the developing world.

Much remains to be done to make communities full partners in the planning, implementation and evaluation of immunization and other primary health care services. This is evidenced by low coverage rates seen in many programmes for infants receiving BCG or a first dose of DPT and polio vaccines and by the high "drop-out rates" seen between infants receiving a first dose of DPT and polio and those receiving a third dose. Effective community involvement is a fundamental strategy for the development of primary health care as a whole.

A rich array of training materials has been developed during the past 7 years to help strengthen national immunization programmes, and WHO and UNICEF have sponsored courses using these materials in which over 14 000 health staff have been trained to date.

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Although the methods for monitoring and evaluating immunization programmes have been well defined, they are far from being fully applied. Routine systems for recording immunization coverage and the incidence of the target diseases remain weak at national level and are being supplemented by special surveys and/or by sentinel reporting systems. Comprehensive programme reviews are being used in programmes having several years experience in expanding their services to provide an overview of major problems and to recommend solutions.

Research and development efforts have concentrated on the following areas: improving the cold chain, simplifying survey techniques, clarifying the epidemiology of the target diseases, simplifying immunization schedules and improving the understanding of programme costs.

The simplicity of immunization services and the ease with which success or failure of an immunization programme can be documented make immunization an excellent building block for the development of the health care delivery system.

The cost per fully immunized child is estimated to be within the range of US$ 5.00-15.00. Some 80% of these costs will normally be expected to come from within the budgets of the developing countries themselves. Existing studies indicate that immunization is highly cost-beneficial.

2. INTRODUCTION

This paper reviews current information concerning the vaccines being used in the EPI and the materials and methods for transporting, storing and administering them, and describes the management tools at hand to transform these materials and methods into effective national immunization programmes. It concludes with a brief summary of information on programme costs.

3. THE VACCINES

Five vaccines provide the foundation for the EPI. Four have their primary use in children: DPT (a combined vaccine providing protection against diphtheria, pertussis and tetanus); BCG (a vaccine providing protection against tuberculosis), measles and polio. Polio vaccine is available in two different forms - a vaccine containing live virus which is administered by

mouth, and an inactivated vaccine which is given by injection. The inactivated vaccine can be combined with DPT as DPT-polio vaccine. Tetanus toxoid is usually used in adults, and its importance in the EPI lies in its protection of pregnant women which, in turn, confers protection to their newborns from tetanus.

The characteristics of these vaccines with respect to the number of doses required, the age at which immunization may begin, the route of administration and their stability set the parameters for the delivery systems in which they are to be used (1) (Table 1).

The number of doses required ranges from 1 for measles and BCG vaccine to 3 for DPT and oral poliomyelitis vaccines. Immunization may be given at birth for BCG vaccine, but is deferred until later for the other vaccines. The extreme case is measles, where antibodies from the mother last long enough to interfere with the vaccine until the age of 9-12 months. All vaccines except the oral poliomyelitis vaccine are given by injection. BCG requires a special injection technique so as to place the vaccine between the layers of the skin. Stability ranges from oral polio vaccine, which can withstand only about a day at 37°C, to tetanus toxoid, which can withstand about 2 months at 37°C. All these vaccines may be stored at a refrigerator temperature (4-8°C) for at least one year.

Many other vaccines exist, and are in use to a variable extent in immunization programmes in developing countries. Some of the more common are cholera, typhoid, meningococcal meningitis and yellow fever vaccines. These have not yet been included in the global EPI either because of their restricted geographic relevance and/or because of less certainty concerning their cost-effectiveness when used on a broad scale. The establishment of effective vaccine delivery systems based on the EPI vaccines will, however, facilitate the choice by developing countries to include additional vaccines, an option which will become increasingly attractive as new or improved products are made available through research and development efforts.

4. IMMUNIZATION SCHEDULES

No immunization schedule is ideal. Each represents a compromise between providing adequate immunity and immunizing before disease strikes. In order to achieve an optimal immune response, immunization should be given later rather than earlier in life, and if multiple doses are involved, with

Table 1

Characteristics of vaccines included in the Expanded Programme on Immunization

Vaccine	Number of doses	Timing of doses	Route of administration	Stability at 37°C
Measles	1	From 9 months where measles remains a problem for infants; from 12-15 months elsewhere.	Subcutaneous injection	Approximately 1 week
BCG	1	From birth.	Intradermal injection	Approximately 1 week
DPT	3	From 6 weeks of age, at intervals of 4 weeks. Two doses may suffice if a high potency vaccine is given at 4-6 month intervals. An additional dose is frequently given during the second year of life.	Intramuscular injection	Approximately 1 week
Oral polio	3	From 6 weeks of age, at intervals of 4 weeks. An additional dose is frequently given during the second year of life. The impact of immunization at birth needs further evaluation.	Oral	Approximately 1 day
Inactivated polio	2	From 3 months of age, at intervals of 4-6 months. The effects of a single dose, an earlier starting age and shorter intervals between doses are being evaluated.	Subcutaneous injection. May be combined with DPT	Approximately 1 week
Tetanus toxoid	2	For use in prevention of neonatal tetanus, first dose at first contact with susceptible woman, second dose 4 weeks later. In previously immunized women, 1 additional dose during pregnancy is sufficient.	Intramuscular injection	Approximately 2 months

months of life, immunization should be started and completed as early as possible. Other factors which may determine the particular immunization schedule selected in a particular area relate to the frequency with which immunization services can be made available and the ages at which the persons to be immunized are most accessible to the health services.

For management purposes, it has been convenient to categorize three methods of providing immunization services: 1) The term "fixed" has been used to describe services provided to persons attending a health facility with permanent staff. In such circumstances immunizations may be provided on a daily, weekly or even a monthly basis. 2) When services are brought from a fixed centre to a site more convenient for the users, they are often termed "outreach" services. They may be on a weekly, monthly or even two to three monthly basis, but ideally they are regularly scheduled and are held at the same site each time. It is most common for immunization to be provided as one among several services in such outreach clinics. The staff providing outreach services are based in a fixed health facility, generally within a few hours travel from the outreach clinics. 3) The term "mobile" describes services provided at relatively infrequent intervals (two to six months). A semi-independent health team operates which may have access to a home base only on a weekly or monthly basis. The number of health services provided may be limited by the amount of time the team can spend in each village visited.

Where resources permit, fixed health facilities located conveniently for the users and providing services on a continuous basis are preferred. This is the setting in which immunization can be best integrated with other primary health care services, particularly those relevant for mothers and children. Coverage is expected to be high, as a visit to obtain any service presents an opportunity to provide the others. The effectiveness of all services is expected to be increased, as they can act in synergy to help break the cycle of infection and malnutrition which accounts for so much of the disability and death among children in the developing world. But it will be many years in some areas before enough health staff and enough physical facilities will exist to permit this, and both outreach and mobile services will be needed in the interim.

The vaccines used in the EPI may be safely and effectively given together during the same visit. In the setting of a fixed facility, a child might receive a BCG immunization at birth; first, second and third DPT and oral polio immunizations at 6 weeks, 10 weeks and 14 weeks respectively; and a

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measles immunization at 9 months. In an outreach setting, the number of immunization contacts might be reduced from five to three, giving BCG along with the first dose of DPT and polio at 3 months of age, giving the second DPT and polio at 6 months of age, and the third, along with a measles immunization, at 9 months of age. A mobile team might have only two contacts with the population per year, and, on average, would be giving children BCG and a first dose of DPT and polio at around the age of 3 months, and would be giving them measles, and a second dose of DPT and polio on their return 6 months later. It is in settings where contact of health staff with the population is extremely limited where the use of a two dose schedule with DPT and inactivated poliomyelitis vaccines has attracted particular interest.

There are many variations on the above schemes, as there should be, so long as they are properly evaluated and meet the criteria of epidemiologic relevance and technical validity.

5. VACCINE PRODUCTION AND QUALITY CONTROL

Several industrialized and developing countries produce one or more of the vaccines used in the EPI, and their capacities to meet the global programme needs are judged to be sufficient, particularly if an 18-24 month lead time on orders is provided. Many developing countries are in the process of strengthening their vaccine production capacities, often with help from WHO, UNICEF and UNDP in conjunction with that offered through bilateral donors. International experience suggests the rule of thumb that national vaccine production may become cost-effective only when the national population exceeds 20 million persons. In 1982, 23 developing countries had populations of this size, and 15 of these are producing one or more of the EPI vaccines (Table 2).

WHO has published requirements for the quality of each of the vaccines used in the EPI (2) and, thanks to the good offices of a number of collaborating laboratories, can respond to requests from Member States to confirm that a vaccine being used conforms to these requirements or to test the potency of vaccines if questions have arisen concerning their transport or storage.

Table 2

Production of vaccines included in the EPI in developing countries with a population above 20 million

Country	1982 Population (in millions)	Vaccines[1]				
		BCG	DPT	TT/DT	Polio	Measles
China	1 045	+	+	+	+	+
India	714	+	+	+	+[2]	-
Indonesia	151	+	+	+	+[2]	-
Brazil	128	+	+	+	-	-
Bangladesh	93	-	-	-	-	-
Pakistan	93	-	-	-	+[2]	-
Nigeria	82	-	-	-	-	-
Mexico	71	+	+	+	+	+
Viet Nam	56	+	+	+	+	-
Philippines	51	+	-	+	-	-
Thailand	50	+	+	+	-	-
Turkey	48	+	+	+	-	-
Egypt	45	+	+	+	+[2]	-
Iran	40	+	+	+	+	+
Republic of Korea	39	+	+	+	-	+
Burma	37	-	-	+	-	-
Ethiopia	31	-	-	-	-	-
Zaire	30	-	-	-	-	-
South Africa	30	...	...	...	...	...
Argentina	29	+	-	+	-	-
Colombia	26	-	-	+	-	-
Morocco	22	-	-	-	-	-
Algeria	20	-	-	-	-	-

1 + Vaccine produced in the country
- Vaccine not produced in the country
... Information not available to WHO/Geneva

2 Produced from imported bulk vaccine

UNICEF is currently the principal supplier of vaccines for the EPI. In 1983, it supplied over 35 million doses each of DPT, BCG and tetanus toxoid, over 24 million doses of oral polio vaccine and over 22 million doses of measles to immunization programmes in the developing world at a cost of some US$ 5 million. WHO screens all EPI vaccines purchased by WHO and UNICEF to assure they meet WHO requirements, and these requirements are also applied to vaccines donated to either Organization.

In the Region of the Americas a "revolving fund" is successfully operating which, through centralized purchase, ensures lowest prices and use of approved vaccine. Payment in local currency reduces the economic burden in many countries

Only a small number of developing countries are known to be using EPI vaccines which do not conform to WHO requirements, and in all of them, work is underway with the hope of remedying this situation before 1990.

6. COLD CHAIN AND LOGISTICS

An effective cold chain and logistics system is required to move vaccines and other materials from the point of their manufacture to the point of use, to assure that they arrive in satisfactory condition and to assure that quantities are adequate to support the uninterrupted provision of services.

Considerable progress has been made, but considerable problems still exist. Refrigeration poses major challenges in areas with less than eight hours electricity per day. Spare parts are available only in very limited quantities; repair and maintenance facilities are largely inadequate.

Mainly as the result of joint WHO-UNICEF efforts during the past five years, a new generation of equipment for storing and transporting vaccines has been developed, and management techniques for forecasting supply requirements and for monitoring the transport and use of supplies as they move down the chain have been substantially improved. Developments include:

- the joint publication by WHO and UNICEF of Product Information Sheets which provide data, test results and purchasing information on suitable refrigeration equipment and accessories such as thermometers, voltage regulators and alarm systems;

- the widespread introduction of unbreakable thermometers, costing less than US$ 1, for monitoring vaccine temperatures at the health centre;

- the development of portable vaccine carriers with a two-day cold life and sufficient volume to meet the requirements of an outreach immunization session;

- the development of cold boxes weighing 20kg and capable of transporting

- the development of an efficient health centre refrigerator which can run on electricity, gas or kerosene and hold a month's supply of vaccine for a population of up to 100 000 people;

- the development of a refrigerator with a special ice lining which can keep vaccines at the proper temperatures with only eight hours of electricity per day;

- the inventory of cold chain equipment currently existing in developing countries, leading in turn to the development of a "universal spare parts kit" which enables a technician to carry out most of the normal repair work required by 200 freezers or refrigerators over the period of a year, leading in turn to the development of tool kits and training materials for the routine maintenance of equipment as well as for its repair;

- the introduction, with each 5000 doses of BCG, DPT, measles or polio vaccines shipped by WHO or UNICEF, of a non-reversible chemical indicator showing the temperature history of a vaccine shipment as it passes down the cold chain;

These developments make it possible in principle to bring potent vaccines to more than 95% of the world's children, but application of the available knowledge remains unsatisfactory. Additional work in progress will further simplify equipment problems and includes improving the performance of kerosene refrigerators which must rely on low grade or polluted fuel and a programme, carried out in part in collaboration with the Centers for Disease Control and the National Space and Aeronautics Administration (NASA) of the United States, to develop and test solar powered refrigerators. Also under development is a potency indicator which can be applied to individual vials of measles vaccine.

There is one area, however, in which existing materials remain unsatisfactory, and that relates to the sterilization of needles and syringes. It is not uncommon for an immunization session attended by 30 or more children to be provided with only a few syringes; the needles sometimes being changed for each child and sometimes not. In addition, the syringes and needles are often not adequately sterilized. Disposable syringes are in use in some areas, but they are often re-used, receiving unsatisfactory sterilization. If they are discarded, they may find their way into the hands of unqualified practitioners.

Newly developed syringes using special plastics which can withstand 200 or more sterilizations, are now being field tested along with specially modified pressure cookers for sterilization. Although the cost of the syringes (about US$ 0.60) is presently double that of an equivalent glass syringe, their working life is estimated to be over 4 times longer.

It is hoped that these developments will permit sterilization practices to improve. This is relevant beyond the field of immunization. To the long-term concern of the transmission of infections such as hepatitis B by contaminated syringes and needles has been added the recent worries about the Acquired Immune Deficiency Syndrome (AIDS).

7. TRAINING AND SUPERVISION

Prior to 1977, few training materials relating to the management of immunization programmes were available, and little such training was occurring in the developing world. In that year, with the help of the Centers for Disease Control (USA) a course on planning and management for senior level national staff was developed by WHO using an educational method which has served as a basic model for a number of courses which have been developed since. The course emphasis is on the learning of management skills applicable to all primary health care activities. The basic modules cover National Priorities, Disease Estimates, Regional Priorities, Programme Targets, and Surveillance. In addition, other modules covering specific technical skills related to immunization, the cold chain, and control of diarrhoeal diseases are included in order that the senior level participants may be better equipped to train and supervise those carrying out these specific technical tasks.

Subsequent to this senior level course, a course for mid-level managers was developed, again with the help of the Centers for Disease Control. While a major objective of the senior course is to permit national programme managers to plan adequate programmes, the objective of the mid-level course is to teach practical skills, and to teach participants to teach those skills to those they supervise. The course comprises nine modules, entitled: Allocate Resources, Manage the Cold Chain System, Conduct Vaccination Sessions, Evaluate Vaccination Coverage, Supervise Performance, Provide Training, Conduct Disease Surveillance, Ensure Public Participation, and Record the Child's Growth. They may be presented individually or in any combination

based on the local requirements. Similar materials have been developed for teaching supervisory skills involved in the Control of Diarrhoeal Diseases and these are being combined with the EPI materials as a first step in providing integrated PHC training at the national implementation levels.

During 1984, training materials for teaching immunization skills to peripheral level health workers will be finalized. Their main emphasis is on practical demonstrations and exercises. The materials contain an introduction for teachers and guidelines on planning a course or a workshop. Topics covered include: immunity and vaccines; when to give vaccines to children; syringes, needles, and sterility; cleaning and sterilizing immunization instruments; how to give vaccines to children; preparing for an immunization session; how to conduct an immunization session; and health education in an immunization programme.

Three other courses have also been developed:

- Logistics and cold chain for primary health care: this course represents a first attempt to apply sound management to the essential supplies and equipment component of primary health care and it presently deals with five activities: malaria control, diarrhoeal disease control, immunization, maternal and child health and essential drugs. The course is directed toward the development of skills required to estimate the demand for supplies, to ensure proper storage, and to plan and carry out rational distribution.

- Course for refrigerator maintenance: this course provides training for all health personnel who use a refrigerator, teaching them how to maintain the equipment and how to carry out small repairs with basic tools. It is a practical course with participants working in pairs with one refrigerator and a toolkit, supervised by course facilitators.

- Course for repair technicians - compression refrigerators: this is a specialized technical course for those responsible for major repairs to electric compression refrigerators, usually technical personnel working at the national or regional level. It represents vocational training designed for those countries where such training does not exist and where expertise is available only in the private sector.

By the end of 1983, over 14 000 health staff had been trained in WHO and UNICEF sponsored courses utilizing these materials, and a similar number of staff had been trained in nationally sponsored courses and workshops. Work continues to adapt these materials to specific national and local needs, and to introduce them into the curricula of institutions training health staff.

8. COMMUNITY INVOLVEMENT

Community involvement remains more a slogan than a reality for the majority of immunization programmes, and much remains to be done in this area. The best laid immunization strategies will go awry if the public motivation to use the services is not at the base of the system. The lack of community involvement and motivation can reveal itself both through low coverage with BCG or the first dose of DPT and polio vaccines and through high "drop-out rates" between infants receiving a first dose of DPT/polio and those receiving three doses. It is not uncommon for drop-out rates to reach 50-75%. To address these problems health workers must understand that the time and the place the services are provided must be adapted to the needs and desires of the community. The community as a whole must also understand the importance of the services being provided, and be convinced to alter attitudes and behaviours so as to promote the utilization of these services by mothers and children.

The participation of communities as active partners in planning, implementation and evaluation is crucial for the success of immunization programmes, and is a fundamental strategy for the development of primary health care as a whole. Yet community involvement at the local level, and the success of "social marketing" approaches at national level require that the health services have the capacity to make an adequate response to the demands which these actions generate. Unless the logistic support has been well planned, users may respond to appeals through community leaders or the mass media only to find long waiting lines and no vaccines at the clinics which are supposed to be providing services. School teachers, religious leaders and other opinion leaders of the community need to be involved so as to encourage a full utilization of immunization and other primary health care services. Investments in these areas, however, will need to go hand in hand with investments in training and supervision of the health staff.

9. PROGRAMME MONITORING AND EVALUATION

Information provided through monitoring and evaluation activities provides the basis for programme management. Although the methods for monitoring and evaluating immunization programmes have been well defined, they are far from fully applied. Three basic techniques are in widespread use. The first involves the collection, analysis and use of routine data to monitor 1) the quality of vaccines, 2) immunization coverage as estimated from reports of vaccines administered and 3) the occurrence of the target diseases. The second involves special assessments of these factors. The third involves periodic comprehensive review of individual national programmes.

The routine data have their primary use within national programmes. They are transmitted by most countries twice yearly to the WHO Regional Offices, who in turn transmit it to WHO/Geneva. Table 1 summarizes selected information available at global level from the routine reporting system.

Special assessments of vaccine potency at the time of use are needed to supplement the routine reports concerning vaccine quality at the time of production. This is generally accomplished through monitoring of the cold chain, it being assumed that if the cold chain is satisfactory, the vaccines will remain potent until their expiry dates. In special circumstances this is accomplished through testing of vaccine samples obtained from peripheral health units. The occurrence of cases in 10% or more of vaccinees is a sign that vaccine storage, transport and administration procedures need review.

Special assessments of immunization coverage are also needed, although routine reports of immunization coverage are improving in quality in most developing countries. In many urban areas, routine reports systematically underestimate actual immunization coverage as they do not include complete information from all health institutions and private practitioners. These may account for up to half of the total immunizations. Fortunately, a simple technique for conducting sample surveys for immunization coverage has been developed (3) which permits checks to be made on the routine data, and these surveys have come into widespread use since 1977.

Table 3.

Number of countries or areas known to be involved in selected immunization activities, by WHO Region, as of 31 December 1983

	Africa	Americas	South-East Asia	Europe	Eastern Mediterranean	Western Pacific
Number of countries or areas in the region	46	47	11	37	24	32
1. Vaccines included in national immunization schedules:						
- BCG	46 (100%)	43 (92%)	11 (100%)	27 (73%)	24 (100%)	30 (94%)
- DPT	46 (100%)	47 (100%)	11 (100%)	34 (92%)	24 (100%)	32 (100%)
- Measles	44 (96%)	44 (94%)	7 (64%)	35 (95%)	24 (100%)	30 (94%)
- Poliomyelitis	45 (98%)	47 (100%)	10 (91%)	37 (100%)	24 (100%)	32 (100%)
- Tetanus for women of childbearing age	44 (96%)	45 (96%)	9 (82%)	1 (3%)	24 (100%)	30 (94%)
2. Reporting to WHO:						
- Total number of immunizations	27 (59%)	47 (100%)	10 (91%)	1 (3%)	22 (92%)	28 (88%)
- Immunization by age or dose	12 (22%)	29 (62%)	10 (91%)	1 (3%)	22 (92%)	21 (66%)
3. Reporting to WHO the 1982 incidence of:						
- Diphtheria	24 (52%)	32 (68%)	9 (82%)	3 (8%)	16 (66%)	30 (94%)
- Measles	33 (72%)	41 (87%)	10 (91%)	3 (8%)	16 (66%)	28 (88%)
- Pertussis	28 (61%)	33 (70%)	10 (91%)	4 (11%)	16 (66%)	29 (91%)
- Poliomyelitis	24 (52%)	32 (68%)	10 (91%)	3 (8%)	16 (66%)	27 (84%)
- Tetanus	22 (48%)	32 (68%)	10 (91%)	3 (8%)	16 (66%)	29 (91%)
- Tuberculosis	30 (65%)	1 (2%)	9 (82%)	2 (5%)	17 (70%)	28 (88%)
- All of the above	15 (33%)	1 (2%)	9 (82%)	1 (3%)	16 (66%)	24 (75%)
- Neonatal tetanus	9 (20%)	22 (47%)	5 (46%)	1 (3%)	9 (38%)	1 (3%)
4. Coverage surveys	28 (61%)	7 (15%)	7 (64%)	4 (11%)	12 (50%)	11 (34%)
5. Staff participating in:						
- EPI planning and management course	41 (89%)	30 (64%)	9 (82%)	8 (22%)	17 (71%)	23 (72%)
- EPI mid-level management course	33 (72%)	30 (64%)	10 (91%)	2 (5%)	6 (24%)	10 (31%)
- EPI cold chain course	13 (28%)	21 (45%)	10 (91%)	1 (3%)	8 (32%)	8 (25%)
6. Organization of EPI national mid-level management course	29 (63%)	39 (83%)	9 (82%)	2 (5%)	5 (21%)	15 (47%)
7. Incorporating EPI training materials in national training curricula	10 (22%)	7 (15%)	9 (82%)	4 (11%)	3 (12%)	8 (25%)
8. Programme reviews	17 (37%)	15 (32%)	5 (46%)	1 (3%)	9 (38%)	4 (12%)

Routine reports of disease incidence rates are not currently a very satisfactory method of assessing actual disease incidence rates, and the use of special assessment techniques, including the use of "sentinel" reporting sites and disease incidence surveys will be needed to follow trends during the current decade. From a comparison of data obtained from 13 surveys of the incidence rate of neonatal tetanus and 13 surveys of the incidence rate of poliomyelitis in developing countries with the officially reported data (4), it was estimated that less than 5% of neonatal tetanus cases were currently being reported, and less than one quarter of the cases of poliomyelitis.

The third technique mentioned, periodic comprehensive national programme review, is now being carried out in countries having several year's experience in expanding their immunization coverage. These intensive reviews supplement the routine monitoring systems, bring programme needs and weaknesses to the attention of national decision makers for remedial action, and provide a basis for examining the validity of programme objectives, targets and strategies. Although originally evaluating just the technical, operational and managerial aspects of EPI, these reviews are currently being broadened to cover other primary health care activities integrated with the delivery of immunizations. The impact of such reviews will be strengthened by the composition of the teams carrying out the evaluation: national health staff from within the country as well as from neighbouring countries, international staff from collaborating agencies and governments, and representatives from the public actually using the services.

10. RESEARCH AND DEVELOPMENT

Research and development activities to date have focused on improving programme effectiveness and efficiency. Efforts have been directed toward:

(1) improving the cold chain to ensure potent vaccines reach the periphery;

(2) improving methods of surveillance and programme monitoring;

(3) improving methods of assessing immunization coverage;

(4) clarifying the epidemiology of the target diseases to permit the development of more effective immunization strategies;

(5) exploring the use of alternative immunization schedules to decrease the frequency of clinic visits;

(6) estimating programme costs.

The biotechnology revolution and its implications for the development of new vaccines is discussed in an accompanying paper authored by Prof. G. Nossal.

11. HEALTH INFRASTRUCTURE DEVELOPMENT

Improving immunization coverage in developing countries will require improving the health infrastructure, and immunization services themselves can be used as a stimulus to strengthen and extend the existing infrastructure. The programme elements required for successful immunization, including logistical support, training and supervision, community involvement, monitoring and evaluation and research and development, are also required for the delivery of other health services, and these services can build on the systems established for immunization.

When the immunization system is working, the results are apparent to the peripheral health worker and to the community, particularly for highly visible diseases such as measles or poliomyelitis which may fall to low levels soon after the services have been initiated. Success can stimulate communities not yet covered to seek ways of obtaining coverage. But failure of the system is also apparent. A measles or polio epidemic will announce the fact that a significant number of children remain unimmunized or have been immunized with impotent vaccines, and will provide a powerful, if tragic, evaluation of programme performance and stimulus for remedial action.

The simplicity of immunization services and the ease with which the success or failure of an immunization programme can be documented make immunization an excellent building block for the development of the health care delivery system.

12. COSTS

It is estimated that the cost of providing complete immunization coverage to an infant is generally within a range of US$ 5.00-15.00. The variation results from national strategies and conditions but all surveys

indicate that immunization costs are expensive during the development period of the programme, as they cover fixed costs while delivering services to a relatively small percent of the infant population. It will usually require 5-10 years before most countries are able to attain immunization coverage levels in the range of 60-80% when the services tend to become most cost-efficient. Where immunization is being used as an initial service in the establishment of a health infrastructure, costs attributable to immunization, but actually supporting general infrastructure development, may be high. Services added later are likely to require less cost because of the investments already made in the name of immunization.

Table 4

Typical Vaccine Prices - 1983

Vaccine	No. of doses per vial	Price per dose
Oral Poliomyelitis	20	US$ 0.017
Measles	10	US$ 0.069
DPT	20	US$ 0.018
BCG	20	US$ 0.055
TT	20	US$ 0.011

The approximate vaccine cost (including freight and wastage factors) for a fully protected infant is US$ 0.70

Vaccine costs are easy to identify and use as a basis for planning (Table 4), as are costs related to cold chain equipment and injection and sterilization supplies. The operational and capital costs required for immunization delivery vary widely from country to country and are based on many factors:

Salaries of health personnel
Integration of immunization with other health services
Health centre staffing and distribution patterns
Immunization strategies - fixed, outreach, or mobile
Utilization of health services
Coverage with a first dose of DPT and poliomyelitis vaccines
Drop out rates between doses.

Some 80% of the full immunization costs in most developing countries are being covered by national resources (Table 5).

Table 5

Estimated distribution of costs for fully immunized children in the developing world[1]

Category of cost	% of total cost	% of total costs from national sources	% of total costs from external sources
Recurrent:			
Vaccines	14	9	5
Vaccine supplies	8	6	2
Salaries	45	43	2
Training	5	3	2
Cold chain and transport: operating cost	11	8	3
Non recurrent:			
Cold chain and transport: capital cost	17	10	7
Total	100	79	21

1 Based on a review of available EPI costing studies.

Information has not been obtained concerning the investments currently being made by the international community in immunization services, in part because of the difficulties entailed in obtaining the data. It is possible to make some estimates of the current resources, however, working back from estimates of current coverage and costs. Very broadly, current coverage data suggest that some 29 million children in developing countries under the age of 1 year (out of some 90 million eligibles) are receiving a third dose of DPT vaccine. China is excluded from these estimates, as current coverage levels appear to be high, and relatively few external resources will be needed in coming years. If one uses an average cost figure of US$ 10.00 per fully immunized child at present, this implies a total current investment of US$ 10.00 x 29 million children = US$ 290 million. Of this amount, 20% or US$ 58 million is presumed to be coming from the international community.

The above estimates are approximations only, as they are complicated by the fact that children other than those under the age of 1 year are immunization beneficiaries in many countries and that a proportion of the resources invested by the international community for immunization cover staff

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and overhead costs not included in the US$. 10.00 estimate. The estimate of US$ 58 million now being invested annually in immunization services by the international community is in keeping with what is known about a few major contributors. For example, in 1983 WHO invested some US$ 8 million and UNICEF some US$ 24 million. An additional US$ 10-20 million is probably represented by the bilateral contributions of countries such as Denmark, France, Netherlands, Sweden and the United States.

Another aspect of the cost of immunization services has to do with their value with respect to alternative investments which might be made by society. Intuitively, and as reflected by immunization policies in most countries of the world, investing the few dollars required to prevent the death and disability caused by the six diseases currently included in the global immunization programme makes sense. More rigorous analysis becomes complicated, particularly in developing countries where sick children may not be given the opportunity to utilize the medical care facilities they require and where saving the life of a child may not be counted as an economic benefit. In a review of these issues (5), it was concluded that existing studies of immunization services indicate high rates of return, despite the fact that existing studies, particularly in developing countries, probably underestimate the benefits of immunization. Benefit-cost ratios have ranged from 10 to 1 in Finland and the United States for measles immunization (6, 7) to 6 to 1 in Sweden for polio immunization (8) to 3 to 1 in Indonesia for an immunization programme including vaccines against diphtheria, pertussis, tetanus and tuberculosis (9).

In a preliminary study of the cost effectiveness of the immunization programme in the Ivory Coast (10), it was estimated that it cost about US$ 14 to prevent a case of measles and US$ 479 to prevent a measles death. It was also estimated that by preventing measles deaths, the programme represented a cost of US$ 10.40 per year of life added. The authors compared these figures with two preventive measures in current use in the United States. There the cost per death prevented through the use of seat and shoulder belts is approximately US$ 500 000, and the cost per year of life added through the routine treatment of essential hypertension is about US$ 10 000. They concluded the Ivory Coast programme was good value!

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THE BIOTECHNOLOGY REVOLUTION AND NEW VACCINES

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A paper for the Bellagio Meeting to Protect the
World's Children, 12th-16th March, 1984.

Summary

This paper reviews the principles underlying immunization and explains the basis of currently available vaccines. It then describes two new biotechnologies, namely peptide synthesis and genetic engineering, which have the capacity to produce both molecular vaccines and live, attenuated vaccines, of an extraordinary range. It mentions the limitations in the strength of some of the experimental vaccines and research being performed to overcome these.

Examples are then given of some of the vaccines in the research pipeline - such as those against malaria, hepatitis B and a variety of diarrhoeal diseases including typhoid, cholera and bacillary dysentery. It makes brief reference to new ways of using old vaccines, such as an inhaled aerosolized version of the measles vaccine.

The paper espouses the view that the Consultative Group to Protect the World's Children should have a major commitment to research and development from its inception.

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Vaccines are history's most cost-effective public health tool. Yet, curiously, vaccine research has had a distinctly fluctuating character. There was, of course, a first burst in the late eighteenth-early nineteenth century following Jenner's discovery of a smallpox vaccine in 1796. Then came a long gap until Pasteur's work in the late nineteenth century ushered in the first golden age of immunology. By 1930 many of the anti-bacterial vaccines were in place. The third triumphant surge of activity in the early 1950's brought us vaccines against poliomyelitis. Magnificent though these achievements have been, many gaps remain. The vaccines against diarrhoeal diseases such as cholera, typhoid and paratyphoid are only partially effective. B.C.G., for whatever reason, has not controlled tuberculosis in the developing countries. The early, heady enthusiasm about immunological control of most cancers was grossly premature. Worst of all, research has not provided a vaccine against any of the parasitic diseases, such as malaria or schistosomiasis, that wreak such devastation in the tropical countries.

Now, without doubt, we are on the threshold of another major revolution in vaccine research, comparable or even exceeding in its scope the era that began when the poliomyelitis virus was first grown in tissue culture. As then, the developments in the pipeline rest on powerful new technologies provided through fundamental research. New vaccines will alone provide a justification for the resources which have been poured into biotechnology.

The purpose of this brief paper is to communicate at least some of the excitement which is sweeping through academia at the moment about the prospects for new and improved vaccines, and thus to ensure from the outset that the Consultative Group to Protect the World's Children embraces vaccine research into its orbit. As successful vaccines come on stream, crucial decisions will have to be taken

concerning which ones are incorporated into the various immunization programmes. The sooner a capacity to think about these issues develops within the Consultative Group, the better, because some of the new vaccines may be of even greater public health importance than the six presently within the programme's purview.

The paper addresses a variety of vaccine developments in a way that is not too technical. It is designed for the non-scientists at the Bellagio meeting. I beg the indulgence of the scientists and physicians there for the many oversimplifications, which are intentional.

Principles of Successful Immunization

The immune system is nature's way of defending vertebrate species against infectious diseases. Tragic examples of what happens when the immune system fails are seen in various disease states, for example congenital immune deficiency or the curious acquired immune deficiency syndrome (AIDS). The end result is death, usually within less than two years. In the natural situation, the immune system is provoked to form antibodies to foreign organisms which enter the body and multiply within it. Sometimes these antibodies are formed too late, and the patient dies of the infection. On other occasions, the organism concerned has, through evolution, devised clever tricks of evading the host's defences, and a chronic disease like tuberculosis or schistosomiasis results despite the formation of antibodies. Very frequently, however, the antibodies both vanquish the first infection, and leave the patient immune against that particular disease for long periods or even for life.

3.

The key principle which unites all forms of successful immunization is to devise a way in which the formation of antibodies and other cellular processes contributing to immunity can be provoked without the person or animal concerned having to run the gamut of an actual infection. In the best cases, this leaves a specific immunity just as good as that enjoyed by a recovered patient. With some other vaccines, the protection is less perfect but still substantial, so the risk of getting the relevant infection is much reduced and the disease itself less severe in those cases that do come down with it. The reason that immunization can work is that the cells which make antibodies, white blood cells called lymphocytes, need not interact with living, virulent microorganisms. The lymphocytes' capacity to form the protective antibodies is triggered when they encounter specific molecules coming from the foreign invader. These molecules are known as antigens. So all immunization involves introducing antigens into the body in a risk-free manner.

Broadly speaking, immunization can be accomplished in one of three ways. The first, which Jenner stumbled across in 1796, was developed much further by Louis Pasteur. It is to achieve attenuation of virulence for the human host, either by finding a harmless relative of a virulent organism, or by intentionally changing its characteristics through prolonged culture outside the body or passage through different host animals. The harmless, mutated organism is then allowed to grow and multiply within the body. Such live, attenuated vaccines work because the harmless relative and the virulent organism share one or more antigens, and therefore the antibodies against the relative can also attack the real organism when it comes along. The second method involves killing the virulent organism, for example with formalin, and injecting it into the body. The antigen molecules from these killed organisms can be effective at surprisingly low doses, as the

brilliant success of the Salk poliomyelitis vaccine proved. However, killed vaccines are usually given as two or more injections to ensure that the stimulus to the immune system is sufficiently strong. The third method is of the greatest relevance to this paper. It rests on the fact that one does not have to be immune to every antigen of a microbe in order to be protected. One can therefore inject some component of the microorganism rather than the entire living or killed microbe. The current highly successful diphtheria and tetanus vaccines work on this principle. In these cases, the operative antigen is a modified version of a toxin that the relevant bacteria produce, but in other cases the antigen might, for example, be a molecule sitting on the outer wall of the bacterium. The purer such molecular vaccines are, the less likely they are to have irritating or dangerous side effects.

Principles of Vaccine Manufacture

Until very recently, all vaccine manufacture has involved the large scale growth of the responsible organism, or its harmless relative, under controlled laboratory conditions. For bacterial vaccines, like those against whooping cough, tetanus or diphtheria, this is relatively straightforward as bacteria can grow in nutrient broths rather like a rich meat soup. For viral vaccines, the technology is more demanding. Viruses can grow only inside a living cell. So the vaccine has to be prepared either in living animals (the skin of calves for the smallpox vaccine, or the inner linings of a chick embryo for the yellow fever vaccine) or, more usually, in mammalian cells that are themselves growing under artificial conditions through the technique of tissue culture.

A great deal of technology has to go into conventional vaccine manufacture. Obviously, the growth medium must not become contaminated with even one irrelevant microorganism, so superb aseptic techniques must be used. The workforce must be carefully protected from dangerous bacteria or viruses. For killed vaccines, every last microbe must be killed. For live, attenuated vaccines, the organisms must not be allowed to die. For molecular vaccines, the right antigen must be purified from all the irrelevant material. Quality control procedures must be stringent and each vaccine batch must be tested for safety and efficacy. All this adds to costs.

The Potential of Biotechnology in Vaccine Manufacture

Modern biotechnological advances have unblocked the central bottleneck in vaccine manufacture, namely the need to grow vast quantities of pure virulent organisms. Two separate methods are involved, and indeed are seen by many as competing with each other. The one is to synthesize antigens chemically. The other is to force harmless, easy-to-grow bacteria or yeasts to make antigens through genetic engineering.

The synthetic approach involves simply making antigens in the test tube from simple chemical building blocks. Many antigens are proteins. Proteins are strings of smaller molecules, the amino acids, hooked together in a particular sequence. In many cases, it is not necessary to inject a whole, intact antigen molecule in order to induce a good immune response. One little corner of a protein, say a peptide 10 amino acids in length, may suffice to give protection, though, as we shall see, some tricks have to be used to make this work. Whole protein molecules can be made synthetically from amino acids, but the bigger the

protein, the greater the risk of introducing an error into the sequence and the more cumbersome the synthesis. These difficulties mean that, in practice, synthetic proteins are 50 or less amino acids long. So much emphasis is going into defining "immunodominant" portions of large antigens of medical importance, smaller bits of proteins called peptides, usually 8 to 20 amino acids long.

Genetic engineering harnesses living organisms to mass-produce antigens vicariously Proteins are synthesized as a linear array of amino acids according to the blue-print of a linear array of coding units, the DNA, or gene. One gene codes for one protein; one fragment of a gene codes for the corresponding fragment of the protein It is now possible to cut out the gene for a particular protein, say of a virus, and transplant that gene into a fast-growing microbe, say the harmless intestinal bacterium, Escherichia coli. Moreover, the gene can be forced to "work much harder" than it does in its normal state, so that 10 per cent or more by weight of the E. coli represents the single pure protein of interest. The transplanted gene can be big or small, so that the protein made can be of almost any desired size. Of course, it is still necessary to purify the protein made by genetic engineering from all the other molecules inside the E. coli. Biotechnology has solved this problem, as it is possible to make monoclonal antibodies against the protein and to use these as a tool in elegant and cheap purification methods.

Advantages and Disadvantages of the Two Most Commonly Used Biotechnologies for Vaccine Development and Production

Both the peptide synthesis and the recombinant DNA approaches have their ardent proponents. What is not revealed in many such discussions is that the two technologies are very interactive : genetic engineering may be the way to find the

small piece of protein that you eventually wish to synthesize, and testing immune responses against small synthetic antigens may help you to validate the importance of a particular large antigen, that you then make through genetic engineering. In practice, many laboratories probing for new vaccines use both technologies in their research. Nevertheless, each approach has its own special advantages and disadvantages.

As mentioned, the synthetic approach is practically limited to proteins of c. 50 amino acids or less, and in fact most work with synthetic peptide antigens has used pieces of 8 to 20 amino acids. Intact protein antigens, on the other hand, are usually 100 to 2,000 amino acids long. In nature, these long protein chains assume a highly distinctive and predictable but complex and contorted folding, assuming a three-dimensional shape where amino acids far separated in the sequential array may in fact lie quite close to each other. It was thus predicted that most antigenic sites would be conformational, i.e. requiring the whole protein to display its full shape. In the event, short peptides, particularly those corresponding to the surface of the protein, can be injected and cause the production of antibody reactive with the whole intact molecule (1-3). Moreover, a chemically synthesized peptide 20 amino acids in length coming from the immunologically most important section of a particular antigen of the foot and mouth disease virus was capable of protecting guinea pigs against virulent virus (4). In fact, on a weight for weight basis, this peptide worked much better than the whole protein of 213 amino acids. Similarly, short peptides from influenza or hepatitis virus antigens cause excellent antibody formation. While much work remains to be done to see how general this finding will be, recently-devised approaches to <u>predict</u> the immunologically most important portions of an antigen show great promise (1, 5).

It may be, therefore, that the most serious potential disadvantage of synthetic peptide vaccines, namely their failure to reflect the antigens of the whole molecule, will turn out to be illusory. Nevertheless, there is one biological constraint that may not have received enough attention. Microorganisms show a great ability to change and evolve. If a vaccine is directed against just one tiny portion of one antigenic molecule, there is a real risk that the microbe concerned would mutate in such a manner as to change that one component of its make-up, and thereby elude the host immune response. To combat this possibility, synthetic vaccines should probably be cocktails of several different peptides.

A second disadvantage of synthetic vaccines relates to their strength as antigens. Living or killed microorganisms frequently present antigens to the immune system as a bristling array of hundreds or thousands of molecules packed closely together on the surface of the microbe. This, for technical reasons which need not detain us, increases the intensity of the immune response (6). Furthermore, the micro-particulate nature of microorganisms makes them palatable to the body's scavenger cells, and scavenger cell-associated antigen is a much more powerful trigger to the immune system than soluble antigen. In experimental situations, these disadvantages are overcome by the use of powerful stimulants of the immune system, called adjuvants, which are given with the synthetic vaccine. Most adjuvants are not suitable for human use because of toxicity and side-effects. For this reason, interest attaches to a group of synthetic molecular adjuvants that are being developed at the Pasteur Institute in Paris, the muramyl dipeptides and their analogs (7, 8). However, these are also not free from toxicity. Other approaches under investigation include old-fashioned ones such as adsorbing the synthetic vaccine onto aluminium hydroxide particles ("alum precipitation") to achieve a slow release effect; or newer methods of coupling of the synthetic peptide onto a

"carrier" molecule which is itself a strong antigen. Research aimed at strengthening immune responses deserves to be promoted, as it is common to all synthetic vaccines and indeed to the recombinant DNA approach as well.

A third disadvantage of synthetic vaccines may be their cost, which presently is well ahead of that of genetically engineered proteins. It is probable that costs will come down sharply as production technology improves.

The major advantages of synthetic vaccines relate to their precision as chemical entities. There should be a minimum of batch variation and of unwanted side-effects due to molecules not germane to the desired immune response.

The genetic engineering approach can make proteins of essentially any length, although most of the proteins that have been successfully made so far are less than 1,000 amino acids long. Theoretical problems of finding the best part of an antigen molecule are thereby largely avoided, although it may still be wise to use a cocktail of different molecules. Genetically engineered vaccines need not be confined to one protein - it is possible to insert several genes and have them function in E. coli, thus making the bacteria into factories for ready-made cocktails. The Cetus Corporation has marketed a vaccine against scours, a toxic diarrhoea of swine, based on this principle. The Genentech group have produced a foot and mouth disease vaccine, which works in cattle, through genetically engineering the viral protein VP1.

A further, and somewhat avant-garde, advantage of genetic engineering is that potentially the DNA coding for the relevant antigens can be engineered into a living microbe which could actually grow inside the host being immunized, thus

making a genetically-engineered live, attenuated vaccine with all the attendant advantages of dosage and duration of antigenic stimulation. For example, Moss has successfully engineered the cowpox virus, the very agent responsible for the global eradication of smallpox, to act as a carrier for several antigens (9, 9A). Harmless gut microorganisms can also be engineered to carry non-toxic antigens of intestinal pathogens such as cholera or typhoid. This is an active and exciting area of current research.

We have already mentioned that genetically engineered vaccines will probably be inexpensive, except, of course, for the need to amortize research and development costs.

The chief disadvantages of genetically engineered vaccines do not apply to vaccines dependent on living, engineered microbes but on pure antigen molecules. They are first the need to purify the antigen from all the other products made by the engineered organism and secondly the question of antigenic strength, already discussed for synthetic vaccines and likely to be somewhat less of a problem for whole protein molecules, but still not a negligible one.

While much of our discussion has focused on E. coli as a factory for pure protein antigens, or living harmless microbes as gene recipients, there are many variations on these themes. For example, yeasts are frequently mentioned as likely tools, not only because they can be grown so easily, but also because they are evolutionarily closer to vertebrates than E. coli, and thus have the capacity to add sugars to some genetically engineered antigens which are mixtures of amino acids and sugars. Generally, yeasts synthesize and process proteins in a form that more nearly approximates its natural form in the human host. For example,

the hepatitis B vaccine currently being marketed by Merck and Co. consists of particulate aggregates of a virus surface antigen termed HBsAg, which are present in the blood of chronic carriers of hepatitis B, and which have been collected and purified from blood donations. These aggregates come from the liver cells of the patient. When yeast cells are engineered with the gene for HBsAg, they produce particles very similar to those found in the serum of human carriers. These particulate entities have been very strong antigens in chimpanzees.

Animal cells are also being engineered successfully. While they are much more fastidious in their growth requirements, any description of the "state of the art" technology would be remiss in not pointing them out as possible factories of the future. However, the much greater cost of growing animal cells probably excludes them from practical vaccine manufacture for at least the next decade.

Vaccines in the Pipeline : The Challenges and the Constraints

Given the above technological leaps, it is no wonder that academics all over the world are excited about all kinds of new vaccines or improvements in old ones. Dreams of great daring are being dreamt, extending the concept of vaccination from viruses and bacteria to single-celled or multicellular parasites and even to non-infectious diseases like cancer and multiple sclerosis. A birth control vaccine is the subject of active research (10). The sky seems to be the limit.

Yet, great though the need and the opportunity undoubtedly are, many academics underestimate the constraints which will ensure that new vaccines for human use will only materialize gradually. The first relates to funding. Vaccine research is expensive and risky, because research and development costs are high, but

profits likely to be low, because directly or indirectly governments are the major users, and they are good at negotiating minimal prices. Moreover, drugs are used by patients daily for long periods, whereas once a person has been vaccinated, he or she only requires boosters at rare intervals, so the volume of sales is inherently lower than that of drugs. Overall, there is good evidence that human vaccines are less profitable investments for the pharmaceutical industry than are drugs, and this would be even more the case for those vaccines required particularly for developing countries, with their lesser ability to pay.

The second constraint relates to the changing perceptions of regulatory agencies. Pasteur's rabies vaccine or even Jenner's smallpox vaccine would have great difficulties in today's regulatory climate, and indeed even the first tentative clinical trials would have trouble receiving approval by relevant ethics committees. Somehow, the balance has tipped too far towards requirements for safety - the risks of <u>not</u> deploying potentially effective agents rarely enter into the equation. Even if this issue is engaged for pure molecular vaccines, and is resolved, the difficulties with respect to suitable adjuvants and any living, genetically engineered organism as a carrier for antigens, will remain substantial.

The third constraint relates to expertise in the development component of research and development. Even though academics are buzzing with bright ideas about new vaccines, their capacity to translate a research breakthrough into a marketable product is notoriously limited, and partnerships with industry will be difficult to forge in this traditionally low-profit arena. Will academics have the patience to see a vaccine through to the development phase, and to conduct the extensive clinical trials that will be needed? This is much less heady work that the original genetic engineering, but just as essential.

There are two distinct roles for a Consultative Group to Protect the World's Children relating to these dilemmas. First, from the very beginning of the project, a significant proportion of the funds raised for an expanded programme of immunization, say 10-20%, should be reserved for vaccine research. This will ensure that the bright ideas have some chance of being brought to fruition. Secondly, the Group could influence world opinion concerning the design and implementation of clinical trials, allaying illusory or exaggerated fears, and speeding the movement from laboratory research to reasonable and responsible, but nevertheless forceful clinical research.

It is appropriate now to consider some of the examples of vaccines that appear to be within reach. There is no better place to begin than with a look at possible malaria vaccines.

Malaria Vaccines : Where Are We Now?

There are four major species of the single-celled parasite Plasmodium that cause clinical malaria in man, but the most serious is Plasmodium falciparum, which causes the highest mortality, particularly in children. Most of the current vaccine effort is being directed at P. falciparum, although if these efforts are crowned with success, the relevant principles will be applicable to other forms as well. Many decision-makers in Western countries do not realize the enormous public health importance of malaria. Informed guesses put the number of cases at 200 million per year, and in some parts of the world, 50 of every 1,000 children die below the age of 5 from malaria. It is believed there are one million deaths annually in Africa south of the Sahara alone. Chronic and/or recurrent malaria poses severe health problems for older age groups. Despite the efficacy of some

of the control programmes, there has been a resurgence of malaria over the last twenty years due to difficulty in maintaining effective control programmes indefinitely, development of resistance to insecticides among the mosquito vectors and the emergence of drug-resistant strains. While it is hard to estimate the economic burden of malaria as such, it is known that not less than US$2,650 million was spent between 1955-1977 on attempts at malaria control.

A vaccine would be a wonderful and possibly decisive new tool in efforts at global control. There are two basic and not mutually exclusive approaches that have made considerable progress over recent years. The first is to seek to vaccinate against that form of the parasite that first enters from the mosquito's salivary gland after a sting from an infected mosquito. This stage of the life cycle is referred to as the sporozoite. The work of Drs. R. and V. Nussenzweig at New York University (e.g. 11, 12) has given great hope that a suitable sporozoite vaccine will soon emerge. The sporozoite is covered by a highly antigenic surface protein called the circumsporozoite protein or CS protein. Experimental animal studies of various analogues of human malaria have shown that monoclonal antibodies against the CS protein can protect against sporozoite challenge. The CS protein of the laboratory model has a distinctive and unusual structure, which includes 12 tandem repeats of a particular sequence of 12 amino acids, each repeat being separated by a stretch of highly variable amino acids. It seems likely that the repeat structure is the antigenically significant part of the molecule. Once genetic engineering technology finds the relevant structure of <u>human</u> rather than monkey or mouse malaria (and this can only be a matter of weeks or months), one could envisage the vaccine being developed either through the synthetic or the recombinant DNA approach.

Within minutes after the mosquito bite, the sporozoites enter the liver, and, 6 to 12 days later, liver cells release the blood stage called a merozoite. It is the successive waves of invasion and destruction of red blood cells by merozoites which causes the classical fevers, chills and severe malaise of the disease. If even one sporozoite survives to elude the immune attack, a severe infection may follow, as the CS antigen is clearly quite different from the merozoite antigens.

For this reason, our malaria team at The Walter and Eliza Hall Institute has chosen to concentrate its efforts on a merozoite vaccine, the second major approach. While hoping for a "perfect" vaccine, we reasoned that even a merozoite vaccine that is less than 100% effective may produce great benefits. First, a drastic decrease in childhood mortality should result from a vaccine that decreases the severity and frequency of attacks. Secondly, a vaccine that is non-sterilizing but decreases the average level and duration of parasite presence in the bloodstream would lower the malaria transmission rate in a community, and thus the severity of the public health problem. Therefore, we planned a strategy based on recombinant DNA technology for fashioning a merozoite vaccine.

No antigen analogous to the CS protein is known for merozoites. On the other hand, good evidence exists that anti-merozoite immunity can be protective. It is therefore a case of patiently sorting out which antigens on the merozoite, and/or on the surface of the parasitized red blood cell, are the right ones to incorporate into a vaccine. We have been fortunate enough (13) to have been able to engineer the merozoite genes for potential antigens into E. coli, and to induce the bacteria to form large amounts of malarial antigens. Moreover, we have devised a strategy which should allow us to find the right ones for effective protection. Accordingly, we are in the process of forming a joint venture with the Queensland

Institute of Medical Research, the Commonwealth Serum Laboratories, Melbourne and a commercial firm, Biotechnology Australia Pty. Limited, to pursue intensified research and development, in close association with the Papua New Guinea Institute of Medical Research. We are aware, of course, that a number of other research groups are pursuing similar goals. If these efforts, ours or those of our "friendly competitors", progress to a stage where laboratory studies, including trials to protect monkeys against monkey-adapted human malaria, look sufficiently promising for a human vaccine trial, the World Health Organization will be responsible for the co-ordination and supervision of this work. Obviously, much water needs to flow under the bridge yet, but it is a pleasure here to acknowledge the support we have received from the Australian Government (National Health and Medical Research Council and National Biotechnology Programme), the Rockefeller Foundation Great Neglected Diseases Program, and the WHO/UNDP/World Bank Special Programme for Research and Training in Tropical Diseases.

In the happy event that both sporozoite and merozoite vaccines turn out to be effective, it would make sense to combine the two into a single, compound vaccine that attacks the problem from two different points. This would, of course, necessitate further developmental research, and the Consultative Group might well find itself a sponsor of such work.

Hepatitis B Vaccine : The First Anti-Cancer Vaccine in History?

A small proportion of people, for reasons that are far from clear, become chronic carriers of the hepatitis B virus and have large amounts of the antigen HBsAg in their blood, as already mentioned. As many as 10^{13} particles (10 million million) can be present per millilitre of blood plasma. It is possible to bleed donors in

such a manner as to remove the fluid (plasma) component of blood, but to return the white and red blood cells. Further, the HBsAg can then be purified from donated plasma and sterilized. In 1980, a clinical trial proved the capacity of this human-derived material to act as an effective vaccine capable of preventing hepatitis B infection. In 1982, two firms, Merck and Co., U.S.A., and the Institut Pasteur, Paris, independently marketed rather similar vaccines. To date, there is every reason to believe that this vaccine is effective in its primary purpose, namely to prevent hepatitis B in groups at special risk, such as physicians, nurses, workers in blood banks, laboratory personnel, dentists, homosexuals, etc. However, an even greater challenge is looming on the horizon.

Primary cancer of the liver is uncommon in Europe or America but is one of the commonest fatal cancers in Asia and Africa. Excellent evidence exists incriminating the hepatitis B virus as at least one of the causative agents of liver cancer. The relative risk of contracting liver cancer between chronic carriers and non-carriers is in fact higher than the relative risk of lung cancer in heavy cigarette smokers versus non-smokers, being 100:1, for example, amongst Chinese in Taiwan. A pathological sequence can readily be identified from viral destruction of liver tissue, attempts by the liver cell to divide rapidly to make up the damage, and finally frank cancer. It is evident from epidemiological studies that this progression takes several years. A final piece of incriminating evidence is that the genes of the hepatitis B virus integrate into the malignant liver cell. The evidence incriminating the virus, probably acting in association with genetic and/or environmental factors, in cancer causation has recently been summarized by the International Union Against Cancer (14).

Logically, then, it would be reasonable to suppose that preventing hepatitis B virus infection would prevent the eventual development of liver cancer. One problem is the fact that, in many cases, the carrier status develops in very early life, possibly through exposure to maternal blood and/or faeces during the birth process. Thus the vaccine will have to be given very early, or else babies will have to be protected by gamma globulin given at birth and given vaccine somewhat later. Multicentre trials are currently underway to determine the feasibility of perinatal prevention of infection, and the first results of these trials will be available in 1984 at a major conference to be held in San Francisco, U.S.A. Provided these trials succeed, the omens look good for a hepatitis B vaccine as a cancer prophylactic, though obviously it will be years till hard data are available

Obviously, material from blood donors is not ideal as a source of antigen. It is expensive (about US$100 for the three doses recommended) and even though 2 million doses have already been distributed, the thought of vaccinating every child born into the world with human carrier-derived material strains credulity. Therefore, there are at least 5 or 6 initiatives under way for a genetically engineered vaccine. The Merck version is already undergoing clinical trials. This and related work will need to be carefully monitored by the Consultative Group. It could well turn out that a genetically engineered hepatitis B vaccine thrusts its way into our programme reasonably soon.

Vaccines Against Diarrhoeal Diseases

Overall, the diarrhoeal diseases are as important to world health as the parasitic diseases. Perhaps most publicity has been given to cholera, because of its frequently dramatic manifestations and its capacity to cause brisk epidemics, but

other causative agents are of even great public health importance. These include the Salmonella infections, typhoid and paratyphoid; Shigella infection (bacillary dysentery); infestation with amoeba (amoebic dysentery); and a wide variety of intestinal viruses. Diarrhoeal disease can interact with malnutrition and so an infection which might be readily controlled in industrialized countries may prove fatal in the sanitary and nutritional situation pertaining in some developing countries. Oral rehydration and antibiotics are very effective ways of combatting many diarrhoeal diseases. However, as it will be many decades until environmental sanitation and personal hygiene practices in some tropical countries reach an adequate standard, the vaccine approach, with its capacity to prevent rather than cure, also has enormous potential in this field.

Yet, the vaccines against the major enteric diseases which are in widespread use, e.g. those against cholera and typhoid, leave much to be desired. The injectable killed typhoid vaccines are essentially as used 80 years ago. They cause adverse side reactions and the protection conferred is only about 50-70%. The injectable cholera vaccine is of low efficacy (50-70%) and its effects of short duration (6 months or less). Fortunately, research, which includes both conventional genetic manipulation of microbes and more recent biotechnologies, is fast coming up with some alternatives.

On the typhoid front, an oral live attenuated vaccine, developed by R. Germanier of Switzerland, is showing great promise (15). This vaccine, termed Ty21a, makes use of a stable double mutant of the typhoid bacillus which has lost the capacity to make some of the enzymes required for virulence. The safety and efficacy of this vaccine has been the subject of a three year field trial in Egypt involving over 32,000 children. No harmful side effects were noted, and even minor adverse

reactions were scarcely above those of placebo controls. Over a three-year period 1 case of typhoid fever occurred in 16,486 immunized children versus 22 in 15,902 placebo controls and 39 in a further group of 25,628 unimmunized children. This 96% efficacy is most impressive, and a further trial is in progress in Santiago, Chile, where typhoid fever is highly endemic with incidence rates up to 140 per 100,000 per year. This trial, which began in May 1982, involves 85,000 children. If it, too, is positive, Ty21a will need to be looked at very closely by the Consultative Group.

In cholera, great efforts to produce a better vaccine by bio-engineering are under way. Finkelstein's group (16) have produced a live, attenuated cholera strain as an experimental vaccine which goes by the picturesque name of "Texas Star", and studies on normal human volunteers have shown it to be protective against subsequent challenge with live virulent cholera organisms. This strain lacks the gene for one part of the cholera toxin and thus does not cause disease. Its only drawback is that it caused mild to moderate transient diarrhoea in 24% of the volunteers, which puts mass population administration in some doubt. Another strand of research seeks to clone V. cholerae antigens into other gut bacteria, creating a live vaccine through recombinant DNA technology. A further approach is to produce cholera antigens which form part of the lethal toxin, but are themselves non-toxic, and to give these orally as a molecular vaccine to supplement standard killed whole V. cholerae vaccine. A fourth approach uses large, non-toxic aggregates of heated cholera toxin with the provisional name "procholeragenoid"

It will take some years to sort out the best of these lines of research but the long-term future looks bright for a cholera vaccine that really works.

Shigellosis or bacillary dysentery has not hit the headlines to the same extent as cholera or typhoid, yet is the cause of much diarrhoea ranging from mild to severe and fatal, in many parts of the world. Shigella bacteria possess highly toxic antigens in their cell wall, and also secrete a potent protein toxin into their environment. The combination can cause extensive cell damage within the intestine and even death. Experimental dysentery vaccines are on the horizon. One intriguing oral vaccine is based on genetic engineering. The antigens of Shigella are introduced into the Ty21a typhoid Salmonella, and, hey presto! - one has two for the price of one, a combined Shigella-typhoid vaccine! (17). This concept works in mice; it has yet to be tested in monkeys and humans.

Of the viral vaccines in the research pipeline, the one that is nearest to fruition is a rotavirus vaccine, giving protection against a common, but not exceedingly severe, form of viral diarrhoea in children.

Measles - The Next Candidate Disease for Global Eradication?

The layman has an incorrect view of measles as an irritating but harmless disease of childhood that everyone gets, but gets over. In fact, measles is a serious disease. In western communities, complications include encephalitis, pancreatitis and secondary bacterial problems such as middle ear infections. These severe complications do not occur at high incidence per case, but help to fill wards in children's hospitals because of the great prevalence of the disease. In some third world epidemics, particularly in isolated regions where the disease is not endemic, the primary measles infection has proven devastatingly toxic, causing many deaths. For this reason, the WHO/UNICEF Expanded Programme of Immunization has included a live, attenuated, injectable measles vaccine as one of the 6 to be deployed.

Recently, measles vaccination has been given a novel twist by Dr. Albert Sabin, the developer of the Sabin oral poliomyelitis vaccine (18). One of the problems with the conventional injectable vaccine is that it does not "take" in very young infants, because it is neutralized by anti-measles antibodies that crossed from the mother's bloodstream through the placenta to the foetal bloodstream. This antibody decays only slowly, providing the young infant with protection against measles up to about the age of 6 months. There is a potential problem for infants in the second half of their first year of life, where maternal antibody may be inadequate for protection but sufficient to interfere with vaccine take. Sabin and collaborators decided to administer an undiluted, conventional live attenuated measles vaccine not by injection but by inhalation as an aerosol. Special attention was paid to children aged 4-6 months, who usually have enough maternal antibody to prevent a good immune response against injected vaccine. Ninety per cent of 39 infants in this age group responded to the aerosol with good antibody formation by 6 weeks, and all did so when tested at 6 months. The same 100% "take was demonstrated amongst older infants and children. Side reactions were mild and infrequent.

The apparent success of this approach obviously requires independent confirmation and extension. However, as there is no animal reservoir of the measles virus, it is not altogether wild to think of the possibility of eventual global eradication This is a long way off, but the existence of a thrusting programme such as is envisaged by the Consultative Group brings the goal potentially closer.

Lists, if exhaustive, are also exhausting, and so I will refrain from summarizing exciting work in other areas. Suffice it to say that the above analysis is exemplary only. Vaccine research is alive and well for bacterial infections such

as tuberculosis and leprosy, sexually transmitted diseases such as syphilis, gonorrhoea and herpes, virus diseases like dengue fever, influenza and hepatitis A, as well as for a variety of special situations relevant more to developed countries, such as vaccines against gram-negative bacteria that cause infection in surgical wounds, etc. The more the power to manipulate microbes and antigens grows due to the continuing biotechnology revolution, the faster will these efforts come to fruition.

A Blueprint for Future Action

"Health for all by the year 2000" will not be achieved by the 5 present childhood vaccines alone. They represent a solid beginning for a global immunization programme, but right from the beginning, a flexible attitude to the inclusion of new vaccines will be necessary. There must be heavy input from member countries, because problems of communicable diseases present tremendous geographic variation There must be not only a passive monitoring of global vaccine research (important though this will be) but an active commitment to it. It has been my privilege to witness at close quarters what two relatively modest (in financial terms) initiatives have done for research into parasite vaccines. I refer to the WHO/UNDP/World Bank Special Programme for Research and Training in Tropical Diseases, and the Rockefeller Foundation Great Neglected Diseases Program. Because of superb planning; selection of the most worthwhile lines of endeavour and the most able scientists; and a conscious effort to engage the minds and spirits of world leaders of research as active supporters of the initiatives, a catalytic avalanche has started, which is essentially unstoppable. The initial funding has been multiplied many times over as pressure on national and international funding agencies to join the fray has mounted. If a global immunization programme got

behind vaccine research in the same intelligent and selective way, but with more substantial funding, an equal multiplier effect would ensue. The conscience of the world is ready to be stirred by this cause. Many of the new vaccines have been waiting in the wings for too long, being largely the dreams of selected, small groups of scientists with limited financial and moral backing. The climate is changing; what is needed is a crystal in the super-saturated solution. A Consultative Group to Protect the World's Children needs a major research and development component to be credible in the modern world, and to do real justice to the vision of its founders. We finish where we began - vaccines are history's most cost-effective public health tool. It is time the world began to behave as if it knew this to be so.

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CHILDHOOD IMMUNIZATION AS AN IMPETUS TO PRIMARY HEALTH CARE

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SUMMARY

The Alma-Ata Declaration on Primary Health Care, as its principal tenet, affirmed that essential health care, as a basic human right, should be universally accessible at a cost that individuals and the community can afford. "Essential health care" is broadly defined to include a range of promotive, preventive, curative and rehabilitation services.

To provide the range of essential services envisaged at Alma-Ata will require a quantum change in the structure and nature of health care systems in virtually all developing countries. In most such countries today, health services of any type are available to only a proportion of the population, none of whom are afforded more than a few of the essential services; resources everywhere are limited both in quantity and quality. Projects which have so far been undertaken to develop broadly-based primary health care systems have proved to be both disappointing and costly. Moroever, many health officials, confronted with all too modest resources and managerial skills, have viewed the Alma-Ata objectives as utopian, beyond realization and sometimes beyond comprehension. Frustration in their inability to realize the revolutionary totality of change has engendered paralysis.

Needed are initiatives to define first steps in what is clearly a long journey. Experience in other community-based programs for health care as well as in other development sectors shows that the limiting constraint is institutional and managerial capacity. A strategy which explicitly addresses this constraint is both logical and necessary.

To build institutional and managerial capacity requires the practical experience gained in the execution of a program. Programs best equipped to do this are those with clearly defined and measurable objectives and which, at first, involve a few rather than many interventions. An ideal choice is a program emphasizing childhood immunization whose ultimate objective is to embrace other effective but inexpensive health measures. In the process of implementing such a program, certain of the objectives set forth at Alma-Ata will be realized. More important, an institutional capacity will be developed and a structural and managerial framework evolved which will facilitate ultimately the realization of the Declaration.

PRIMARY HEALTH CARE - AN IMPORTANT BUT DECEPTIVELY SIMPLE CONCEPT

Knowledge and technology is now available to prevent or alleviate a substantial number of health problems extant throughout developing countries. However, even now, only a small proportion of those living in developing countries have access to the most basic of essential health services. Resources allocated to health by governments and donors alike have been meager and, until the past decade, have been heavily concentrated in the development of expensive curative services, e.g., hospitals, which serve a comparatively small number.

Recognition of the need for a fundamental change in a development policy for health culminated in 1978 in the Declaration of Alma-Ata. This Declaration enunciated a set of principles which give priority to the extension of affordable basic health services throughout the population. Defined as "primary health care," the services envisaged include at a minimum (Mahler, 1981):

- "education concerning prevailing health problems and the methods of identifying, preventing, and controlling them;

- o promotion of food supply and proper nutrition;
- o "an adequate supply of safe water and basic sanitation;
- o "maternal and child health care, including family planning;
- o "immunization against the major infectious diseases;
- o "prevention and control of locally endemic disease;
- o "appropriate treatment of common diseases and injuries;
- o "provision of essential drugs."

The objectives are laudable in that they shift the health strategy toward the provision of more cost-effective measures for all in the population from expensive curative programs available for the few.

The difficulty in providing the array of services encompassed by the deceptively simple phrase, "primary health care" must not be underestimated, however. Although industrialized countries now make such services available to all or most in their populations, they do not offer suitable institutional models for others because they utilize prohibitively large resources in money and manpower. The Declaration does not elaborate on possible institutional structures and experience to date in the development of appropriate capacity has provided little guidance.

Over the past decade, support has been provided for the development of a number of primary health care projects, but the results have been disappointing. A recent analysis of experience with 52 primary health care projects (APHA International Health Programs, 1982) reveals how extraordinarily difficult it has been to translate principle into reality. As the report describes, it is, intrinsically, a formidable task to provide essential support services to numerous and scattered health

service points which characterize a community-based program. Project plans have uniformly failed to recognize a multitude of practical problems encountered in implementation; all have been far behind schedule and recurrent costs have been substantially greater than anticipated. Most important is the observation that institutional capacity to organize and manage such programs is woefully inadequate - a problem which all but precludes innovative solutions and program evolution.

The findings documented in the above report are reaffirmed by a recent analysis of World Bank projects (Israel, 1983) which reveals that the development of health delivery systems has been among the most difficult and least satisfactory of any sector. Primary health care systems are not separately discussed, but of all health delivery systems, these require the most sophisticated institutional structures. In broad outline, a primary health care program requires that services be offered by large numbers of persons working alone or with a few others in widely scattered locations. Inevitably, in such circumstances, supervision and measurement of progress is difficult, the distribution of necessary vaccines, drugs and supplies is complex, and approaches in rendering services must be varied from area to area to take into account varying cultural factors and political realities. To date, programs with characteristics such as these have frustrated the best and most competent efforts of those concerned with institutional development in all sectors - and, no less, those concerned with primary health care. The problems and levels of success contrast sharply with experience in institutional development where other characteristics pertain, such as in industry, telecommunications and plantation-type agriculture.

A STRATEGY FOR THE DEVELOPMENT OF A PRIMARY HEALTH CARE STRUCTURE

Given their nature, the development of necessarily innovative and effective primary health care structures cannot follow simple blueprints, nor will they be rapid in evolution, nor will the strategy be wholly replicable from country to country or even from one area to another within the same country. To date, however, little attention has

been given to the examination of possible solutions. Indeed, the intrinsic difficulties of institutional development in this sector have tended to be minimized or ignored

At present, health delivery systems in many developing countries are inadequately funded, poorly managed, primarily concerned with curative procedures and lacking in systems to evaluate performance. For the resources and manpower provided, productivity by almost any measure is poor. Most are ill-equipped and poorly structured even to provide curative care. At the same time, efforts to define a more appropriate system have provided little instructive guidance. Most have been of the "pilot project" type, usually located outside of the agency with program responsibility and rarely able to be replicated beyond the immediate area concerned. Indeed, as many have noted, the health landscape is strewn with small pilot projects.

A new development strategy in health is needed. Instructive in devising such a strategy is an analysis by Korten (1980) of the factors involved in the evolution of five Asian rural development projects in different sectors. He concludes that the most successful have been those characterized by "an organization with a capacity for embracing error, learning with the people and building new knowledge and institutional capacity through action." In such programs, changes in approach and definition of goals have been an ongoing process as the program adapted flexibly to unanticipated local realities and opportunities.

Important conceptually is Korten's focus on the development of institutional capacity rather than on the execution of traditional "blueprint" projects, elaborately preplanned, completed within a finite time frame and carefully specifying all resource requirements in advance. Although, as he notes, the project approach has served well in industrial development, for example, he believes it to be counterproductive in the building of institutional capacity necessary for community-based programmes such as those in the health delivery sector. These latter require flexibility, a latitude to be opportunistic and a sustained commitment of interest and resources.

If it is accepted that the development of a primary health care system requires that priority first be given to building institutional capacity, attention may be directed to identifying which program services will best serve this end rather than trying to devise methods to deliver whatever products or services may happen to be available or superficially attractive. Logic suggests and experience shows that "fewer services in the early period of implementation should be provided.... Specific, well-defined primary health care projects with limited goals and objectives and selected interventions of proven effectiveness have the best chance of becoming established and of effecting improvements in health" (APHA International Health Program).

The array of primary health care services envisaged differ greatly in character and require quite different approaches in their delivery. They may be divided into two broad groups: (1) services for individuals who become ill and seek relief (curative services); and (2) services for individuals who are not ill (immunization, health education and other preventive measures).

Curative services are usually provided by medical and/or paramedical staff working in health centers and hospitals and by such as traditional healers. Characteristically, those who are ill will travel considerable distances in hope of obtaining relief. Thus, a curative health center, for example, might attract patients from a catchment area which is 10 to 15 kilometers or more in radius. However, the provision of basic but adequate curative services poses an array of difficult problems, including those of training and supervising large numbers in the diagnosis and therapy of many different diseases and of providing quantities of a diverse array of drugs and biologicals. Moreover, even when such programs are financed, in part, by recipients, the costs to government compared to benefits have invariably been great and the logistics formidable.

The second category of services are those which are offered to individuals who are not in ill health and include such as immunization to

prevent illness, education regarding the use of oral rehydration solutions when diarrhea occurs and family planning materials. For almost every intervention of this type, the benefit-cost ratios are high, often extrordinarily so; the cost of the illness or the death or disability caused by vaccine-preventable disease, diarrhea or the unwanted pregnancy being far greater than the cost of prevention. Delivering these services, however, poses special problems. Healthy individuals in a community are not strongly motivated to seek such services. In rural areas, for example, few will travel more than a few kilometers to a health clinic in order to obtain vaccination. Even among those living near a health center, attendance to obtain preventive services is proportionately low in the absence of continuing, effective promotional campaigns. Moreover, experience shows that in health centers, curative care receives first priority in time and resources; other activities of a preventive nature are conducted only if specially promoted and supervised.

Not surprising is the fact that successful prevention programs have required a different approach in providing services than those concerned with curative interventions. Such programs are characterized by two principles: (1) provision of the services at a convenient location near the residence of recipients and at a convenient time; and (2) active promotion of the service being offered. When immunization, for example, is brought to the residence at a time of day when villagers are not in the fields or at the market, acceptance by 90% or more is common. Comparable results are obtained if immunization is offered at convenient assembly points which are not too distant provided that the program is well-organized and promoted. Even in populations to which immunization is alien or resisted, remarkably high levels of acceptance have been achieved when educational and promotional methods have been imaginative. It is obvious that different types of preventive programs, such as the provision of oral rehydration packets and family planning materials, require somewhat different patterns of activity than does an immunization program, but the most successful have adhered to the two principles cited. Neither are intrinsic to the provision of curative services.

It is apparent that the beguilingly simple phrase "primary health care system" does not define a simple system but an array of services which must be delivered using quite different approaches and which differ in their relative costs and benefits. Where resources are limited, it would seem logical to give priority to the development of institutional capacity to provide community-based preventive services.

Of the possible preventive interventions, immunization is clearly preferred. It offers the highest benefit-cost ratio and promises even more when other, still experimental antigens become available. An immunization program requires the development of an organizational and management structure which extends from a national center through each level of government, which relates to all existing health units and which involves village-level participation. It requires the establishment of a distribution system for a manageable few biologic agents and supplies and requires that a reporting and assessment system be established to measure progress in program inputs and success in controlling disease. For building institutional capacity, it is perhaps the best of any of the possible preventive interventions. Once established, one could envisage the addition of other primary health care activities which require community-based participation and health promotion.

IMPLEMENTATION OF IMMUNIZATION PROGRAMS

To many who have not had field experience, the phrase "immunization program" conveys the image of a comparatively simple and straightforward set of activities amenable to definition in a "blueprint" type of project. Such programs, however, although less elaborate than those for a broader-based primary health care, must take into account a complex of variables and so will vary, sometimes greatly, from area to area. Some of the factors to be taken into account can be anticipated in the planning stage but many cannot. Effective programs, therefore, are characterized by continuing assessment, flexibility and evolutionary change. As such, they are ideal vehicles for what Korten (1980) describes as "action based capacity building." Illustrating this are five sets of factors which must be considered in such a program.

First are the factors associated with the vaccines employed and their method of administration. Different groups of vaccines will be used in some areas than others. Some programs may employ many antigens but others will use fewer, because of problems of cost or logistics or because a particular disease is not present in the area, e.g., yellow fever. Depending on the vaccine and on epidemiological patterns of the disease, the targetted age groups in the population will differ. To prevent neonatal tetanus requires vaccination of women in their child-bearing years; to prevent measles where transmission is rapid, as in parts of Africa, requires vaccination of children as soon after nine months of age as is practicable. The logistics of administration must be considered for each antigen in deciding, for example, whether to give inactivated polio vaccine by needle and syringe or attenuated live vaccine by mouth. Each of the vaccines has different characteristics of heat stability and these must be taken into account in storage and distribution. Design of the program requires that the substantial economies of cost in packaging vaccines in multi-dose containers be considered and delivery systems utilized which permit vaccination daily of as many persons as possible.

A second group of considerations in design of a program relates to the method utilized for distributing vaccine to recipients. For some areas, e.g., orthodox Muslim areas, it has proved necessary for vaccinators to proceed house-by-house to vaccinate women and small children confined to their residence because of religious practise. In other areas, assembly of recipients at convenient collecting points, e.g., health cener, school or other, has proved effective and economical. Consideration must be given to the participation of those at health centers and hospitals. If they are to participate, they require refrigerated storage for vaccines, training and continuing supervision of their personnel and a plan which permits each to vaccinate a sufficient number during a day to utilize vaccines packaged in multiple-dose containers. Some such centers may be able to undertake continuing vaccination of those in nearby areas through regular visits to villages. Since in most health services, those assigned to health centers or hospitals do not now leave

their facility, a major reorientation in their responsibilities and plan of work may be required

A third set of problems to be considered in design of a program relates to the techniques needed to motivate residents to seek or at least to accept vaccination. The character of promotional-educational programs will depend on sociocultural factors. Different approaches have proved effective in different areas and range from communication through village leaders, community health workers, schools, religious leaders the media and others in a variety of different mixes. Where and when vaccination is provided is related to vaccine acceptance and must also be considered. If, for example, vaccination is offered only at distant locations, at times of day when many adults are in the field or at market or during certain religious periods, receptivity may be low however effective the educational-promotional program.

A fourth group of considerations relate to the design of assessment mechanisms and their use in management. As experience has shown, continuing and timely monitoring of progress in the program is essential to assure that vaccines are potent at the time of administration, that satisfactory numbers are being immunized and that the program is having the expected effect in reducing morbidity and mortality. Systems need to be devised to provide such data as the numbers vaccinated, the proportion of target populations which have actually been immunized and the numbers of cases and deaths occurring. Different types of data will be required depending on the antigens used. In the past, few reliable data of this sort have been routinely gathered by health programs and, even less frequently, used to identify weaknesses in the program which require modification. Considerable experience is needed in evolving such systems and these may be expected to differ from area to area depending on their sociopolitical structure.

Lastly, perhaps most important, is the organizational structure and management of the program. Leadership is required to provide technical guidance and training and to facilitate incorporation of practical

experience into operation; to assure timely receipt and distribution of vaccines and equipment; to identify and resolve problems; to provide encouragement to field staff; and to develop and sustain mechanisms for measurement of progress. The program organization may take many forms but to realize its full potential in building institutional capacity, it must be an integral part of the health structure and must utilize, to the fullest possible extent, health staff throughout the existing system. To do so requires that each program be appropriate and relevant to the national health structure which it serves and so will vary from country to country.

In brief, the development of an immunization program encompasses anything but a simple, straightforward set of actions which can be neatly prescribed by a development blueprint. Rather, it must address the full range of problems which are germane to the eventual development of a primary health care system embracing the panoply of activities described in the Alma-Ata Declaration. As such, it is an ideal vehicle for building the institutional capacity to do so.

Research in the Program

The development of immunization programs is clearly an experimental process involving questions which are susceptible to being addressed through social science research as well as research designed to produce new or better vaccines and better technologies to facilitate their distribution and application. How this research is conducted and how it relates to ongoing programs will be important.

Social scientists potentially have much to contribute but, as Korten (1980) has pointed out, social scientists have had little influence on the design or performance of typical rural development programs. Their past activities have commonly consisted of: (1) summative evaluations, documenting failure long after the time when corrective action might have been taken; (2) pilot projects, commonly located outside of the operating agency, which provide blueprints for application by others but

for which there is seldom the capacity to make them operational; and (3) baseline surveys, which provide data which are often irrelevant to planning or, if relevant, directed to agencies which don't have the capacity to use them. Most effective and needed are research activities conducted within the context of ongoing programs employing tools which facilitate the rapid collection of data which are directly relevant to action. In Korten's view, disciplined observation, guided interviews and informant panels are preferred over formal surveys; timeliness over rigor; informed interpretation over statistical analysis; and attention to process and intermediate outcomes as a basis for rapid adapatation in preference to detailed assessment of final outcomes. In brief, a reorientation in social science research is required.

No less important is the need for a close relationship between those engaged in program operations and those in research programs intended to develop and improve vaccines and the technologies for their distribution and application. Opportunities, problems and obstacles identified by field staff can play an important role in defining research priorities. Although the value of basic research is acknowledged as essential, the most critical and frequently deficient bridge has been that between program staff and research scientist. A reorientation in this area is thus quite as important as in social science research.

Program Support

Most important to a program which is intended to build institutional capacity is the nature of donor support. Here, too, a change is called for (Israel, 1983 and Korten, 1980). Most development programs have consisted of detailed preplanned projects of definite but short duration. To paraphrase Korten: a demand for detailed preplanning and subsequent adherence to the detailed line item budgets and implementation schedules immediately preempts the learning process by imposing the demand that leadership of the incipient effort act as if it knew what it was doing before there was an opportunity for learning to occur.

Israel, after review of nearly 200 Bank projects, reaffirms the need to reconsider the nature of support provided to programs in the social sector. As he points out, programs "trying to reach and involve large numbers of people are more 'institution intensive' ..." and that "the institutions involved are the most difficult to improve." At the same time, he finds that in the social sector, institutional and managerial problems are the most pervasive and resources, the most scarce. He calls for long-term programs transcending individual projects and, in formulating these, a recognition that detailed preplanning such as has been employed in industrial and telecommunications projects, is not only unrealistic but counterproductive.

CONCLUSION

The Alma-Ata Declaration was important in redefining objectives in health program development. Not fully appreciated were the formidable difficulties inherent in reaching these objectives nor that the principal constraint in most countries lay in the fundamental generic problem of institutional and managerial capacity. A strategy which addresses this problem is critical. Most appropriate and cost-effective would be a program whose initial thrust is immunization, but whose ultimate objective is to embrace the range of preventive interventions envisaged in the Declaration. A flexibly evolving program, rather than a blueprint-type project, would best serve this end, its strength being appreciably greater if social science and other forms of research are integrally related to operations and to program goals.

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Minutes*

Consultative Group to Protect The World's Childr

The Harvard Club of New York

October 24, 1983

In attendance at the meeting were four representatives from The World Health Organization, Dr. Halfdan Mahler - Director General, Dr. Joshua Cohen, Dr. Ralph Henderson and Dr. John Copland; two representatives of UNICEF, Dr. James Grant - Executive Director, and Dr. Stephen Joseph; four representatives of the International Committee to Protect the World's Children, the Honorable Robert S. McNamara, Dr. Jonas Salk, Dr. Philippe Stoeckel and Sir Gustav Nossal; Dr. William Foege of the Center for Disease Control and two representatives from The Rockefeller Foundation, Dr. Laurence Stifel, Vice President, and Dr. Kenneth Warren.

James Grant gave a summary of the discussion on the previous evening. He began with the landmark decision at The World Health Organization/UNICEF meeting in Alma-Ata to support primary health care throughout the world in order to provide Health For All By The Year 2000. A major factor in this effort was the World Health Organization's Expanded Programme on Immunization (EPI) which evolved from the great campaign which eradicated smallpox. He then described the new UNICEF initiative called the Children's Survival Revolution which is devoted to the acceleration of four crucial sectors of primary health care; childhood immunization, oral rehydration, breast feeding and growth monitoring. In order to achieve the goal of a drastic reduction in child mortality three factors are essential: (1) additional advocacy in order to foster political will and the involvement of

*Final 23/11/83 as amended by Grant, Salk, Cohen and Nossal.

the people and existing institutions to attack this overwhelming problem; (2) financial aid in the form of both more dollars and more flexible funding, particularly from the laggard countries such as US, France, Germany and Japan; (3) research into vaccines and improved operations, a matter of fundamental importance. With respect to the organization of the program, Sir Gustav Nossal's proposal for a Consultative Group was discussed. He suggested an executive body led by the sponsoring organizations, WHO, UNICEF and the World Bank, and a Secretariat headed by a senior experienced Executive Director. It was felt that this would significantly strengthen both the EPI and UNICEF in their respective roles. A Scientific and Technical Advisory Committee (STAC) would be necessary to affirm and monitor the program. Grant believes that the program should be broadened as emphasized in the title suggested by Jonas Salk - Consultative Group to Protect the World's Children. In the initial period the primary focus would be on immunization; as this was consolidated it would be complemented by the addition of equally important technologies such as oral rehydration therapy, all working through primary health care and incidentally strengthening it.

McNamara was pleased at these developments and endorsed this plan and sees the new Consultative Group as parallel in many ways to the hugely successful Consultative Group in International Agricultural Research (CGIAR). He believes that The World Bank would back this initiative. There was general support for the concept of a joint invitation involving WHO, UNICEF, and The World Bank from all of the participants in the meeting. McNamara felt that any groups involved in this initial program should be prepared to

make long term commitments as in the CGIAR program, and that countries that were willing to develop major immunization programs, such as India, Colombia and Senegal would be eligible for large loans from The World Bank. Salk felt that if dramatic results occurred in these three countries, the campaign would sell itself. McNamara supported broadening the name to "Protect the World's Children," and saw the program developing from immunization to oral rehydration ultimately through all of the components of primary health care and would be a major factor in the development of population control. He clearly believed that if health improved it would lead naturally to a reduction in family size. Mahler felt that it was essential to have The World Bank involved as a joint sponsor at the March meeting. It was generally felt that the meeting should not preordain India, Colombia, or Senegal or other countries as the first major programs in immunization, but that these countries should be invited to discuss these issues. While the world's capacity to deal with this major effort must be considered, it was not necessary to go into exact tactical detail. We must also deal with the resource issues of political will, motivation of the people, and technical and financial resources.

A decision was made to go along with the planned meeting at The Rockefeller Foundation's Study Center in Bellagio, Italy, in the period March 12-16, 1984. A maximum of 29 people could attend that meeting, and the guest list would include the following: Mahler, R. Henderson, Grant, Joseph, Warren, Nossal, Stoeckel, Salk, Foege, D.A. Henderson. The World Bank might send either Clausen, Husain, or Stern, and major representatives from the Inter-American Development Bank and the Asian Development Bank would be welcomed. Representatives from three countries interested in

developing immunization programs would be invited; the three countries suggested were Colombia, India and Senegal. The representatives should be at the top governmental level, with the possibility of a second technical level person as back-up. Up to nine bilateral agencies would be invited, one covering a consortium of the Nordic countries, plus probably US, Canada, France, Germany, UK, Holland, Japan and Australia. Foundation representatives would include MacArthur, and David Hamburg of the Carnegie. Pisani of the Commission of the European Communities would also be invited.

Six working papers would be prepared: the first two by Ralph Henderson and staff of the Expanded Programme in Immunization, (1) The nature and extent of the problem and the potential effect of immunization procedures and (2) A description of the state of the art of immunization for childhood diseases. As an example of a major immunization program in the developing world, Philippe Stoeckel would prepare a paper on (3) The Senegal/Mali/Upper Volta Immunization Program. Sir Gustav Nossal would prepare the paper on (4) The biotechnology revolution and new and improved vaccines. William Foege would produce a paper on (5) Strategies for the development of a comprehensive global childhood immunization program and paper (6) would be by Donald A. Henderson on Childhood immunization as an impetus to primary health care. It was requested that Warren, R. Henderson and Joseph prepare a draft letter for the joint sponsors to send to the invitees to the conference. Mahler, Grant and McNamara would divide up the invitation list for personal phone contact.

McNamara discussed the actions coming out of the Bellagio meeting. He felt that the Scientific and Technical Advisory Committee (STAC) was of great importance and that Sir Gustav Nossal should head it. Salk concurred

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with this and pointed out that Nossal was now the President-Elect of the International Union of Immunological Societies. It was suggested that a function of the STAC would be to recommend the best present technology relevant to the interests of the Consultative Group. Salk felt that the committee should deal with all phases of vaccinology, from epidemiology to laboratory science to vaccine production and to operational field research; the STAC should think of the problem as a whole. Stifel pointed out the crucial role of TAC in the CGIAR is that it provided the donors with the confidence to make long-term commitments for support. Salk pointed out that this committee must be open to new ideas and be prepared to encourage new ideas and be prepared to encourage new science and to consider new ways and new ideas.

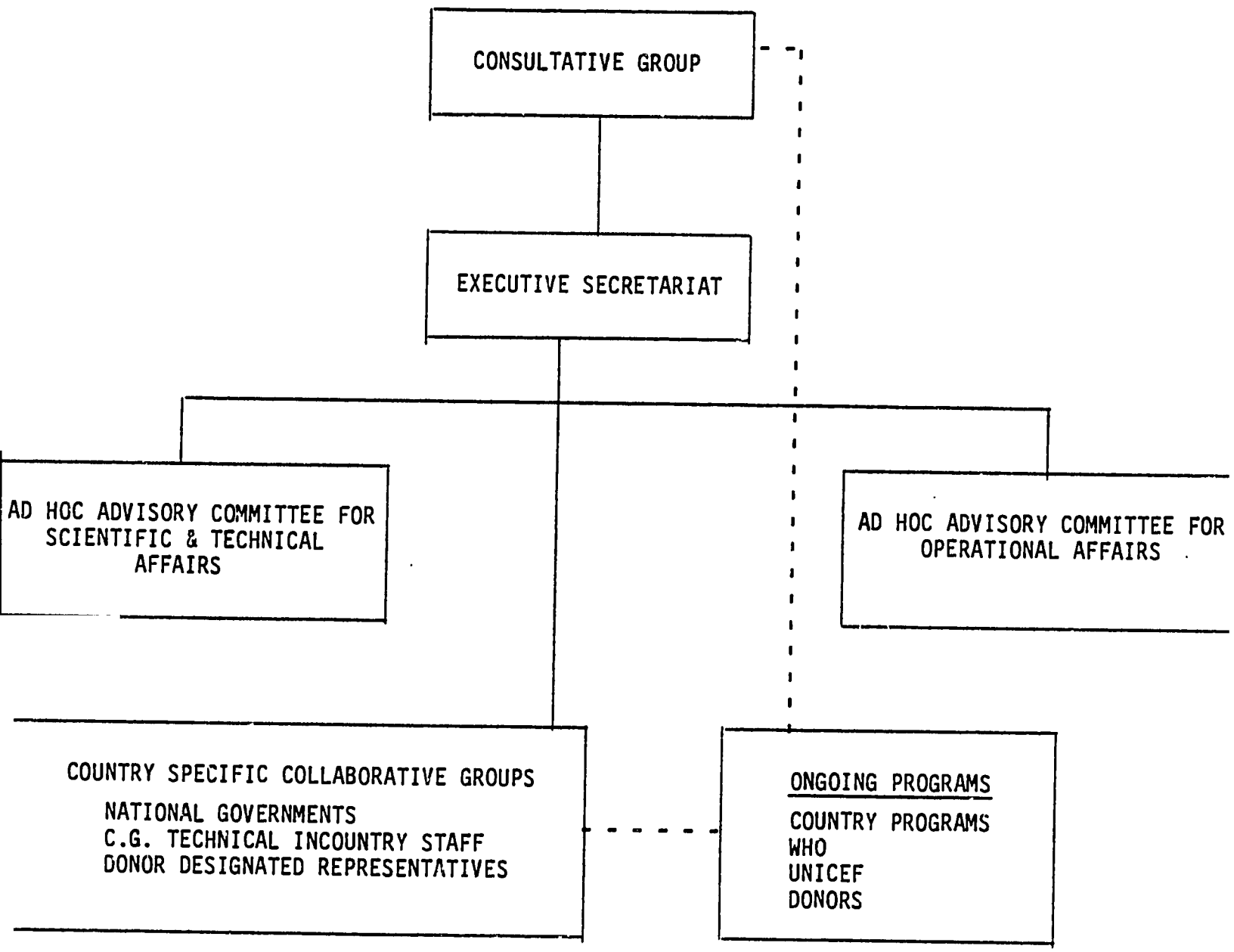
The crucial role of the Executive Director for this program was then discussed. It was generally believed that if a truly outstanding person who had the confidence of all parties could be obtained this would be of enormous importance. With Mahler taking the lead, there was a unanimous feeling that William Foege would be the ideal person to lead this great effort. He was asked to consider the possibility, and all of the agencies involved pledged their support for this initiative.

The meeting ended with the feeling expressed by Grant that we were at the crest of a great wave, and that an overwhelming attack on childhood morbidity and mortality would have an enormous influence on the other elements essential for the well being of the developing world, population and agriculture.

Proposed Membership and Functions of the Units of the Consultative Group to Protect the World's Children

	MEMBERSHIP	FUNCTIONS
1. Consultative Group to Protect the World's Children	Donor sources Interested partie UNICEF World Bank WHO	Advocacy to protect the world's children through immunization, ORT and other appropriate measures. Mobilization of world opinion and political commitment. Review and endorsement of criteria for matching country programs and donors. Foster coordination among country specific donors. Foster the development of policies in support of (immunization/ORT) PHC initiatives. Mobilization of private resources for country representatives, PVO's and international organizations.
2. Secretariat of the Consultative Group	Executive Secretary Administrative Assistants Technical advisors as required	Liaison and focal point for providing operational support. Review of reports from committees. Review of and reporting on ongoing projects. Administrative support to consultative group.
3. Ad Hoc Advisory Committee for Scientific and Technical Affairs	Chairman from C.G. membership Technical advisors as required	Review and proposal of research projects to the C.G. Review of techniques proposed by Country Specific Collaborating Groups.
4. Ad Hoc Advisory Committee for Operational Affairs	Chairman from C.G. membership Donor Representative Country Representative	Review and guidance for the selection of countries. Guidance for the implementation of program. Periodic review of progress of implementation.
5. Country-Specific Collaborative Groups	National Governments WHO C.G. Technical In-Country Staff Donor Designated Representatives	Assist national governments in development of plans. Development of plan criteria. Coordinate donors in health sector to accept a collaborative approach for child survival and agreement on strategies. Coordination of activities at country levels.

PROPOSED ORGANIZATIONAL CHART FOR THE CONSULTATIVE GROUP TO PROTECT THE WORLD'S CHILDREN



PROTECTING THE WORLD'S CHILDREN: STRATEGIES FOR ATTAINING THE GOAL

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WORKING PAPER

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Contents

EXECUTIVE SUMMARY

A global immunization initiative to protect the world's children, beginning with a universal attack on six vaccine preventable diseases of childhood, holds the promise of forging a partnership between donors and developing countries. Such an initiative could become the catalyst for the development of a primary health care infrastructure in the developing world by making the best public health measures accessible to the populations who need them most.

Immunization services cannot be effectively delivered without the existence of a basic infrastructure and program management skills, elements also required for the delivery of other primary health care services. The development of successful immunization programs, therefore, also provides the framework for the delivery of other priority primary health care services such as oral rehydration therapy. The list of vaccines and services will grow as a greater number of simple technologies which address the problems of infection and malnutrition are brought to the stage of application.

A three point program is proposed: (1) accelerate the expansion of immunization coverage to those developing countries where children contribute disproportionately to the vaccine preventable disease mortality; (2) simultaneously provide increased support for immunization services to all other developing countries to assure they are not constrained by the lack of vaccine, supplies, equipment or technical assistance; and (3) intensify research and development to improve current immunization and delivery system technology. These actions should all be designed and made available in such a way as to contribute to the development of national health infrastructures.

The expansion of primary health care systems which can deliver immunization services will require more than financial resources. The support and commitment of political leaders will be important in assuring the success of this effort. In addition, those countries with the lowest immunization levels or the least developed health care structure may also be those least

able to use additional financial resources efficiently or effectively. Sufficient technical and managerial manpower will need to be trained, and trained expatriate manpower may need to be placed in many of the countries participating in the accelerated component of the program.

The formation of a Consultative Group to Protect the World's Children is described. A small Secretariat could act as the focal point for providing operational support. Research activities and the validation of the techniques of program implementation could be provided by a Scientific and Technical Advisory Group, and financial management exercised by the World Bank. Guidance to the implementation of projects could be provided by an Operational Advisory Committee made up of implementating and donor agencies.

Detailed cost projections will need to be developed based on specific country plans. The general order of magnitude of the needs for additional external resources, over and above current national and external investments, might range between US$ 45-178 million during the first year of the initiative (1985 dollars), rising to US$ 227-958 million during the sixth year (current dollars). It is proposed that 5-10% of the resources mobilized under this initiative be made available for research and development.

1. INTRODUCTION

Despite the availability of effective and inexpensive vaccines and the knowledge of how to apply them, vaccine preventable diseases continue to be a major cause of unnecessary morbidity and mortality in the developing world. Without a major intensification of effort the goal set by the Expanded Program on Immunization to reduce childhood morbidity and mortality by providing immunization against six target diseases will not be reached. This paper addresses the questions of what can be achieved through a new global initiative to protect the world's children which would augment current developing world financial and technical resources and how this might be accomplished.

2. WHAT CAN BE ACHIEVED

This global immunization initiative begins with an attack against six vaccine preventable diseases of childhood, but holds the promise of forging a partnership between donors and developing countries which could catalyze the development of primary health care delivery capability in the developing world by making the best public health measures available to the populations who need them most.

The construction of the immunization initiative is intended to go far beyond the diseases initially included in the Expanded Program on Immunization. The building of an effective primary health care delivery system is the work of years, not months, and it is imperative that such systems be established as soon as possible, not only because of the continuing tragedy that currently available vaccines do not reach children in need, but because the hundreds of millions of dollars which are being invested in the search for new and better vaccines are a mockery if such vaccines can only be delivered to a fraction of those who need them.

Immunization is only part of the story. In most developing countries up to 15% of newborns die within the first year of life and up to 1/3 die within the first five years of life. The causes are well known. The child born in a developing country is born at a disadvantage: its birthweight is some 20% less than the birthweight of a child in the industrialized countries. Within its first few years, the child is exposed to a series of life-threathening challenges beginning with the weaning process and soon followed by attacks of whooping cough, diarrhea, malaria, and measles. Very frequently a child has not yet fully recovered from one challenge before it is exposed to the next and in this way a debilitating spiral of infection and malnutrition is established, often resulting in death.

Through the application of tools which are available now, these mortality rates can be reduced by one-half of their present levels within 15 years at a relatively small cost. The ingredients of successful immunization services are common to the delivery of other primary health care services: an infrastructure capable of reaching all children and pregnant women and program management skills. The development of successful immunization programs will also provide the framework for the delivery of other locally determined priority health care services.

An early candidate to join immunization in these intensified child care services is a program for the control of diarrheal diseases. Diarrhea is responsible for some five million childhood deaths every year. The cycle of vaccine preventable diseases and malnutrition is potentiated by the debilitation and weight loss by diarrhea. An effective and relatively simple technology is available which at low cost could prevent over 60% of these deaths. In a number of countries there are already organizational links between the management of these two programs; within WHO and UNICEF there is a close collaboration between these two programs, particularly in training and in program evaluation.

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UNICEF, in its State of the World's Children reports for the past two years, has made an eloquent case for protecting the world's children through other actions ready for immediate support, citing growth monitoring and breas feeding as partners of immunization and oral rehydration therapy. The exact list of other candidate technologies will be determined by countries themselves, but the list is likely to grow as a greater number of simple technologies which address the problems of infection and malnutrition are brought to the stage of application. If this present initiative proves successful with respect to immunization, countries and donor agencies may consider including the control of diarrheal diseases, family planning and child spacing, or selected nutritional problems. Such successes can become a source of advocacy for the application of all cost-effective and feasible methods for further reducing childhood morbidity and mortality in the developing world. Better use of existing technologies through improved management, training and evaluation techniques can be sought while at the same time identifying additional problems to be addressed through applied research and development.

The first steps must provide clear results if the full potential of this initiative is to be realized. These first steps should focus on immunization, where chances of early success are the greatest.

3. WHAT NEEDS TO BE DONE NOW: A THREE POINT PROGRAM

Given the national political commitment to the reduction of vaccine preventable disease morbidity and mortality, and the willingness to at least continue to commit resources at their current levels, three actions are needed now to increase immunization coverage in the developing world:

A. Placement of new financial and technical resources in a number of countries where vaccine preventable disease contributes significantly to childhood mortality or morbidity to accelerate the expansion of immunization coverage.

B. Simultaneously, provide increased support to ongoing immunization programs in all other developing countries to assure that none is constrained in their efforts to expand immunization coverage by lack of vaccines, supplies, equipment and technical assistance.

C. Intensification of research and development to make current immunization technology even more efficient.

A. Accelerate Expansion of Immunization Coverage in Selected Countries

Ten developing countries, which account for some 55% of all infant deaths, also account for nearly 70% of the deaths attributable to the EPI vaccine preventable diseases (Table 1). Expansion of immunization coverage i these countries has the potential of making a major global impact on childhoo morbidity and mortality. Resources should be provided to permit these countries, as well as additional countries with special political commitment or absorptive capacity, to expand immunization services at maximum possible speed. In addition, the countries selected should represent a diversity of size, socio-economic, geographic, and cultural settings to permit experience to be gained in the optimal methods for providing support.

The Alma Ata conference declaration of support for primary health care throughout the world in order to achieve health for all by the year 2000 will be realized in many countries only with major additional investments in the health sector for the development of a primary health care infrastructure. This initiative is in support of the Alma Ata goals. It uses immunization as an entry point for strengthening the capacities of the primary health care delivery system. It works through the existing infrastructure and helps build the additional infrastructure needed to assure that national health delivery systems have the permanent capacity to provide immunization and other priority health services.

A detailed assessment should be made of the current situation in each country selected (where such assessments do not now exist) and should include review of the magnitude of the problem, the extent of the development of primary health care services, and the requirements for strengthening immunization programs. Particular attention should be paid to identification of needs for external assistance in terms of manpower and training, supplies and cold chain equipment, and the needs for strengthening management capacities through additional staff (national or international) and/or training of existing staff. Criteria for evaluating country plans should emerge from this assessment.

Funding of individual programs should be contingent on a country submitting its own plan which satisfactorily addresses all aspects listed in the criteria. Special attention should be paid to assuring a national program focus, specific time limited objectives framed in terms of reduction of morbidity and mortality as well as delivery (vaccine coverage), effective supervisory mechanisms and adequate disease surveillance system. In addition to technical issues, the plan should include specific political commitments to the program, a description of the community level efforts to be made to assure community participation. Mechanisms for involving community leaders, school teachers, politicians, etc., to evolve a felt need for immunization services, a description of the external financial support needed and of the country's own financial contribution, both at the outset and over the longer term should be described.

In some countries, vaccines other than those included within the global EPI may be warranted for inclusion in the national program e.g., yellow fever, hepatitis B, meningococcal vaccine. Resources of the global initiative permitting, this should be encouraged, particularly where the prime target groups for immunization - mothers and infants - are the same as for the current EPI vaccines.

There should be willingness to support a variety of country-specific approaches to program implementation. On one hand, countries are aware that

the provision of adequate health measures can best be achieved through the creation of permanent, organized units. On the other hand, it is realized that such a process takes years, and that it is essential in the meantime to take effective steps as rapidly as possible against certain diseases which constitute a preventable burden. The challenge is to make an optimal mix of approaches so measures which can be undertaken now are applied, but are applied in a manner which gives maximum support for the development of permanent and comprehensive health services.

Further, countries are different, and strategies will have to be adjusted to individual epidemiological, political, social and economic situations. The distribution of susceptible children does not mirror overall distribution of infants in the world because programs in different countries are at different stages of development. Further, the distribution of the current burden of morbidity and mortality does not mirror the distribution of susceptible children, in part because of the differing age-specific patterns of disease, and in part because of the coexistence of other conditions which may increase the severity or worsen the prognosis (e.g. measles is much more likely to result in death in a malnourished child than in a well nourished one). Consequently, strategies will differ between countries and even within countries. Planning and implementation must be sufficiently flexible to allow for these difference.

Through mechanisms to be developed and agreed upon, country plans of action would be reviewed and, if acceptable, recommended for support. Following award of support, progress toward objectives specified in the plan should be monitored on a continuing basis through annual progress reports and through visits by consultant program reviewers. The reports should include data on disease incidence rates, immunization coverage, and vaccine quality. Technical personnel should visit each country frequently to discuss progress and problems and any needs to modify the plan or the character of outside support.

B. Simultaneously, Provide Increased Support to Ongoing Immunization Programs

Most developing countries, supported by WHO, UNICEF as well as by other international, national and voluntary agencies, are in the process of expanding the coverage of their immunization services as part of the development of primary health care. Growth in the early years of this effort has concentrated on investments to develop the management infrastructure. Many countries are now ready for accelerated growth, but are constrained by the inability to secure the basic supplies and technical help required. There are four specific areas in which this global initiative could support immunization efforts throughout the developing world, so as to assure that no country lacked the elements required for its planned expansion of immunization coverage.

1. Vaccines

There are approximately 50 countries in the developing world whose EPI vaccine requirements are being provided totally from outside sources, and this situation seems unlikely to change radically during the next decade. Although UNICEF and bilateral donors are generally fulfilling current vaccine requirements, acceleration of coverage and the recent addition of polio and measles vaccines to the immunization schedules of several large countries of South-East Asia threaten to exhaust these outside financial resources. UNICEF is currently the single largest supplier of vaccines to immunization programs in the developing world, and should be provided the financial support to assure that no developing country is constrained in its efforts to reduce childhood morbidity and mortality by shortages of vaccine.

2. Vaccine Supplies and Cold Chain Equipment

Most of the supplies and cold chain equipment necessary for the administration and transport of vaccines are purchased with 'hard currency' and are currently being provided from donor resources. These include needles, syringes and sterilization equipment, in addition to refrigerators, cold boxes

and vaccine carriers. The cold chain equipment is critical to permitting the expansion of services with potent vaccines. Further, these items contribute to strengthening health services beyond immunization. As is the case with vaccines, UNICEF is the current major supplier of these items, and should be given the resources to meet global program needs.

For governments purchasing their own vaccines and other supplies and equipment, revolving funds, similar to that instituted in the Americas, should be supported to assist countries to obtain materials of satisfactory quality at the most economical prices.

3. Training and Training Materials

Extensive training materials covering the technical and management aspects of immunization services, diarrheal disease control, and logistics for primary health care have been developed by WHO, and are being used widely with WHO and UNICEF support. Additional resources are required to accelerate the training of health workers, as well as to adapt the training materials to meet national needs and to translate them into national languages.

4. Management and Evaluation

Many ongoing immunization programs would benefit from increased levels of external support to improve management at central and intermediate levels and to strengthen both continuous and periodic program evaluation. WHO and UNICEF are principal providers of this support at present.

C. Research and Development

Further improvement of the efficiency and effectiveness of immunization services is possible and requires active and persistent pursuit of research efforts as part of program operations. An intensive, focused, operational research program along with limited intermediate research activities to

stimulate breakthroughs should be supported. Specific efforts should include:

- development of more effective methods for the promotion of community involvement;

- continued study of the epidemiology of the target diseases and of the impact of immunization schedules and vaccines to search for the most cost-effective techniques to reduce vaccine preventable morbidity and mortality, including the field application of new vaccines.

- improvement of program evaluation methods, focusing on improved disease surveillance systems, on survey techniques for the determination of immunization coverage and disease incidence rates, and on approaches for conducting periodic reviews of national programs, where immunization is reviewed as one of a number of components of primary health care;

- improvement of methods and materials relating to the cold chain to ensure that vaccines are maintained in a safe, effective and stable manner;

- development of more heat-stable vaccines which will reduce the dependence on the cold chain;

- development of vaccines that are safer, more effective, easier to administer, and/or that require fewer doses.

While there is rich research potential in exploring the application of genetic engineering and other emerging technologies to the development of new vaccines and new vaccine combinations, there is already active interest in this field in many quarters, and it is suggested that resources stemming from this immunization initiative be used sparingly in basic research, being reserved as a source of last resort for projects which appear to have particularly important public health potential.

4. IMPLEMENTATION ISSUES AND POTENTIAL IMPEDIMENTS

The success that many countries had in achieving smallpox eradication is an important legacy demonstrating that apparently difficult tasks are indeed achievable. This raises expectations that resources made available through this immunization initiative if judiciously applied, will effectively and efficiently catalyze broader immunization program goals.

A. Priority Afforded Health

There are major differences between countries and within countries in the priority afforded health and as a result, health care delivery systems are varied, and the proportion of the annual budget and GNP allocated to health differ. Health programs in developing countries are generally given low priority. The ability of individual countries to invest the resources required to start and to maintain this effort may require a major change in attitude so that access to health care is considered an investment rather than a consumption of resources. Recognizing the necessity in many countries to increase the allocation of resources to the health sector, the program will have to be presented in epidemiologically persuasive manner. The support and commitment of political leaders in developing support for this initiative will be important in assuring its acceptance and success.

B. Politial Commitment

Obtaining the necessary political commitments may be the most challenging task. Development of a primary health care system with the accompanying resource obligations is an interlocking series of political, economic and social issues, and will require effective marketing. It should be realized at the outset that some countries may not be prepared to begin an accelerated immunization initiative.

C. Tension with Curative Medicine

Developing countries are currently expanding efforts against diseases that were controlled several decades ago in industrialized countries. At the same time they are under pressures to keep pace with the expensive technology of modern medicine. This initiative may increase the tension between a necessary concentration of limited new resources on public health measures and a temptation to engage in fashionable gadgetry. The strong motivation to invest in curative versus preventive medicine services must not be underestimated, otherwise the efforts required for change will be underestimated.

D. Limited Absorptive Capacity

The expansion of a primary health care delivery system may require more than financial resources in some countries. Unfortunately, the countries with the lowest immunization levels or the least developed health care structure may also be least able to utilize additional financial resources efficiently or effectively. This limited absorptive capacity results from a mix of low educational level, administrative inefficiency, poor motivation, material shortages and political instability. The availability of additional financial resources alone will not improve outcomes proportionately in such environs.

Therefore, this initiative must be prepared to make available sufficient technical and management training through external assistance. Increased attention to manpower development, training, management and administration will be required for all levels of personnel in the health sector. Careful evaluation of needs, and thoughtful planning will be required to ensure that the additional resources of this initiative will be effectively applied and utilized.

Further, to accelerate immunization coverage at the pace desired will require the placement of experienced manpower in many of the participating countries. Identification and cataloguing of needs, development of plans of action, delineation of specific training needs, and facilitation of implementation, all will require an infusion of trained manpower to provide assistance if this initiative is to succeed.

E. Community Support and Social Will

It is recognized that an increase in the supply of vaccines alone will be insufficient to increase the demand for immunizations. Techniques which effectively mobilize community support for improved health are not yet employed in most health systems and are needed in support of this immunization initiative. Much additional effort will be required to develop and apply country-specific techniques to ensure the evolution of community felt needs for immunization and other preventive health services.

F. Maintenance of Coverage is Not Less Expensive

Continuing costs in immunization program are nearly as high as start up costs, since the size of the cohort to be immunized will remain the same or increase with time. As long as the eradication of vaccine preventable diseases is not feasible, maintenance of high levels of vaccine coverage will be necessary to keep morbidity and mortality levels low. Failure to maintain high levels will result in recrudescence of disease.

G. Cold Chain

Although some vaccines such as measles, have had stabilizers added which prolong potency at high ambient temperatures most require continuously monitored refrigeration of freezing and protection from sunlight. In some countries the maintenance of the cold chain is one of the most serious problems currently facing immunization programs. Although technology may generally be present to ensure an adequate cold chain, the monitoring and supervision of the system is often not fully developed.

H. Vaccines

The necessity of giving several doses of some vaccines makes it more difficult to achieve full protection than would be the case if a single dose sufficed (e.g. DTP and polio each require 3 doses to complete a primary series). In addition, the technique of administration (e.g. intradermal injection of BCG vaccine) may require the use of highly trained personnel.

The inability to offer measles vaccine during the first 6 months of life because the parenterally administered vaccine does not stimulate protective antibodies in the presence of passively acquired transplacental maternal antibodies limits the age at which successful vaccination can take place. In many areas of the world where infection is highly prevalent, many children will have had measles before programs can reach them for vaccination.

I. Population Growth

The continued press of population growth especially in developing countries not only multiplies the problems of delivering services, but may substantially blunt coverage achievements. The early discussion and addition of child spacing, birth control, and family planning techniques along with other simple preventive technologies will be necessary.

5. ORGANIZATIONAL ISSUES

A wide variety of organizations, structures, and systems are presently providing direct support to the immunization effort in the developing world:

Governmental:	National health systems of developing countries
Bilateral:	Development aid agencies of industrialized countries

Multilateral:	WHO - UNICEF - UNDP - World Bank
Other:	Non-governmental organizations
	Religious and charitable bodies
	Public health institutes
	Academic faculties

The support being provided by the above bodies is a reflection of, and influenced by the resources available to them, their internal regulations and the political considerations specific to each body. The World Health Organization has, to date, informally functioned as a general coordinator of the global immunization effort, and served as a focal point for all interested parties. The EPI Global Advisory Group, meeting annually, has heretofore provided the only scientific forum to review global activities. As the two organizations most heavily involved in promoting and providing external support to the global EPI, WHO and UNICEF have coordinated their efforts to cover the spectrum of activities involved in operational support:

WHO	Program planning, management, and evaluation; Development of training materials and organization of training at global, regional and national levels; Development and management of information and surveillance systems; Research and development of cold chain equipment, vaccine monitoring technology, and equipment for vaccine administration.
UNICEF	Provision of vaccines, cold chain equipment, and other supplies; Project support communications for health workers and the general public; Specific country assistance in support of training and evaluation.

The recognized resources and established structures of the Governments, the UN Agencies, and other donor sources should be utilized to the maximum extent to facilitate implementation of the initiative. In creating any additional organizational structure, efforts should be made to avoid conflicting duplication of technical, managerial, administrative and financial services already in existence.

An organizational chart for a Consultative Group to Protect the World's Children is presented in Figure 1, and its component parts briefly described below.

Membership and functions of the units shown in Figure 1 are shown in Table 2.

6. Costs

A. Limitations of Existing Data

The paucity of existing data on the actual expenditures of immunization programs in developing countries makes it difficult to determine the precise total cost of the proposed immunization initiative.

The relatively small number of studies undertaken to date indicate that the cost of fully immunizing a child* is in the range of $10.00 to $15.00 and $1.50 to $3.50 per fully immunized pregnant woman.** However, the studies from which these estimates are made represent a wide range of immunization program sizes, vaccine packages, delivery system settings with different input requirements, years of operation, service contacts and financial accounting systems which preclude direct comparisons. In addition, these studies are based on short term data which inhibits identification of both economies and dyseconomies of scale.

*a fully immunized child is defined as having received 1 dose BCG, one measles, 3 DTP, and 3 oral polio.

**a fully immunized pregnant woman is defined as having received at least 2 doses of tetanus toxoid prior to delivery.

B. Current Expenditures and Source of Current Funds

Despite the limitations of existing data, several important findings consistently emerge from these studies. Immunization programs are highly recurrent cost intensive. Recurrent costs represent between 70-86% of the total costs in all the projects studied [1-7] and this proportion is not significantly affected by the kind of service delivery system through which immunization was offered whether fixed, mobile or a combination of fixed and mobile (Table 3). Within the cost categories, salaries represent the largest proportion of both the recurrent and total costs, an average of 45%; vaccines represent an average of 12% of total costs.

When costs are broken down by the source of the funds, the data highlight that developing countries themselves have been and continue to assume the major proportion of the costs of immunization programs assuming approximately 80% of total project costs. External funds support only 1/5 of the total costs, 2% of which are the cost of vaccines (Table 4).

C. Basis of the Projected Costs

As the core component and foundation for the development of a primary health care delivery system structure where it does not exist, the estimated resource requirements presented reflect not only the direct program cost of fully immunizing a child and a pregnant woman but also the costs of establishing the basic infrastructure including manpower development and facilities which will form the nucleus of the primary health care delivery system. As oral rehydration and other initiatives are added only their incremental costs will be added to the total cost of delivering these services.

D. Overall Costs

In year one, under maximal external support assumptions, a total of US $226 million will be required (US $114 in the accelerated area US $112 in the ongoing areas). By year 6 when all 10 countries will be phased into the

accelerated areas US $1.1 billion will be required (US $900 in the accelerated areas and US $223 in the ongoing areas) in current dollars.

E. Accelerated Areas

The projected maximum and minimum estimates of annual total costs in 1985 in U.S. dollars for various assumptions of cost per fully immunized infant and pregnant woman are outlined in Table 5. These figures reflect a best guess based on the stated assumptions. Year one can be estimated to cost US $143 million (1985 dollars). By year six when all 10 countries would be phased in costs may range from US $1-1.2 billion. The external resources required to support this level of program activity are illustrated in Table 6 under varying maximal assumptions of external support ranging from 20-80% in current dollars. If up to 80% of program costs are to come from external sources US $28-114 million of the total costs will be required in the first year of the initiative and up to US $225-900 million when all 10 countries are phased in by the 6th year of the program, using the maximum cost assumptions.

It should be observed that the increasing size of each new birth cohort increases the program task and costs. For each increment of additional coverage achieved, a portion of the coverage is eroded by the growth rate in the targeted infant population.

F. Ongoing Areas

The projected maximum and minimum estimates of annual total costs in 1985 dollars to varying assumptions of costs per fully immunized infant and pregnant woman are shown in Table 7. Year one can be estimated to cost US $140 million (in 1985 dollars). Table 8 shows the external resources required under varying assumptions of external funding required in current dollars. In year one between US $28-112 million in current dollars will be required. By year 6, costs will range from US $55-222 depending on the assumptions of external support.

G. Cost Issues

Given the extensive expansion of the program envisioned and the likely inability of many low income countries to invest any new resources in the health sector, and for some the possibility of spending even less, the traditional donor support only for capital costs may require reassessment both of the type and duration of support required. The commitment of countries to the EPI to date is apparent from the total cost of immunization programs assumed by national governments (79%); however, in a program of such importance which is so recurrent cost intensive, careful consideration may need to be given not only to the traditional support of capital costs but also to support of recurrent costs if this initiative is to significantly accelerate the current limited immunization coverage.

Since it will likely take 5-10 years for programs to develop to maturity, maximal external assistance should generally be provided for from 5-20 years, with countries thereafter gradually replacing much external support with National support. This must be understood by both host countries and donor institutions. Emphasis should be placed at the outset on a plan which will maximize self sufficiency at the end of the period of external assistance.

On the other hand, it must be recognized that for the forseeable future some countries will not be able even to begin to allocate additional resources for the development of infrastructure, while others may have only the potential capacity to sustain growth of their health sectors in the future. Both groups will require long term external assistance to support recurrent costs to run health services.

Recognizing that the immunization initiative is just the opening wedge in the campaign to protect the world's children from preventable illness, innovative approaches to stimulating the development of a health care delivery system must be undertaken. This initiative may be easily undermined if not given adequate internal and external resources and if plans are not carefully made to permit phased growth with sustaining resources.

Because of the paucity of existing actual data on expenditures early research will focus on acquiring a better understanding of costs and identifying potentially greater efficiencies of limited resource use.

H. Research and Development

No provision for research and development has been made in the estimates provided. It may be appropriate to make available some 5-10% of the funds mobilized under this initiative for research and development efforts.

Table 1

Developing Countries Ranked by Number of Deaths from Selected Vaccine Preventable Diseases (excluding China), 1983

Country	Estimated annual deaths				
	Neonatal tetanus[1] (000's)	Measles[2] (000's)	Pertussis[3] (000's)	Total (000's)	Cumulative %
1. India	298	782	189	1 269	28
2. Pakistan	132	163	66	361	36
3. Bangladesh	119	173	69	361	44
4. Indonesia	71	218	63	352	51
5. Nigeria	64	171	68	303	58
6. Mexico	31	57	19	107	60
7. Ethiopia	16	60	25	101	62
8. Zaire	21	45	19	85	64
9. Philippines	12	39	12	83	66
10. Brazil	28	34	18	80	68
11. Burma	20	43	16	79	70
12. Thailand	10	57	11	78	71
13. Vietnam	12	46	19	77	73
14. Kenya	9	37	15	61	74
15. Egypt	16	32	13	61	76
16. South Africa	11	35	14	60	77
17. Sudan	8	36	15	59	78
18. Afghanistan	11	27	11	49	79
19. Iran	17	19	9	45	80
20. Algeria	10	25	8	43	81
21. Morocco	10	21	5	36	82
22. Turkey	8	16	5	29	83
23. Colombia	9	14	6	29	83
24. Tanzania	6	7	6	19	84
25. Rep. of Korea	5	10	2	17	84
Total	954	2 187	703	3 844	84
All other developing countries	181	411	139	731	16
Grand total	1 135	2 598	842	4 575	100

1. Based on survey data or in absence of survey data, neonatal tetanus deaths are estimated from countries with similar socio-economic conditions.

2. Based on immunization coverage data reported to EPI/WHO, assuming vaccine efficacy of 95% and that 90% of unimmunized children will acquire measles. Coverage is assumed to be zero in countries from which data are not available.

3. Based on immunization coverage data reported to EPI/WHO assuming vaccine efficacy of 80% and that 80% of unimmunized children will acquire pertussis. Coverage is assumed to be zero in countries from which data are not available.

Table 3

Distribution of Recurrent and Nonrecurrent Costs
Observed in 11 Evaluated EPI Programs

ost Category	Total Costs (Range) (%)
Recurrent Costs	
Salaries [A]	45 (27-60)
Transport [B]	12 (8-15)
Vaccines [C]	12 (3-21)
Miscellaneous [D]	8 (5-43)
Subtotal	77 (70-36)
Nonrecurrent Costs	
Buildings	3 (2-3)
Vehicles	1 (1-2)
Equipment [E]	17 (9-20)
Miscellaneous [F]	2 (<1-3)
Subtotal	23 (14-30)
Grand total	100

A Immunization team, support supervisors and managers

B Staff travel allowance and expenditures, fuel, vehicle maintenance, vaccine distribution

C Includes BCG, 3 DTP, 3 OPV, Measles, unless otherwise indicated

D Kerosene/electricity, stationary, cold chain maintenance, jet injection maintenance, etc.

E Refrigeration, cold chain, vehicles

F Other equipment and spare parts

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Table 4

Distribution of Costs by National and External Sources Observed in the 11 Evaluated EPI Programs

Cost Category	Source of Funds		Total
	National (%)	External (%)	(%)
Recurrent Costs			
Salaries	42	3	45
Transport	9	3	12
Vaccines	10	2	12
Miscellaneous	7	1	9
Subtotal	68	9	77
Nonrecurrent Costs			
Buildings	2	1	3
Vehicles	8	10	1
Equipment			17
Miscellaneous	1	1	2
Subtotal	11	12	23
Grand total	79	21	100

Table 5

Projected Maximum and Minimum Estimates of Annual Total Costs in 1985 Dollars for Varying Assumption of Cost per Fully Immunized Infant and Pregnant Women in the Proposed Accelerated Areas

Year	Target Infants[1,2]	Projected Coverage	Cost per Infant		Pregnant Women[2]	Target Coverage[3]	Projected Cost per Pregnant Woman[1,2,3]		Total Cost in 1985 US$	
			Max.[4]	Min.[5]			Max.[4]	Min.[5]	Max.	Min.
	(000)	(%)	(US $)		(000)	(%)	(US $)		(000)	
1	9042	40	15.00	15.00	2261	10	3.50	3.50	143,548	143,548
2	11527	50	15.00	15.00	5763	25	3.50	3.50	193,074	193,074
3	22111	60	15.00	15.00	16583	45	3.50	3.50	389,711	389,711
4	26307	70	15.00	15.00	22549	60	3.50	3.50	473,530	473,530
5	28744	75	15.00	14.00	26828	70	3.50	3.00	525,064	482,906
6	39498	80	15.00	14.00	39498	80	3.50	3.00	730,709	671,462
7	40244	80	15.00	14.00	40244	80	3.50	2.75	744,519	674,092
8	41005	80	15.00	14.00	41005	80	3.50	2.75	758,590	686,832
9	41780	80	15.00	12.50	41780	80	3.50	2.55	772,928	628,787
10	42570	80	15.00	12.50	42570	80	3.50	2.40	787,536	634,286
11	43374	80	15.00	12.50	43374	80	3.50	2.40	802,421	646,274
12	44142	80	15.00	12.50	44142	80	3.50	2.25	816,623	651,092
13	44923	80	15.00	11.00	44923	80	3.50	2.25	831,078	595,231
14	45718	80	15.00	11.00	45718	80	3.50	2.25	845,788	605,767
15	46527	80	15.00	11.00	46527	80	3.50	2.00	860,758	604,857
16	47351	80	15.00	10.00	47351	80	3.50	2.00	875,994	568,212

1 The proposed accelerated areas consist of the 10 developing countries with the highest vaccine preventable disease mortality. China's population was excluded because of the likelihood that external resources will not be required for this initiative. Source: Demographic indicators of Countries. Estimates and Projections as Assessed in 1980. Department of International Economic Cultural Affairs. U.N. ST/ESA/SER. A/82. The median variance of each projection has been chosen.

2 Total infants and pregnant women at risk was estimated in year 1 by phasing in 3 countries for acceleration. Year 3 - 3 additional countries (total 6) and by Year 6 - the last 4 countries included. The target population is infants in each successive birth cohort. The backlog of unimmunized missed infants in each cohort is not considered a primary target. The birth rate in the developing countries was assumed to be 3.0%, and slowly declining; to approximate the increase in cohort size, a base year birth rate was increased by the population growth rate.

3 Total pregnant women at risk were considered all women 15-49 years of age. This projection does not take into account multiparity. Each pregnant woman is assumed to deliver one liveborn infant. This assumption ignores as much as 5% total wastage which necessitates vaccinating 105 women for each 100 liveborn children.

4 No economies of scale or dyseconomies of scale are assumed.

5 In the early years of program expansion, 3-4 years are expected at constant cost before the average cost of immunizing a child and a pregnant woman may benefit from any economies of scale. There may be on the other hand, certain dyseconomies of scale and infrastructure development which inhibit any further fall in costs. In addition, increasing marginal costs may be observed as the program extends to the lease accessible populations.

Table 6

Projected Maximum and Minimum Estimates of Annual Total Costs in Current Dollars for Varying Assumptions of External Program Support in the Proposed Accelerated Areas

Year	Total Cost in Current US$[1]		External Support for Program, US$ (Maximum Cost Assumption)[2]		
	Max. (000)	Min.	20.0%	50.0% (000)	80.0%
1	143,548	143,548	28,710	71,774	114,838
2	211,802	211,802	42,360	105,901	169,442
3	469,991	469,991	93,998	243,995	375,993
4	623,307	623,307	124,661	311,654	498,646
5	749,634	689,444	149,927	374,817	599,707
6	1,125,584	1,034,320	225,117	562,792	900,467
7	1,231,658	1,115,150	246,332	615,829	985,326
8	1,342,250	1,215,280	268,450	671,125	1,073,800
9	1,457,587	1,185,767	291,517	728,794	1,166,070
10	1,577,829	1,270,792	315,566	788,914	1,262,263
11	1,703,138	1,371,716	340,628	851,569	1,362,510
12	1,831,523	1,460,268	366,305	915,762	1,465,218
13	1,965,000	1,407,365	393,000	982,500	1,571,000
14	2,103,728	1,506,724	420,746	1,051,864	1,682,982
15	2,247,956	1,579,645	449,591	1,123,978	1,798,365
16	2,397,770	1,555,310	479,554	1,198,216	1,918,216

1 1985 dollars were inflated to current dollars using an inflation rate of 9.7% (this i a combination of a 10% national inflation rate weighted 0.9 to 0.1 with a 7% international rate). Source: World Bank.

2 National governments will be expected to contribute no less than they are now contributing to immunization programs. The current level has been maintained as a constant commitment.

Table 7

Projected Maximum and Minimum Estimates of Annual[1] Total Costs in 1985 Dollars for Varying Assumptions of Cost per Fully Immunized Infant and Pregnant Women in the Ongoing EPI Areas[1]

Year	Target Infants	Projected Coverage	Cost per Infant[2]		Target Pregnant Women	Projected Coverage	Cost per Pregnant Woman[2]		Total Cost in 1985 US$	
			Max.	Min.			Max.	Min.	Max.	Min.
	(000)	(%)	(US$)		(000)	(%)	(US$)		(000)	
1	27,633	40	4.80	4.80	6,908	10	1.12	1.12	140,375	140,375
2	31,702	45	4.80	4.80	10,567	15	1.12	1.12	164,007	164,007
3	29,251	50	4.80	4.80	14,626	25	1.12	1.12	156,787	156,787
4	32,816	55	4.80	4.80	23,864	40	1.12	1.12	184,233	184,233
5	33,463	55	4.80	4.48	34,429	50	1.12	0.96	194,696	179,120
6	31,002	60	4.80	4.48	28,419	55	1.12	0.96	180,639	166,172
7	34,220	65	4.80	4.48	31,588	60	1.12	0.88	199,637	181,105
8	34,867	65	4.80	4.48	34,867	65	1.12	0.88	206,414	186,888
9	38,259	70	4.80	4.00	38,259	70	1.12	0.82	226,493	184,255
10	38,982	70	4.80	4.00	38,982	70	1.12	0.77	230,774	185,867
11	42,506	75	4.80	4.00	39,672	70	1.12	0.77	248,461	200,491
12	43,258	75	4.80	4.00	40,374	70	1.12	0.72	252,858	202,102
13	44,024	75	4.80	3.52	44,024	75	1.12	0.72	260,621	186,661
14	44,803	75	4.80	3.52	44,803	75	1.12	0.72	265,234	189,965
15	48,636	80	4.80	3.52	45,596	75	1.12	0.64	284,519	200,379
16	49,496	80	4.80	3.20	49,497	80	1.12	0.64	293,020	190,067

1 The ongoing EPI areas are defined as all those countries considered as developing by the UN classification excluding the 10 countries included in the accelerated areas. Developing countries are phased into the accelerated areas.

2 The cost per fully immunized infant or pregnant woman is estimated to be 1/3 the costs of immunization programs in the accelerated areas based on Table 3 (the sum of recurrent costs for vaccines, transport and miscellaneous).

Table 8

Projected Maximum and Minimum Estimates of Annual Total Costs in Current Dollars for Varying Assumptions of External Program Support in the Ongoing EPI Areas

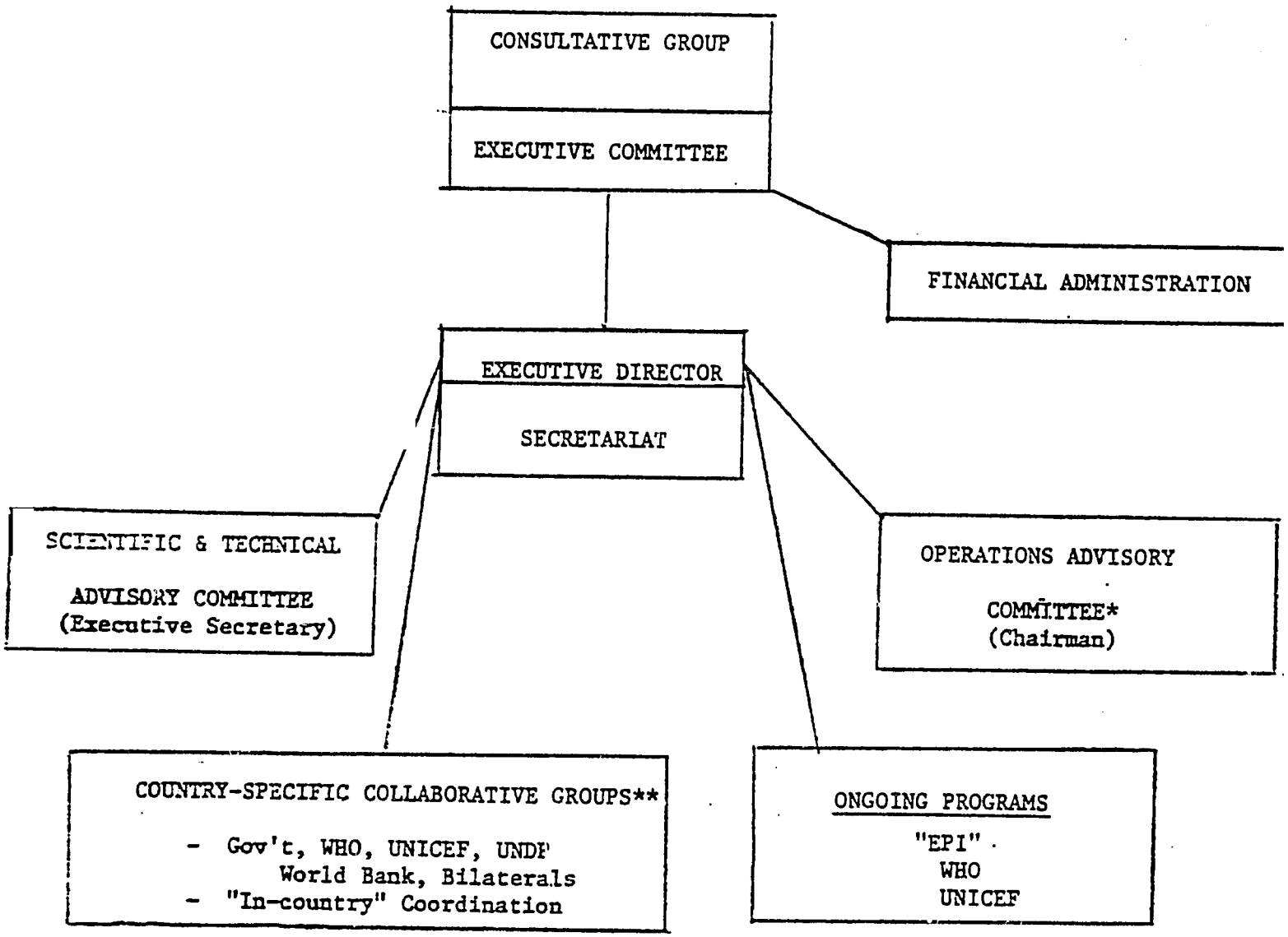
Year	Total Cost in Current $US[1]		External Support for Program, Current $U		
	Max.	Min.	Maximum Cost Assumption[2]		
			20.0%	50.0%	80.0%
	(000)			(000)	
1	140,375	140,375	28,075	70,187	112,300
2	179,916	179,916	35,983	89,958	143,933
3	189,086	189,086	33,858	84,646	135,433
4	242,506	242,506	48,501	121,253	194,005
5	277,967	255,730	55,593	138,983	222,374
6	278,257	255,971	55,651	139,128	222,605
7	330,259	299,602	66,052	165,130	264,207
8	365,229	330,680	73,046	182,614	292,183
9	427,121	347,469	85,424	213,561	341,697
10	462,356	372,384	92,471	231,178	369,885
11	527,358	425,543	105,472	263,679	421,886
12	567,111	453,275	113,422	283,555	453,689
13	616,212	441,341	123,242	308,106	492,970
14	659,717	472,500	131,943	329,858	527,773
15	743,051	523,311	148,610	371,525	594,441
16	802,055	520,252	160,411	401,027	641,644

1 The cost per fully immunized infant or pregnant woman is estimated to be 1/3 the co of immunization programs in the accelerated areas based on Table 2.

2 1985 dollars were inflated to current dollars using an inflation rate of 9.7% (this a combination of a 10% national inflation rate weighted 0.9 to 0.1 with a 7% international rate).

FIGURE 1

PROPOSED ORGANIZATIONAL CHART FOR THE CONSULTATIVE GROUP TO PROTECT THE WORLD'S CHILDREN



* WHO, UNICEF, UNDP, World Bank, etc.
** One Group in each location Accelerated Country

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RECOMMENDED CONFERENCE OUTCOMES

Robert - File Copy

RECOMMENDED CONFERENCE OUTCOMES

Objectives for Oral Rehydration Therapy

1. Endorsement of Oral Rehydration Therapy as an important priority intervention in Primary Health Care.

   1.1 Agreement that oral rehydration therapy is a cost-effective health intervention which could save millions of lives each year.
   1.2 Agreement that there remains a significant unmet need for financial and technical assistance in many countries.
   1.3 Agreement that the technology of oral rehydration therapy can be as effective as immunization as an entry point for the development of comprehensive primary health care services.
   1.4 Agreement that the Consultative Group should build on the growing worldwide interest in Oral Rehydration Therapy generated by such successful activities as ICORT and the GOBI promotional campaign.

2. Incorporation of ORT into health interventions targeted by the Consultative Group.

   Agreement that ORT could enhance not detract from other appropriate interventions and may, in particular cases, be more cost-effective.

3. Agreement that considerable collaborative research, analysis, planning and deliberation needs to be carried out by staff, designated by members of the Consultative Group, prior to the initiation of program actions or the mobilization of world opinion.

4. Agreement that the following ORT activities be included in the planning to be undertaken by the Consultative Group staff:

   4.1 Ensuring that ORT be introduced into all levels of the national and international health systems through policy development and dialogue, training of health workers, health planning/implementation and resource allocation.
   4.2 Improving the availability of ORT by providing salts, augmenting local production facilities, and encouraging home production and use by mothers or families.
   4.3 Improving home-based therapy by facilitating the ability of families and mothers to understand the importance and timely use of ORT interventions.

4.4 Improving and facilitating communications among, and utilization of ORT by, public and private sector health professionals, including traditional medical/health care practitioners.

4.5 Recognizing and making maximum use of the synergistic interactions between ORT and immunizations and other priority health services related to PHC such as family planning, nutrition, etc.

5. Agreement that the Consultative Group will meet prior to _____, 1984 to review the detailed plans for specific ORT program initiatives which are developed by the designated staff.

6. Agreement that the Consultative Group will issue a statement of support such as given by President Reagan on April 18, 1983. An example of such a statement:

> Humanity has always been deeply concerned and supportive of children's health and well-being. As leaders of international development agencies, universities, foundations, and governments, we ask the world community to help bring about a health revolution for children during the coming decades by supporting specific health intervention programs endorsed by the Consultative Group to Protect the World's Children, particularly ORT and immunization.

RECOMMENDED CONFERENCE OUTCOMES

Objectives for Oral Rehydration Therapy

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Objectives for Immunization

1. Endorsement of immunization as an important priority intervention in PHC and as part of the ongoing efforts of the Consultative Group.

   1.1 Agreement that immunization is a cost-effective health intervention which could save millions of lives each year.
   1.2 Agreement that there remains a significant unmet need for financial and technical assistance in many countries.
   1.3 Agreement that the effective delivery of immunization services is an effective entry point for the development of comprehensive primary health care services.

2. Agreement that considerable collaborative research, analysis, planning and deliberation needs to be carried out by staff, designated by members of the Consultative Group, prior to the initiation of program actions or the mobilization of world opinion. Specific emphasis needs to be placed on:

   2.1 Political Commitment
   2.2 Comparative & Recurrent Cost
   2.3 Vaccines
   2.4 Refrigerators and Supplies (Syringes and Needles)
   2.5 Research....Basic
   ....Operational

3. Agreement that the Consultative Group will meet, prior to _____, 1984 to review the detailed plans for specific ORT program initiatives which are developed by the designated staff.

4. Agreement to improve the delivery of immunization by the private health sector and health professionals.

5. Agreement to take advantage of the synergistic interactions of immunization programs with ORT and other priority health services related to PHC such as family planning, nutrition, etc.

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5. Agreement to take advantage of the synergistic interactions of immunization programs with ORT and other priority health services related to PHC such as family planning, nutrition, etc.

Administrative/Organizational Objectives

1. Agreement that there is no need for creation of another donor agency, and that instead, the CG's activities be focused on advocacy, policy development, mobilization of private resources, and facilitation and coordination of country selection and in-country program interventions by donor members.

   (See attached illustrative functional statement, which contrasts with page 21 of Foege paper proposing in effect a donor resource allocating and check-writing "super donor agency.")

2. Agreement that there be formed a small Executive Secretariat that would report periodically to the Consultative Group, and whose function would be primarily: (a) the provision of administrative support to the CG; and (b) information sharing and clearinghouse functions, advisory services to, and operational support of coordinated activities among CG members/donors.

   (The Foege plan would have a secretariat much like this, but reporting to an Executive Committee, which we do not need if this CG is to be a coordinative body vs. a de facto donor agency.)

3. Agreement that there will be formed, as necessary, ad hoc advisory groups for scientific/technical and operational affairs.

   (We see these as advisory, ad hoc, convened as needed. The original plan has them as decision-making standing committees.)

4. Agreement that CG members be encouraged to carry out in-country programs in coordination with one another and where appropriate, through country-specific collaborative groups.

   (As called for in the Foege paper.)

5. Agreement that the Secretariat's first task, assisted by assigned staff from CG members as necessary, will be to develop within _____ months a general work plan, and to then report that plan back to the CG. The plan should focus on the identification and design of specific programs for EPI, ORT, and other appropriate PHC interventions, and consider such factors as:

- Country-by-country approaches instead of a single model program design.

- Policy dialogue with host countries to ensure commitment.

- Assurance of financial resources to cover initial and recurrent program costs.

- Coordination of present donor and host country health and development programs with designated priority health care interventions.

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CATLEY-CARLSON, Margaret
President, Canadian International Development Agency (CIDA)
b.: Regina, Saskatchewan, October 6, 1942
educ.: B.A. (hon.) Univ. British Columbia, 1966; post-graduate work in International Relations & Latin American Affairs, Univ. of West Indies.
car.: Asst. Secretary-General of United Nations, & Deputy Executive director for UNICEF since 1981; Assistant Under-Secretary for Trade, General Economic, Commodity & Development Policy, & North-South Relations, Dept. External Affairs, 1980-81; Senior Vice-President/Acting President of the (CIDA), 1979-80; Vice-President of the Agency, 1978-79; joined Dept/o External Affairs, 1966; Economic Counsellor for Canadian High Commission in London, England, 1975-78; assigned to Conference on International Economic Cooperation in Paris, (1976-88); worked in various divisions in Dept. External Affairs, 1970-75; Second Secretary at Canadian High Commission in Colombo, Sri Lanka, 1968.

CATTANI, Sergio
Minister Plenipotentiary (Without Portfolio) - Ministro Plenipotenziario (di Prima Classe)
b.: September 10, 1929, Bologna
educ.: Obtained Law Degree from U. of Catania, 1954.
car.: Joined Ministry of Foreign Affairs, 1956; Vice-Consul & Attache in Paris, 1957; 2nd Vice-Consul & 3rd Secretary, 1958; 1st Vice-Consul, 1959; 2nd Secretary, 1960; Italian Embassy (Belgrade, Yugoslavia), 1961; 1st Secretary, 1962; Mission to Paris to the NATO Defence College, 1964; 1st Secretary-c/o Italian Representation to NATO in Paris, 1965; Counsellor, 1967; Direzione General Affari Politici Rome, Ufficio 6, 1967; Capo Secretario Direttore Generale degli Affari Politici, Rome, Head Secretary, Director General for Political Affairs, 1969; Consigliere d'Ambasciata in Rome, 1969; responsible for the Uffico Ricerche Studie Programmazione of the Direzion - Generale degli Affair Politici, 1970; 1st Counsellor, Italian Embassy (Vienna, Austria); Minister Plenipotentiary (di 2nda Classe), 1976; Italian Ambassador (Lagos, Nigeria), 1977; appointed as "adviser" to assist the Minister of Foreign Affairs in order to coordinate activities for aid to be given to developing countries; promoted as Minister Plenipotentiary (without Portfolio) di Prima classe.

DE DONNEA DE HAMOIR,
Chevalier Francois-Xavier
International Civil Servant
b.: April 29, 1941,
Edegem, Belgium
educ.: Graduated in Economic Science, Universite Catholique de Louvain, 1963; M.B.A., Univ. of California, Berkeley, 1965; graduated in Applied Economics, Universite Catholique de Louvain, 1968; doctorate in Economic Science, Erasmus Univ., Rotterdam Nederlandse Economische Hogeschool, 1971.
car.: Assoc. Prof., Universite Catholique de Louvain, 1971-77; Prof. in Economic Policy & Public Administra- tion, Universite Catholique de Louvain, 1978-; Chairman, Centre de Recherche en Gestion Publique de l'Institut d'Administration et de Gestion, 1981-; Undersecretary of State for Development Cooperation, 1983-present.

FOEGE, William Herbert
Public Health
Administrator
b.: Decorach, Iowa,
March 12, 1936
educ.: B.A., Pacific Luth.
U., 1957; M.D., U.
Washington, 1961; M.P.H.,
Harvard U., 1965
car.: Intern, USPHS Hosp.,
S.I., N.Y., 1961-62;
epidemic intelligence
service officer Communi-
cable Disease Center,
Atlanta, 1962-64; med.
officer Immanuel Med.
Center, Yahe, Eastern
Nigeria, 1965-66; epidemi-
ologist smallpox
eradication/measles
control program, Eastern
Nigeria, 1969-70; dir.
smallpox eradication
program Center Disease
Control, Atlanta, 1970-73,
dir. Center Disease
Control, 1977 -- med.
epidemiologist assigned to
SE Asia Regional Office
smallpox program WHO,
New Delhi, 1973-75; WHO
cons., Bangkok, Thailand,
1967, Kinshasha, Zaire,
1968; dep. field coordina-
tor Internat. Red Cross
Joint Relief Action, Nigeria.

FORSSE, Anders
Director-General
b.:
educ.:
car.: Attache Ministry of
Foreign Affairs New York,
Washington, 1949-55;
Secretary, Ministry of
Foreign Affairs 1955-59;
First Secretary 1959-60;
First Secretary to Sweden's
Delegation to OEEC/OECD
Paris 1960-62; Consul and
Charge d'Affaires Algiers
1962-63; Chief of Section,
Ministry of Foreign Affairs
1963; Chief of Dept. SIDA
1965; Director 1978;
Director-General since 1979.

GRANT, James Pineo
American International Civil
Servant
b.: May 12, 1922, Beijing,
China
educ.: Univ. of California
at Berkeley, Harvard Univ.
Law School.
car.: Served U.S. army
1943-45; with UN Relief and
Rehabilitation Admin.
1946-47; Acting Exec. Sec.
to Sino-American Joint
Committee on Rural
Reconstruction, 1948-50; Law
Assoc., Covington and
Burling, Washington, D.C.,
1951-54; Regional Legal
Counsel, New Delhi, U.S. aid
programmes for S. Asia
1954-56; Dir. U.S. aid
mission, Ceylon (now Sri
Lanka) 1956-58; Deputy to
Dir. Int. Co-operation
Admin. (U.S. foreign aid
programme) 1959-62; Deputy
Asst. Sec. of State, Near
East and S. Asian Affairs
1962-64; Dir. U.S. aid
mission, Turkey (rank of
Minister) 1964-67; Asst.
Admin. Agency for Int.
Devt. (AID) 1967-69; Pres.
Overseas Devt. Council
(ODC), Washington, D.C.
1969-80; Exec. Dir. UN
Children's Fund (UNICEF)
Jan. 1980-; mem. Bd. of
Dirs. Rockefeller
Foundation, Overseas Devt.
Council, Johns Hopkins
Univ., Int. Voluntary
Services; Hon. Dr. Iur., Hon
LL.D. (Notre Dame Univ.,
Maryville Coll.), Hon.
D.Sc. (Hacettepe Univ.,
Ankara); Bronze Star with
oak leaf cluster; Breast
Order of Yun Hui (China)
others: Distinguished Public
Service Award 1961,
Rockefeller Public Service
Award 1980; Publications:
Several articles in
journals.

HENDERSON, Donald Ainslie
University Dean
b.: September 7, 1928, Cleveland, OH
educ.: B.A., Oberlin (Ohio) Coll., 1950, D.Sc. (hon.), 1979; M.D., U. Rochester (N.Y.), 1954, D.Sc. (hon.), 1977; M.P.H., Johns Hopkins U., 1970; LL.D. (hon.), Marietta (Ohio) Coll., 1978; D.Sc. (hon.), U. Ill., 1979, U. Md., 1980; M.D. (hon.), U. Geneva, 1980; L.H.D. (hon.), SUNY, 1981.
car.: Intern, then resident Mary Imogene Bassett Hosp., Cooperstown, N.Y., 1954-55, 57-59; chief med. officer smallpox edn. WHO, Geneva, 1966-77; Dean Johns Hopkins U. Sch. Hygiene and Pub. Health, 1977-.
others: Recipient Commendation medal 1976; award Govt. India-Indian Soc. Malaria and Other Communicable diseases, 1975; Rosenthal Internat. Award for excellence, 1975; George MacDonald medal London Sch. Hygiene and Tropical Medicine, Royal Soc. Tropical Medicine and Hygiene, 1976; Health medal Govt. Afghanistan, 1976; Sp. Albert Lasker Pub. Health Service award for WHO, 1976; Public Welfare medal Nat. Acad. Scis, 1978; Joseph C. Wilson award in internat. affairs, 1978; Service award Blue Cross-Blue Shield, 1979; medal for contbns. to health Govt. of Ethiopia, 1979; Outstanding Alumnus award Delta Omega, 1980; diplomate Am. Bd. Preventive Medicine. Hon. fellow Am. Acad. Pediatrics, Royal Coll. Physicians (U.K.) mem. Inst. Medicine (Nat. Acad. Scis.), Am. Public Health Assn., Internat. Epidemiol. Assn., Royal Soc. Tropical Medicine and Hygiene, Indian Soc. Malaria and Other Communicable Diseases.

HENDERSON, Ralph Hale
Physician
b.: New York City, NY, March 5, 1937
educ.: A.B., Harvard U., 1959, M.D., 1963, M.P.H., 1970, M. Pub. Policy, 1972
car.: Intern, then resident in internal medicine, Boston City Hosp., 1963-65; joined USPHS, 1965, capt., 1973-81, asst. surgeon gen. 1981 - service in U.S. and West Africa, 1965-69; asst. chief venereal disease br., state and community services div. Center Disease Control, Atlanta, 1972-73, dir. venereal disease control div. Bur. State Services, 1973-76; program mgr. expanded program immunization, 1979
others: Trustee Dermatology Found., 1975-77. Recipient Commendation medal USPHS, 1969, Mem. U.S.-Mex. Border Health Assn., Am. Coll. Preventive Medicine.

ISAKSEN, Mogens Knud
Counsel on Foreign Affairs, Ambassador
b.:
educ.: Political Science 1957.
car.: Secretary in the Ministry of Finance 1958; employed in the Ministry of Foreign Affairs 1962; First Secretary with Denmark's permanent delegation to OECD in Paris 1964; Ministry of Foreign Affairs 1967; Economic Counsellor with the UN-Mission in New York 1970; Chief of Section Ministry of Foreign Affairs 1973; Assistant Chief for the Department for International Development Aid (DANIDA) 1978; Ambassador and Counsel on Foreign Affairs, Chief of DANIDA since 1981.

JOSEPH, Stephen C.

b.: November 25, 1937, New York City, NY
educ.: B.A., Harvard College, 1959; M.D., Yale Uni., 1963; M.P.H., Johns Hopkins Uni., 1968.
car.: Intern in Pediatrics, Boston Children, Hospital, 1963-64; Asst. Resident in Pediatrics, Boston Children's Hospital, 1966-67; Fellow, Comprehensive Child Care Project, Johns Hopkins School of Medicine, 1967-68; Fellow, Global Community Health Program, U.S. Public Health Service, 1966-69; Commissioned Officer, United States Public Health Service, 1964-69; Peace Corps Physician, Nepal, 1964-66; Special Asst. to the Asst. Secretary for Health & Scientific Affairs, U.S. Dept. of Health, 1968-69; Senior Consultant in Medical Care, Office of Economic Opportunity, Washington, D.C., 1969; Attending Physician, Children's Hospital, Washington, D.C. 1969-71; Director, Comprehensive Health Services Division, Washington, D.C., 1969-71; Regional Public Health Physician, United States Agency for International Development, 1971-73; Prof. of Pediatrics and Community Health, University Center for the Health Sciences, Cameroon, 1971-73; Director, Medical Education Planning, and Consultant to the President, Uni. of Wyoming, Laramie, 1973-74; Asst. in Medicine, Children's Hospital Medical Center, Boston, 1974-78; Faculty Fellow, Harvard Institute for International Development, 1974-78; Lecturer in International Health Programs, Harvard School of Public health, 1974-78; Deputy Asst. Administrator for Human Resources Development, 1978-81; Consultant, Lecturer, Author, 1981-82; Chief of Pediatrics, Grenfell Regional Health Services, (Newfoundland, Canada), 1982-83; Special Coordinator, Child Health and Survival, United Nations Children's Fund, 1983--present.
others: Elliott-Black Annual Award, American Ethical Union, 1982.

KOSTRZEWSKI, Jan Karol

Epidemiologist, educator.

b.: December 2, 1915, Cracow.

educ.: Studied Jagiellonian U. (Med. Fac.), Cracow 1934-39, underground Warsaw U. 1943-44, grad. Warsaw U. (med. diploma) 1945; Harvard U. Sch. of Public Health, Boston, Mass. 1958; D. 1948, extraord. prof. 1954, ord. prof. 1967.

car.: Staff Jagiellonian U., Cracow; Surgical Clinic 1939-40, Internal Med. Clinic 1941, 1946-48, Internal and Infectious Diseases Clinic 1948-50; St. Roch Hospital, Warsaw 1941; mil. surgeon Home army, physician in POW camps 1944-45; Mil. Surgeon, epidemiologist, cracow 1948-49; Nat. Inst. of Hygiene, Warsaw; head of team against typhoid fever 1941-44, head Epidemiology Research Center 1951-78; Nat. Inst. of Hygiene, Cracow: asst., head of section in vaccine Production Research Centre 1946-51; dep. minister of health and chief sanitary inspector 1961-68, govt. plenipotentiary for food and nutrition 1963-69, govt. plenipotentiary for food and nutrition 1963-69, Minister of Health and Social Welfare 1968-72. Corr. mem. 1967-76, mem. 1976. PAN, sec. PAN Med. Sciences. Dept. 1972-80, vice-pres., PAN 1981; WHO exper. on epidemiology and virology 1960; chmn WHO Executive Board 1975-76, chmn WHO advisory group on world vaccination programme 1976; chmn. Internat. Comm. on smallpox eradication in India, Nepal and Bhutan 1976-77, dep. chmn. World Comm. on Smallpox Eradication in the World 1978-80; mem Council Internat. Epidemiologists Soc. 1974 (pres. 1977); mem. Pol. Med. Soc. 1951. Pol. Epidemiologists and Infectious Diseases Physicians Soc. 1958; hon. mem. Mechnikov All-soviet Sci. Soc. (USSR) 1956, Pol. Med. Alliance (US) 1973; Corr. mem. French Med. Acad. 1979.

others.: Recipient Badge For Exemplary Work in Health Service 1953; Cross of Valour 1944, Gold Cross of Merit 1951, Knight's (1954) and Commander's (1975) Cross Polonia Restituta Order, People's Poland 10th Anniversary Medal 1955, Banner of Labour Order 2nd (1964) and 1st (1969) class, Silver Medal For Services to Country's Defences 1977.

LYMAN, Richard Wall
Found. Exec., Historian
b.: Philadelphia, PA, October 18, 1923
educ.: B.A., Swarthmore Coll., 1947; LL.D., 1974; M.A., Harvard, 1948, Ph.D., 1954, LL.D., 1980; Fulbright fellow London (Eng.) Sch. Econs., 1951-52; LL.D., Washington U., St. Louis, 1971; Mills Coll., 1972, Yale 1975; L.H.D., U. Rochester, 1975
car.: Teaching fellow, tutor Harvard, 1949-51; instr. Swarthmore Coll., 1952-53; instr., then asst. prof. Washington U., St. Louis, 1953-58; mem. faculty Stanford, 1958—prof. history, 1962-80, Sterling prof. emeritus, 1980—asso. dean sch. Humanities and Sci., 1964-66, v.p., provost, 1967-70, pres. univ., 1970-80; pres. Rockefeller Found., 1980--spl. corr. The Economist, London, 1953—; hon. fellow London Sc. Econs., 1978--Nat. Council on Humanities, 1976-81; chmn. Commn. on Humanities, 1978-80 Carnegie Found. Advancement of Teaching, 1976--; bd. dirs. Nat. Assn. Ind. Colls. & Univs., 1976-77; chmn. exec. com. Assn. Am. Univs., 1978-79; dir. IBM, Chase Manhattan Bank. Served with USAAF, 1943-46. Fellow Royal Hist. Soc.; mem. Am. Acad. Arts and Scis., Am. Hist. Assn., Conf. Brit. Studies, Soc. Study Labour History (London), Phi Beta Kappa.
others: Decorated officier Legion of Honor; Guggenheim fellow, 1959-60. Author: The First Labour Government, 1957, Editor: (with Lewis W. Spitz) Major Crises in Western Civilization, 1965. Mem. editorial bd. Jour. Modern History, 1958-61 diseases WHO; adj. prof. health sci., depts. psychiatry, community medicine and medicine U. Calif., San Diego, 1970; mem. Am. Coll. Preventive Medicine, Am. Acad. Neurology, Assn. Am. Physicians. Soc. Exptl. Biology and Medicine, Am. Soc. Clin. Investigation, Am. Assn. Immunologists, Am. Epidemiol. Soc. Phi Beta Kappa, Alpha Omega Alpha, Delta Omega.
others: Decorated chevalier Legion of Honor (France), 1955, officer, 1976; recipient Criss award, 1955, Lasker award, 1956, Gold medal of Congress and presdl. citation, 1955, Howard Ricketts award, 1957, Robert Koch medal, 1963, Mellon Inst. award, 1969; Pres. medal of Freedom, 1977; Jawaharlal Nehru award for internat. understanding, 1976. Fellow A.A.A.S., Am. Pub. Health Assn.; asso. fellow Am. Acad. Pediatrics (hon.); Author: Man Unfolding, 1972; the Survival of the Wisest, 1973, Contbr. sci. articles to journals.

MAHLER, Dr. Halfdan
Danish Health Official
b.: April 21, 1923, Vivild
educ.: Univ. of Copenhagen.
car.: Planning Officer, Mass Tuberculosis Campaign, Ecuador 1950-51; joined WHO 1951; Sr. WHO Officer attached to Nat. TB Programme, India 1951-61; Visiting Prof., postgraduate medical schools, Rome and Prague 1961-; Chief Medical Officer, Tuberculosis Unit, WHO HQ, Geneva 1962-69, also Sec. to WHO Expert Panel on TB; Dir. Project Systems Analysis 1969; Asst. Dir.-Gen. WHO, respnsible for Div. of Famiy Health, Div. of Org. of Health Services, Div. of Research in Epidemiology and Communication Science 1970-73, Dir.-Gen. 1973-; Fellow, Royal Coll. of Physicians 1981; various hon. fellowships and memberships; Hon. LL.D. (Nottingham) 1975, Hon. M.D. (Karolinska Inst., Stockholm) 1977, Hon. Dr. (Univ. des Ciences Sociales, Toulouse) 1977, Hon. Dr. of Public Health (Seoul Nat. Univ.) 1979, Hon. Dr. of Science (Lagos) 1979, Hon. M.D. (Warsaw Medical Acad.) 1980.
others.: several awards.
Publications: several publications relating to the epidemiology and control of TB and to the utilization of operational research in health care delivery systems.

MCPHERSON, Melville Peter
Lawyer, Gov. Official
Grand Rapids, Michigan
October 27, 1940
educ.: J.D., Am. U., 1969; M.B.A., Western Mich. U., 1967; B.A., Mich. State Univ., 1963
car.: Peace Corps vol., Peru, 1966; with IRS, Washington, 1969-75; spl. asst. to Pres. and dep. dir. Presdl. personnel White House, Washington, 1975-77; admitted to D.C. bar, 1977; mem. firm Vorys, Sater, Seymour and Pease, Washington, 1977-81; acting counsel to Pres., White House, 1981; adminst. AID, Washington, 1981-; mem. BD. for International food and Agrl. Devel., 1979-, mem. joint com. on agrl. devel. and chmn. Latin Am. work group. Mem. bd. Am. Council Young Polit. Leaders, 1978-81, Republican chmn. del. selection com., 1976; bd. dirs. Charles Edison Youth Found., 1976-81, Jobs for Am. Grads, 1977-81, Capital Inst. for Tech., 1978-81. Mem. Washington Bar Assn. Republican. Methodist.

MORSE, F. Bradford
American politician and United Nations official
b.: August 7, 1921, Lowell, MA
educ.: Lowell Public School and Boston University.
car.: Service with U.S. Army 1942-46; admitted to Mass. Bar 1948; Law Clerk, Supreme Judicial Court, Mass. 1949; law practice, Lowell 1949-53; lecturer, Instructor School of Law, Boston Univ. 1949-53; City Councillor, Lowell, Mass. 1952-53; Special Counsel, U.S. Senate Committee on Armed Services 1953-54; Chief asst. to Senator Leverett Saltonstall 1955-58; Deputy Admin. of Veterans Admin., Washington 1958-60; mem. U.S. House of Reps. 1960-72, mem. Foreign Affairs, UN 1972-76; Administrator of UNDP Jan. 1976-; sec.-Gen. UN Conf. on Tech. Co-operation among Developing Countries 1978; congressional adviser U.S. Del. to 18 Nations' Disarmament Committee, Geneva; U.S. Observer Council of Europe, Latin American Parl; Chair. Mems. of Congress for Peace Through Law 1968-70; mem. American Bar Assn., Council on Foreign Relations; mem. Bd. of Trustees, Boston Univ. Bd. of Visitors, School of Foreign Service, Georgetown Univ., Bd. Dirs., Boston Wrld Affairs Council, Pan-American Devt. Foundation, World Rehabilitation Fund, three hon. doctorates.

NOSSAL CBE, Sir Gustav Joseph Victor
b.: June 4, 1931
educ.: Sydney U (MB, BS), Melbourne U (Ph.D.);
car.: Fell Walter and Eliza Hall Inst. of Med. Res. 1957-59, assist. prof. Stanford University Sch. of Medicine California U.S.A. 1959-61, dep. dir. (Immunology) Walter and Eliza Hall Inst. of Med. Res, 1961-65 (dir. 1965); kt. 1977.
others: Mem. of Melbourne, Club, Rosebud Country.

RAMALINGASWAMI, Dr. Vulimiri
Director-General, Indian Council of Medical Research (ICMR).
b.: August 8, 1921, Srikakulam (Andhra Pradesh)
educ.: M.B., B. S., M. D., D. Phil, D.Sc., Oxford.
car.: Pathologist, ICMR, 1947-54, Dept Dir, 54-57, Dir & Prof of Pathology, AIIMS, 1969-79; Fellow: Ind Academy of Med Sciences, Ind National Science Academy, 1971; Royal College of Physicians; London, 1970; hon Fellow, American College of Physicians, 1970; mem: Pathological Soc of Great Britain & Ireland, American Assn of Pathologists & Bacteriologists, International Academy of Pathology, Nutrition Soc of England, Ind Med Assn, Ind Assn of Pathologists, Ind Assn for Advancement of Med Ed.
others: Received Basanti Devi Amir Chand Prize, from ICMR, 1966, Shanti Swarup Bhatnagar Awd for Med Sciences, 1965, Watumull Awd for Med Sciences, 1962, Khanolkar Prize of Ind Assn of pathologists, 1954, Edward Chapman Research Prize, Magdalen College, Oxford 1953, D.Sc. (honoris causa), from Andhra Univ, 1967, Med Council of India Silver Jubilee research Awd, 1974, hon Doctorate in Medicine from Karolinska Inst, Sweden, 1974, Leon Bernard Foundation Prize from WHO, Geneva, 1976.

SALK, Jonas Edward
Physician, Scientist
b.: New York City, NY
October 29, 1914
educ.: B.S., Coll. City, N.Y., 1934, LL.D., 1955; fellow in Chemistry, N.Y. Univ., 1935-37, exptl. surgery, 1937-38, bacteriology, 1939-40, M.D., 1939, Sc.D., 1955; NRC fellow Sch. Pub. Health, U. Mich., 1942-43, Sc.D., 1955; LL.D., U. Pitts., 1955; Ph.D., Hebrew U., 1959; LL.D., Roosevelt U., 1955; Sc.D., Turin U., 1957, U. Leeds, 1959, Hahnemann Med. Coll., 1959, Franklin and Marshall U., 1960; D.H.L., Yeshiva U., 1959; LL.D., Tuskegee Inst., 1964
car.: Intern Mt. Sinai Hosp, N.Y.C., 1940-42; research fellow epidemiology Sch. Pub. Health, U. Mich., 1943-44, research asso., 1944-46, asst. prof. epidemiology, 1946-47; asso. research prof. bacteriology Sch. Medicine, U. Pitts., 1947-49;dir. virus research lab., 1947-63, research prof. bacteriology, 1949-55 Commonwealth prof. preventive medicine, 1955-57, Commonwealth prof. exptl. medicine, 1957-63; dir. Salk Inst. Biol. Studies, 1963-75, resident fellow, 1963-, founding dir., 1975-; developed vaccine, preventive of poliomyelitis, 1955; cons. epidemic diseases sec. war, 1944-47, sec. army, 1947-54; mem. comm. on influenza Army Epidemiol. Bd. 1944-54, acting dir. comm. on influenza, 1944; mem. expert adv. Panel on virus

WARREN, Kenneth S.
Physician
b.: June 11, 1929, New York City, NY
educ.: A.B., Harvard Univ., 1951, M.D., 1955.
car.: Intern. Har ar service Boston City Hosp., 1955-56; research asso. Lab. Tropical Diseases, NIH, Bethesda, Md., 1956-62; asst. prof. medicine Case Western Res. U., 1963-68, asso. prof., 1968-75, prof., 1975-77, prof. library sci., 1974-77; dir. health scis. Rockefeller Found., N.Y.C., 1977-; Cons. WHO; mem. com. internat. health Inst. Medicine, Nat. Acad., Scis.
Others: Recipient Career Devel. award NIH, 1966-71. Fellow A.C.P.; mem. Am. Soc. Clin. Investigation, Assn. Am. Physicians, Am. Assn. Immunologists, Am. Soc., Tropical Medicine and Hygiene. Author books, including: Schistosomiasis: The Evolution of a Medical Literature. Selected Abstracts and Citations, 1852-1972, 1973; Geographic Medicine for the Practitioner, 1978; Scientific Information Systems and the Principle of Selectivity, 1980; contbr. numerous articles to profl. journals, patentee diagnostic methods, drugs.

AWAITING RESPONSE

DIOUF, Abdou
Senegalese Statesman
b.: Louga, Senegal
September 7, 1935
educ.: Lycee Faidherbe, Saint Louis, 1947-55, University of Dakar, 1955-58, University of Paris, France, 1958-60 (Licence en Droit)
car.: Director of International Co-operation, Ministry of Planning, September-November 1960, deputy secretary-general to the Government, 1960-61, secretary-general, Ministry of Defense, June-December 1961, governor, Sine Saloum Province, 1961-62, head of Cabinet, Ministry of Foreign Affairs, 1962-63, head of Cabinet, Office of the President, 1963-65, also secretary-general to the Government, 1964-65, elected member, National Assembly, minister of Planning and Industry, 1968-70, prime minister, 1970-80, sworn in as President of Senegal, January 1981; member, Union Progressiste Senegalaise (UPS), secretary-general, UPS' member, Political bureau, UPS; former chairman, Council of Ministers, Organization of Senegal River Basin States
others: National honour: National Order of the Lion.

HOGEN, Shinsaku
b.: Wakayama, Japan, February 11, 1910
educ.: Graduated from Faculty of Law, Tokyo Imperial University, 1933
car.: Entered Min. Foreign Affairs, 1937; Consul-General, Los Angeles, 1953; Director, 6th Div., European & American Affairs, 1955; Consul-General, Berlin, 1957; Counselor, Embassy of Japan in USSR, 1959; Director-General, European & African Affairs, 1961; Ambassador Extraordinary & Plenipotentiary to Austria, 1965; Ambassador Extraordinary & Plenipotentiary to India, 1968; Deputy Minister for Foreign Affairs, 1969, Vice Minister for Foreign Affairs, 1972; Advisor to the Minister for Foreign Affairs, 1974; President, Japan International Cooperation Agency, 1974; Advisor to President, Japan International Cooperation Agency, 1980.

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Bellagio Meeting

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BRADFORD MORSE

ADMINISTRATOR OF THE UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP)

The Secretary-General's appointment of Bradford Morse as Administrator of UNDP was confirmed by the Thirtieth session of the United Nations General Assembly, and he assumed the office on January 16, 1976.

Mr. Morse was born in Lowell, Massachusetts, on August 7, 1921. He attended Lowell public schools and Boston University, where he received his Bachelor of Science degree in 1948 and his Law degree in 1949. He holds honorary Doctorates in Science from Lowell Technological Institute, and in Public Administration from Northeastern University.

From 1949-1953 he practiced law and also served as a member of the Law Faculty of Boston University (he now serves on its Board of Trustees). First entering public service in 1950 as a member of the Lowell City Council, from 1953-1955 he was a Special Counsel to the U.S. Senate Committee on Armed Services, and then became Chief Assistant to U.S. Senator Leverett Saltonstall. In 1958, President Eisenhower named him Deputy Administrator of Veterans Affairs.

Mr. Morse was a member of the 87th to the 92nd Congress from the 5th District of Massachusetts. He served as United Nations Under-Secretary-General for Political and General Assembly Affairs from 1972-1975.

BIOGRAPHIC DATA - SUPPLEMENTAL

Mashler, William T.

- Senior Director, Division for Global and Inter-Regional Projects, UNDP, New York.
- U.S. Citizen, born 6/26/20, Germany.
- B.S. City College, New York; M.A. Columbia University.
- U.S. Army 1943-46.
- In U.N. since 1946. 1963-65, Executive Officer, Bureau of Operations and Programming, U.N Special Fund. Continued in same position from formation of UNDP (in 1965) through 1971, when he assumed present position.
- Has served as UNDP Representative to CGIAR, 1969 to present.

BIO-DATA ON DR. JOSHUA COHEN

Current Title: Director Program Promotion
Office of the Director General
World Health Organization

Born: January 19, 1926
Glasgow, Scotland

Israel National

Degrees: Bachelor of Medicine & Bachelor of Surgery
Glasgow, Scotland

M.P.H. - Yale University

Work Experience:

1971-76 - Secretary - Headquarters of Program Coordination
World Health Organization

1961-1969 - Assistant Director General
Ministry of Health
Israel

Married - 2 Children

PORTER, Robert Stanley
Deputy Secretary, Overseas Development Administration, Foreign and Commonwealth Office.
b.: September 17, 1924
educ.: St. Clement Danes, Holborn Estate, Grammar Sch.; New Coll., Oxford.
car.: Research Economist, US Economic Coop. Administration Special Mission to UK, 1949; British Middle East Dev. Div.; Assist. Statistical Adviser, Cairo, 1951; Statistical Adviser and Economist, Beirut, 1955; Min. of Overseas Development: Dir, Geographical Div., Economic Planning Staff, 1965; Dept. Dir-Gen. of Economic Planning, 1967; Dir.-Gen. of Economic Planning, 1969.
others: Publications: articles in Oxford Economic Papers, Kyklos, Review of Income and Wealth.

MCGOVERN, Margaret Rosaleen
Ambassador to Sweden
b.: April 3, 1942.
Clifton Qld., Australia
educ.: St. Ursula's College, Toowoomba; Australian National Univ., Canberra, B.A.
car.: Library Assist., Nat. Library, 1961; Community Public Service, 1961; Clerk Defence, 1962; Defence Offr., 1965-69; Clerk Foreign Affs, 1970; Counsellor (Aid), Jakarta, 1972-75; Clerk, 1975; Australian Development Assistance Agency, 1974; Assist. Secty Programs & Appropriations Br., 1977; Assist. Secty, 1977; Assist. Secty. South East Asia Programs, 1977-83; Ambassador to Sweden, 1983-present.

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February 17, 1984

Mr. Franz Herder
Deputy Director
Agency Directorate for Health
and Population
U.S. Agency for International
Development
Room 809 SA/18
Department of State
Washington, D.C. 20523

Dear Franz:

How quickly time has passed since our meeting! With the Bellagio Conference less than one month away, I'm sure that you, as we, are very much in the throes of final preparations for our "jefes". To hopefully ease the load, I am enclosing biographical sketches of the principal conference participants, as promised. The few missing ones are diligently being tracked by our reference center which hopes to complete the list within the next couple of weeks. We welcome any corrections or additions to the U.S. Who's Who profile of Mr. McPherson, also included.

Thank you for the summary of oral rehydration therapy activities in USAID-assisted countries. It will be a valuable resource not only for Bellagio but for our Operating Divisions in their country sector and lending work.

Both Tony and I enjoyed our meeting with Ann Van Dusen, Robert Clay and you, and look forward to continued liaison as Bellagio and other mutual health and population activities evolve.

Sincerely,

Karen Lashman Hall
Senior Economist
Population, Health and Nutrition Dept.

Enclosures

MCPHERSON, Melville Peter
Lawyer, Gov. Official
Grand Rapids, Michigan
October 27, 1940
educ.: J.D., Am. U., 1969; M.B.A., Western Mich. U., 1967; B.A., Mich. State Univ., 1963
car.: Peace Corps vol., Peru, 1966; with IRS, Washington, 1969-75; spl. asst. to Pres. and dep. dir. Presdl. personnel White House, Washington, 1975-77; admitted to D.C. bar, 1977; mem. firm Vorys, Sater, Seymour and Pease, Washington, 1977-81; acting counsel to Pres., White House, 1981; adminst. AID, Washington, 1981-; mem. BD. for International food and Agrl. Devel., 1979-, mem. joint com. on agrl. devel. and chmn. Latin Am. work group. Mem. bd. Am. Council Young Polit. Leaders, 1978-81, Republican chmn. del. selection com., 1976; bd. dirs. Charles Edison Youth Found., 1976-81, Jobs for Am. Grads, 1977-81, Capital Inst. for Tech., 1978-81. Mem. Washington Bar Assn. Republican. Methodist.

FOEGE, William Herbert
Public Health
Administrator
b.: Decorach, Iowa,
March 12, 1936
educ.: B.A., Pacific Luth. U., 1957; M.D., U. Washington, 1961; M.P.H., Harvard U., 1965
car.: Intern, USPHS Hosp., S.I., N.Y., 1961-62; epidemic intelligence service officer Communicable Disease Center, Atlanta, 1962-64; med. officer Immanuel Med. Center, Yahe, Eastern Nigeria, 1965-66; epidemiologist smallpox eradication/measles control program, Eastern Nigeria, 1969-70; dir. smallpox eradication program Center Disease Control, Atlanta, 1970-73, dir. Center Disease Control, 1977 -- med. epidemiologist assigned to SE Asia Regional Office smallpox program WHO, New Delhi, 1973-75; WHO cons., Bangkok, Thailand, 1967, Kinshasha, Zaire, 1968; dep. field coordinator Internat. Red Cross Joint Relief Action, Nigeria.

HAMBURG, David A.
Psychiatrist
b.: Evansville, IN, 1925
educ.: M.D., Ind. U., 1947, D.Sc. (Hon.), 1976, D.Sc. (hon.), Rush U., 1977;
car.: Intern, Michael Reese Hosp., Chgo., 1947-1948, resident in psychiatry, 1949-50; asst. resident in psychiatry Yale U., New Haven Hosp., 1948-49; practice medicine specializing in psychiatry, 1950 - staff psychiatrist Brooke Army Hosp., 1950-52 research psychiatrist Army Med. Service Grad. Sch., 1952-53; asso. dir. Psychosomatic and Psychiat. Inst., Michael Reese Center for Advanced Study in Behavioral Scis., Palo Alto, Calif., 1957-58, 67-68; chief Adult Psychiat. br. NIMH, Bethesda Md., 1958-61; asst.in pathology Ind. U. 1946-47; asst. in psychiatry Yale U., 1948-49; prof., exec. head dept. psychiatry Stanford U. Med. Sch., 1961-72; Reed Hodgson prof. human biology, 1972-76; Sherman Fairchild Distinguished scholar Calif. Inst. Tech., 1974-75; pres. Inst. Medicine Nat. Acad. Sci. Washington, 1975--80; dir. div. health policy research and edn. Harvard U., Cambridge, Mass., 1980 - Served as capt. M.C. AUS, 1950-53; Diplomate in Psychiatry, Am. Bd. Psychiatry and Neurology.
others.: Recipient numerous awards including Pres.'s medal Michael Reese Med. Center, 1974, A.C.P. award, 1977, Mass. Inst. Tech. Bicentennial medal, 1977; Mem. Am. Psychiat. Assn. (Vestermark awa 1977), AAAS, Am. Psychosomatic Soc., Assn. Research Nervous and Mental Disease (pres. 1967-68). Internat. Soc. Research on Agression (pres. 1976-78) Internat. Soc. Research in Psychoneureondocrinology, Psychiat. Research Soc. (chmn.), Am. Acad. Arts and Scis.

HENDERSON, Ralph Hale
Physician
b.: New York City, NY, March 5, 1937
educ.: A.B., Harvard U., 1959, M.D., 1963, M.P.H., 1970, M. Pub. Policy, 1972
car.: Intern, then resident in internal medicine, Boston City Hosp., 1963-65; joined USPHS, 1965, capt., 1973-81, asst. surgeon gen. 1981 - service in U.S. and West Africa, 1965-69; asst. chief venereal disease br., state and community services div. Center Disease Control, Atlanta, 1972-73, dir. venereal disease control div. Bur. State Services, 1973-76; program mgr. expanded program immunization, 1979
others: Trustee Dermatology Found., 1975-77. Recipient Commendation medal USPHS, 1969, Mem. U.S.-Mex. Border Health Assn., Am. Coll. Preventive Medicine

TEXTNAME: bio (R)P: 05

LYMAN, Richard Wall
Found. Exec., Historian
b.: Philadelphia, PA, October 18, 1923
educ.: B.A., Swarthmore Coll., 1947; LL.D., 1974; M.A. Harvard, 1948, Ph.D., 1954, LL.D., 1980; Fulbright fellow London (Eng.) Sch. Econs., 1951-52; LL.D., Washington U., St. Louis, 1971; Mills Coll., 1972, Yale 1975; L.H.D., U. Rochester, 1975
car.: Teaching fellow, tutor Harvard, 1949-51; instr. Swarthmore Coll., 1952-53; instr., then asst. prof. Washington U., St. Louis, 1953-58; mem. faculty Stanford, 1958--prof. history, 1962-80, Sterling prof. emeritus, 1980--asso. dean sch. Humanities and Sci., 1964-66, v.p., provost, 1967-70, pres. univ., 1970-80; pres. Rockefeller Found., 1980--spl. corr. The Economist, London, 1953--; hon. fellow London Sc. Econs., 1978--Nat. Council on Humanities, 1976-81; chmn. Commn. on Humanities, 1978-80 Carnegie Found. Advancement of Teaching, 1976--; bd. dirs. Nat. Assn. Ind. Colls. & Univs., 1976-77; chmn. exec. com. Assn. Am. Univs., 1978-79; dir. IBM, Chase Manhattan Bank. Served with USAAF, 1943-46. Fellow Royal Hist. Soc.; mem. Am. Acad. Arts and Scis., Am. Hist. Assn., Conf. Brit. Studies, Soc. Study Labour History (London), Phi Beta Kappa.
others: Decorated officier Legion of Honor; Guggenheim fellow, 1959-60. Author: The First Labour Government, 1957, Editor: (with Lewis W. Spitz) Major Crises in Western Civilization, 1965. Mem. editorial bd. Jour. Modern History, 1958-61

NOSSAL CBE, Sir Gustav
Joseph Victor
b.: June 4, 1931
educ.: Sydney U (MB, BS), Melbourne U (Ph.D.);
car.: Fell Walter and Eliza Hall Inst. of Med. Res. 1957-59, assist. prof. Stanford University Sch. of Medicine California U.S.A. 1959-61, dep. dir. (Immunology) Walter and Eliza Hall Inst. of Med. Res, 1961-65 (dir. 1965); kt. 1977.
others: Mem. of Melbourne, Club, Rosebud Country.

SALK, Jonas Edward
Physician, Scientist
b.: New York City, NY
October 29, 1914
educ.: B.S., Coll. City, N.Y., 1934, LL.D., 1955; fellow in Chemistry, N.Y. Univ., 1935-37, exptl. surgery, 1937-38, bacteriology, 1939-40, M.D., 1939, Sc.D., 1955; NRC fellow Sch. Pub. Health, U. Mich., 1942-43, Sc.D., 1955; LL.D., U. Pitts., 1955; Ph.D., Hebrew U., 1959; LL.D., Roosevelt U., 1955; Sc.D., Turin U., 1957, U. Leeds, 1959, Hahnemann Med. Coll., 1959, Franklin and Marshall U., 1960; D.H.L., Yeshiva U., 1959; LL.D., Tuskegee Inst., 1964
car.: Intern Mt. Sinai Hosp, N.Y.C., 1940-42; research fellow epidemiology Sch. Pub. Health, U. Mich., 1943-44, research asso., 1944-46, asst. prof. epidemiology, 1946-47; asso. research prof. bacteriology Sch. Medicine, U. Pitts., 1947-49;dir. virus research lab., 1947-63, research prof. bacteriology, 1949-55 Commonwealth prof. preventive medicine, 1955-57, Commonwealth prof. exptl. medicine, 1957-63; dir. Salk Inst. Biol. Studies, 1963-75, resident fellow, 1963-, founding dir., 1975-; developed vaccine, preventive of poliomyelitis, 1955; cons. epidemic diseases sec. war, 1944-47, sec. army, 1947-54; mem. comm. on influenza Army Epidemiol. Bd. 1944-54, acting dir. comm. on influenza, 1944; mem. expert adv. Panel on virus

diseases WHO; adj. prof. health sci., depts. psychiatry, community medicine and medicine U. Calif., San Diego, 1970; mem. Am. Coll. Preventive Medicine, Am. Acad. Neurology, Assn. Am. Physicians. Soc. Exptl. Biology and Medicine, Am. Soc. Clin. Investigation, Am. Assn. Immunologists, Am. Epidemiol. Soc. Phi Beta Kappa, Alpha Omega Alpha, Delta Omega.
others: Decorated chevalier Legion of Honor (France), 1955, officer, 1976; recipient Criss award, 1955, Lasker award, 1956, Gold medal of Congress and presdl. citation, 1955, Howard Ricketts award, 1957, Robert Koch medal, 1963, Mellon Inst. award, 1969; Pres. medal of Freedom, 1977; Jawaharlal Nehru award for internat. understanding, 1976. Fellow A.A.A.S., Am. Pub. Health Assn.; asso. fellow Am. Acad. Pediatrics (hon.); Author: Man Unfolding, 1972; the Survival of the Wisest, 1973, Contbr. sci. articles to journals.

DIOUF, Abdou
Senegalese Statesman
b.: Louga, Senegal
September 7, 1935
educ.: Lycee Faidherbe, Saint Louis, 1947-55, University of Dakar, 1955-58, University of Paris, France, 1958-60 (Licence en Droit)
car.: Director of International Co-operation, Ministry of Planning, September-November 1960, deputy secretary-general to the Government, 1960-61, secretary-general, Ministry of Defense, June-December 1961, governor, Sine Saloum Province, 1961-62, head of Cabinet, Ministry of Foreign Affairs, 1962-63, head of Cabinet, Office of the President, 1963-65, also secretary-general to the Government, 1964-65, elected member, National Assembly, minister of Planning and Industry, 1968-70, prime minister, 1970-80, sworn in as President of Senegal, January 1981; member, Union Progressiste Senegalaise (UPS), secretary-general, UPS' member, Political bureau, UPS; former chairman, Council of Ministers, Organization of Senegal River Basin States
others: National honour: National Order of the Lion

GANDHI, Indira (Shrimati)
Prime Minister of India
b.: Allahabad, UP
November 17, 1919
educ.: Allahabad, Switzerland, Poona, Bombay, Viva-Bharati and Somerville College, Oxford
car.: Became mem. of Congress, 1931, courted imprisonment with her husband during Quit India Movement, 1942, was Nehru's hostess and later his close political aide, 1957-64, became mem. of Congress Working Comm. 1955, elected Pres. of Congress, 1959; played leading role in dismissal of first Communist Government in Kerala, 1959, took leading part in forging coalition in Kerala to defeat Communists in elections, 1960 Min. for Information and Broadcasting, GOI, 1964-66, elected to Rajya Sabha, 1964, elected leader of Congress Parliamentary party, 1966, mem. of Lok Sabha, 1966-67, 66-71, 71-77, and again in Nov. 1978, but was expelled; elected to seventh Lok Sabha in 1980; Prime Minister, GOI, January 1966-March 1977, and again since January, 1980; has been associated with a large number of organizations and institutions; Pres, Board of Trustee of Kamla Nehru Memorial Hospital: Trustee; Gandhi Smarak Nidhi, K.G., Memorial Trust; Chancellor: Vishwa Bharati, JNU and North-Eastern Hill University (1966-77).

others: Awd: Doctorate (honoris causa) by Andhra, Agra, Bangalore, Vikram, El Salvador (Buenos Aires), Waseda (Tokyo). Moscow, Oxford, Charles (Prague). Panjab, Gurukul. Nagpur, Jamai Urdu and Poona Univs. Citation of Distinction by Columbia Univ; Recipient of Bharat Ratna, 1972, Mothers' Awd, U.S.A., Isabella d'Este Award of Italy etc.: Publs: The Years Of Challenge 1966-69 The Years Of Endeavour 1969-72.

ORTIZ MENA, Antonio
Internat. Orgn. Exec.
b.: Parral, Chihuahua, Mexico, 1912
educ.: Grad. Sch. Law, Nat. Autonomous U. Mexico, post-grad. Sch. Fine Arts and Philosophy, Sch. Econs: Dr. h.c., U. Guadalajara (Mex.)
car.: Chief legal counsel, then departmental rep. Mixed Agrarian Comm., Dept. Fed. Dist, Govt. Mexico, 1932-38; dir. Property Nationalization Service, then chief legal counsel Office of Atty. Gen., 1940-45; 1st dir. gen. professions Ministry Pub. Edn., 1945-46; dep. dir. gen., trust rep., then chmn. Banco Nacional de Obras y Servicios Publicos, 1947-52; chmn., chief exec. officer Mexican Social Security Inst., 1952-58; chmn. Permanent Inter-Am. Social Security Com., 1955-59; sec. fin. & pub. credit Govt. Mexico, 1958-70; pres. Inter-Am. Devel. Bank, Washington, 1971--Mem. Polit. Def. Comm. of Am. Continent, World War II; cons. Mexican delg. Inter-Am. Conf. to Consider Problems of War and Peace, Chapultepec, Mex., 1945; gov. for Mex. IMF, World Bank, Internat. Devel. Assn., Internat. Finance Corp., 1959-70; founding Mexican gov. Inter-Am. Devel. Bank, 1960-70, chmn. bd. govs., 1966-67; Mexico rep. Inter-Am. Econ. and Social Council at Ministerial Level, 1961-70, pres., 1962-63; chmn. bd. dirs. Nacional Financiera, Altos Hornos de Mex., Compania Mexicana de Luz y Fuerza Motriz, Compania Nacional de Subsistencias

Populares, Industria Petroquimica Nacional, Guanos y Fertilizantes de Mex.; vice chmn. bd. dirs. Petroleos mexicanos, Ferrocarriles Nacionales de Mex.
others: Decorated grand cross Order of Crown of Belgium; grand officer Legion of Honor, grand cross Nat. Order of Merit (France); grand cross Order of Merit (Fed. Republic Germany); order of Flag with Banner (Yugoslavia); grand cross Nat. Order of Soc. Cross (Brazil); grand cross Order Orange-Nassau (Netherlands); grand cross Order of Merit Bernardo O'Higgins (Chile), others. Mem. Mexican Hwy. Assn. (life), AIM (Council of Presidents). Clubs: Metropolitan (Washington); Bretton Woods (Md.) Author: El Desarrollo Estabilizador, 1969; Finanzas Publicas de Mexico, 1969; Development in Latin-America, 1971-75, 76-80.

RAISON, Rt. Hon. Timothy
(Hugh Francis)
b.: Parral, Chihuahua, Mexico, November 3, 1929
educ.: Dragon Sch., Oxford
Eton (King's Schol.); Christ Church, Oxford (Open History Schol.)
car.: Editorial Staff: Picture Post, 1953-56; New Scientist, 1956-61; Editor: Crossbow, 1958-60; New Society, 1962-68. Member: Youth Service Develt Council. 1960-63; Central Adv. Council for Educn, 1963-66; Adv. Comm. on Drug Dependence, 1966-70; Home Office Adv. Council on Penal System, 1970-74; (co-opted) Inner London Educn Authority Educn Comm., 1967-70; Richmond upon Thames Council, 1967-71. PPS to Sec. of State for North Ireland, 1972-73; Parly Under-Sec. of State, DES, 1973-74; Opposition spokesman on the Environment, 1975-76. Sen Fellow, Centre for Studies in Soc. Policy, 1974-77; Mem. Council, PSI, 1978-79; consultant, Selection Trust, 1977-79. Nansen Medal (for share in originating World Refugee Year), 1960.
others: Publications: Why Conservative?, 1964; (ed) Youth in New Society, 1966; (ed) Founding Fathers of Social Science, 1969; Power & Parliament, 1979; various political pamphlets. Recre.: golf; Clubs: Beefsteak, MCC.

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FUJIOKA, Masao
President, Asian Development Bank, (ADB)
b.: Tokyo, Japan, 1924
educ.: Graduated from Tokyo U. in Law 1947; Public Finance & Economics, U. of Chicago, 1950-51
car.: Joined Min/of Finance, 1947; economist with IMF, 1960-64; assisted the UN Economic Commission for Asia & Far East for establishment of ADB; ADB's Dir. Administration until 1969; became Dir. Japan's official aid agency, OECF; Deputy Director-General, 1970-75 & Director-General 1975-77 of Japanese International Finance Bureau; Executive Director to Export-Import Bank of Japan and Executive Director of Japan International conferences, 1977-81; participated as Temporary alternate Governor at IMF/World Bank Annual Meetings in 1975-76 & ADB's 1977 Annual Meeting; elected President of ADB for a five-year term in 1981.

HOGEN, Shinsaku
b.: Wakayama, Japan, February 11, 1910
educ.: Graduated from Faculty of Law, Tokyo Imperial University, 1933
car.: Entered Min. Foreign Affairs, 1937; Consul-General, Los Angeles, 1953; Director, 6th Div., European & American Affairs, 1955; Consul-General, Berlin, 1957; Counselor, Embassy of Japan in USSR, 1959; Director-General, European & African Affairs, 1961; Ambassador Extraordinary & Plenipotentiary to Austria, 1965; Ambassador Extraordinary & Plenipotentiary to India, 1968; Deputy Minister for Foreign Affairs, 1969, Vice Minister for Foreign Affairs, 1972; Advisor to the Minister for Foreign Affairs, 1974; President, Japan International Cooperation Agency, 1974; Advisor to President, Japan International Cooperation Agency, 1980.

CATLEY-CARLSON, Margaret
President, Canadian
International Development
Agency (CIDA)
b.: Regina, Saskatchewan,
October 6, 1942
educ.: B.A. (hon.) Univ.
British Columbia, 1966;
post-graduate work in
International Relations &
Latin American Affairs,
Univ. of West Indies.
car.: Asst. Secretary-
General of United Nations, &
Deputy Executive director
for UNICEF since 1981;
Assistant Under-Secretary
for Trade, General Economic,
Commodity & Development
Policy, & North-South
Relations, Dept. External
Affairs, 1980-81; Senior
Vice-President/Acting
President of the (CIDA),
1979-80; Vice-President of
the Agency, 1978-79; joined
Dept/o External Affairs,
1966; Economic Counsellor
for Canadian High Commission
in London, England, 1975-78;
assigned to Conference on
International Economic
Cooperation in Paris,
(1976-88); worked in various
divisions in Dept. External
Affairs, 1970-75; Second
Secretary at Canadian High
Commission in Colombo, Sri
Lanka, 1968.

EXTNAME: bio (R)P: 18

BEVAN, William
Vice-President & Director of Health Programs, The John D. & Catherine T. MacArthur Foundation
b.:
educ.: A.B. (hon.) Franklin & Marshall College, 1942; M.A. Duke U., 1943; Ph.D. Duke U., 1948; Sc.D. Florida Atlantic U., 1968; LL.D. Duke U., 1972; Sc.D. Emory U., 1974; Sc.D. Franklin & Marshall College, 1979; Sc.D. U. of Maryland, 1981.
car.: Graduate Asst., Duke U., 1942-43; Graduate Research Asst., Frangible Bullet Project, Duke U., 1943-44; Instructor to Asst. Prof. Psychology, Heidelberg College, 1946-48; Instructor in Psychology, Duke U., 1947; Asst. Prof. Psychology, Heidelberg College, 1946-48; Instructor in Psychology, Duke U., 1947; Asstt. Prof. Psychology, Emory U., 1948-59; Prof. & Dept. Chairman, Psychology Department, Kansas State U., 1959-62; Dean, School of Arts & Sciences, Kansas State U., 1962-63; Vice-President for Academic Affairs, Kansas State U., 1963-66; Prof./o Psychology, The Johns Hopkins U., 1966-74; Vice-President & Provost, The Johns Hopkins U., 1966-70; Executive Officer, American Association for Advancement of Science, 1970-74; Publisher, Science, 1970-74; William Preston Few Prof., Duke U., 1974- (present on leave); Chairman, Dept. Psychology, Duke U., 1977-78; Director, Duke Round Table on Science & Public Affairs, 1974-83; Provost, Duke U., 1979-83.

SELECTED DONOR TALKING POINTS

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Bellagio Talking Points

A.

Organization and Function of the Consultative Group

1. Fund raising:

   a. General public: UNICEF already strong here

   b Foundations, corporate donors: this appears to be a promising activity for the CG, but unlikely at the scale proposed

   c governments: scenarios by which CG could obtain funds involve risk that earmarked funds would come at the expense of existing programs

   d World Bank (other multilateral donors): This is not the Bank role presently outlined, but a theoretical possibility. There are advantages to opening this source of development assistance to health (and population) efforts that are smaller, experimental, and more rapidly implemented. Bank programs could use the CG as a source of [illegible]

2. Technical Review Function

   a. Areas included: Orientation of conference emphasizes medical/technical expertise in immunization programs. Expertise in other PHC technical areas such as ORT is justified since (1) some countries will want other

technologies either along with or instead of immunizations, and (2) any serious effort at building PHC on a base of an immunization program will require broader expertise.

A similar point applies to delivery system expertise: if management and communications are the main problem areas, the CG should bring in this kind of expertise, not just immunization program specialists. Low demand for complete immunization series suggests, for example, that some new ideas and research approaches are needed. Example: "focus group interview" technique used in market research, now used in population research.

b Supply of expertise: if the CG raises enough money, this may become a limiting factor. One aspect of reviewing past EPI experience should be an estimate of numbers of technical experts needed for X dollars invested in a Program. Apart from raising new money for PHC activities, it appears highly unlikely that the existence of a CG will Influence the world supply of high quality technical expertise.

c Technical Advantage: Even apart from funding considerations, the CG has a potential role as a source of objective reviews of proposed PHC projects and evaluations of Ongoing programs. Its Position as an independent technical organization could be nurtured as

an important advantage, even though individual consultants would probably have a variety of affiliations. A frank analysis of the strengths and weaknesses of specific programs, shielded from organizational politics, would tend to promote technical excellence. Political commitment should mean more than rising budgets.

Project Funding Function

a Rationale: Many organizations fund PHC activities, design projects, and purchase technical expertise. There is No widely accepted, objective measure of excellence in this complex task. Nevertheless, before duplicating this expensive mechanism, it would seen reasonable to ask how the CG itself will improve on the process.

b Drawback: In becoming another donor, the CG would lose its potential uniqueness as a source of independent technical advice. The trade-off is dubious on the intuitive level: The net gain in PHC funds is zero, since mechanisms presently exist to apply them. This must be balanced against the potential influence the CG as a new, [illegible] effectiveness of programs in the field.

c Cooperation of bilaterals: It is unclear why donors would wish to delegate project approval authority to the CG. Certainly not for the sake of technical excellence:

expertise can be purchased freely and the advice of the CG need not be entirely binding. A high level of commitment to the largest plan for immunization coverage in the targetted countries might lead to such a decision, but this is in no sense a technical decision.

4. Coordination: The CG objective of optimizing the overall distribution of international resources in PHC can be addressed through a coordination function. In this area, none of the participant organizations, including the U.N. agencies, have taken on this role. The conference proposal outlines an executive role for the CG. This would certainly eliminate duplication of effort, but none of the documents have shown this to be a serious problem. An executive role would also permit resources to be channeled in accordance with a predetermined global plan. But none of the background papers argue explicitly that there are clearcut benefits to concentrating exclusively on the listed countries. It is not obvious that investing a given amount of resources in a large country produces "superior" results compared to the same effort in a small country. It is at best a rigid formula that might lead to bad decisions.

A coordination role for the CG, however would be entirely positive. By providing information on the activities of other donors, identifying promising opportunities, and providing technical advice, the CG would often improve donor

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decisions. At worst, things would be as before.

5. Short term planning: Anything like the role outlined above would take several months of planning and substantial operating expenses: (1) A permanent staff with both technical and administrtive personnel would be needed. (2) A board of trustees could consist of high level representatives of the participating institutions, possibly broadened through a rotating chairmanship and rotating LDC government representation. (3) A technical advisory committee could then be formed to establish a list of technical experts and monitor their activities (4) It would be necessary to design and maintain an information system describing relevant donor and host country activities. (5) It would also be necessary to conduct a selective in-depth review of selected aspects of PHC programs to identify the most important shortcomings and related research needs. (6) The CG would require a means of communicating technical information, through conferences, publications, and field consultations.

6. Research and Program Support: Biomedical research is of course important, but the need for a new international body to fund this kind of activity is not at all clear. In contrast, the numerous references to program oriented, operations research contained in conference documents are

reasonably close to AID's objectives for the CG. One could argue forcefully and in a very positive tone ~~force~~, along the following lines: If the CG is to really address the quality and effectiveness of PHC programs (as well as the quantity and funding level of services), it will be necessary to develop a far more detailed outline of how this is to be done. In particular, the CG needs to address the issue of how to gain entry to and assist PHC programs they don't fund.

a. Conceptualization of operations research: it would be reasonable to agree with Dr. Henderson's point that health services research has'nt had enough practical influence. AID already supports a broader interpretation of this kind of research, esentially whatever the problem at hand requires. If some object to labeling as "research" such activities as in depth program evaluations, trials of new management procedures, or experimental worker incentives, then let us change the label. But AID should welcome the development of an ~~informational~~ international body with this kind of focus- but specifying PHC, not just immunizations.

b. Independence: AID has a number of mechanisms by which such an activity could be partially supported immediately (see below). But it would as appropriate to emphasize that AID sees organizational independence as critical for this function: the CG should not be

producing what AID, other donors, or program directors want to hear. We want a source of completely candid assessments that will establish and maintain a worldwide reputation for just that.

B. Oral Rehydration Therapy: The orientation of the organizers of the conference toward a categorical immunization activity is obvious. We should not assume that if this group agrees to review the possibility of including ORT and other PHC activities in the CG mandate, they will necessarily become ORT enthusiasts. The composition of any group that conducts any such review is critical. One could argue for including ORT specialists and others, at the risk of considerable bickering. An alternative is to push for a report from a distinguished group of public health experts with no established position on the matter.

2. Guidelines for Review: AID can propose criteria by which the CG should decide the range of services it will address, such as: (1) in depth cost-effectiveness estimates, if necessary including comissioned studies, (2) a survey of host country requests, or (3) a review of the relationship of differenct PHC services within existing integrated programs, focusing on the issue of how to best build an effective PHC program.

3. ORT Support: Any added funding for ORT from the

CG would be a welcome development. Similarly, an international body working on the effectiveness of PHC is a net gain for ORT activities.

4. Coordination: This is not just a rhetorical point, particularly for ORT: the field is extremely dynamic and AID would be able to make use of a fairly sophisticated attempt to provide us national grounds for our priorities in ORT and other PHC activities. The S&T/H PRITECH project is presently going through the process of setting priorities for technical assistance and program development in ORT and immunizations (as well as other PHC activites). This has proved to be a complex and time-~~conscience~~ consuming excercise. Donors obviously have their own priorities, but rapid access to current information on where their resources would be most effective ~~and~~ would be useful.

a. Immunizations: As the conference is presently conceived, it implies a massive investment channeled exclusively into immunizations. Although none of the conference documeents acknowledge financial competition between technologies and approaches, this seems unavoidable. Especially if the CG achieves a substantial part of its stated objective, both money and technical expertise will be transferred from other activites to a single immunization initiative. AID obviously believes that immunizations are important and often the ~~prepared~~ preferred health

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investment- hence our support for programs such as CCCD in Africa. But a massive, unselective transfer of resources to a single approach is virtually certain to lower the health impact of our resources in some cases. Further, there is no compelling argument for embracing a single, global, immunization- oriented approach to PHC: We are not over-burdened by making case-by-case decisions on how to spend our health funds. In this since, the Agency's objectives for immunizations are negative: stopping what we regard as an unnecessarily procrustean approach to PHC.

On the positive side, the AID can make use of a resource that can identify good opportunities for immunization activities. And this includes not only program expansion, but improvement also. Internal agency expertise is linked and much of our involvement in the field is conceived, designed, and carried out with limited AID impact. We should be Positioning ourselves to take advantage of a Quantum leap in immunization technology- some of which AID has supported extensively (as the malaria vaccine). these developments promise to revitalize all immunization efforts. We should be building Agency expertise in the service delivery elements of these programs with these likely developments in mind. The CG could, for example, organize workshops or study tours for selected AID

personnel. This kind of approach was successful at the beginning of the population program when the agency lacked program personnel knowledgeable in the field.

d. Financial/Resource Issues:

1. Initial Activities: Assuming the CG adopts a plan of action roughly compatible with Agency views (chiefly technical and coordinating, addressing a variety of PHC technologies and approaches on a case-by-case basis), AID could offer a wide range of support for initial activities: (a) Name a coordinator to facilitate Agency collaboration with the CG, (b) The S&T/H PRITECH project can provde experts in a variety of fields-ORT, management, operations research, immunizations- to assist in technical planning. This assistance is available on short notice. (c) S&T/H MEDEX project is less flexible, but could conceivably be used to address some CG interests, particularly training. (d) S&T/H PRICOR operations research project may be able to provide consultants or possibly funding for specified investigations. (This may become more flexible in the future).

Emphasizing AID's views on integrated PHC, other central contracts from the Offices of Population, Nutrition, and Education could be mentioned: (e) The Family Planning Operations Research project could fund promising investigative efforts touching on birth spacing. A current agreement with the NAS addresses generic PHC issues

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related to supervision and management, and the CG may wish to consult with this distinguished working group. (f) The Population Office can also provide consultants and information on the social marketing approach- an area of AID leadership. (g) The Offices of Education and Population can provide expert advice on communication strategies in health. (h) In a general sense, the AID bilateral projects provide numerous opportunities for the addition of research and evaluaiton studies proposed by the CG, with qualifications of course. (i) The Office of Nutrition and Food for Peace Program may have the flexibility to respond to some CG interests. (j) The AID technical offices are in the process of developing a computerized data base on AID centrally funded projects. AID would be willing to consider modifying and expanding this system for PHC activities to address the information needs of the CG.

2. Long Term Programs: AID's interest is in the development of a unique technical resource. The importance of financial administration depends on the success of the CG in raising funds. If this aspect becomes dominant, the CG would become another, probably minor, donor and this would determine AID's relationship with the CG. If the CG develops into the technical and coordination resource outlined above, and plays a useful role in refining PHC delivery systems, direct AID financial support would be reasonable.

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BRIEFING MEMORANDUM FOR THE ADMINISTRATOR

FROM: S&T, N. C. Brady

SUBJECT: Bellagio Meeting: Population Issues
March 12-16, 1984

Participants:

National donors of population assistance: Australia, Belgium, Canada, Denmark, France, Germany, Italy, Japan, the Netherlands, Norway, Sweden, and the United Kingdom.

International organizations involved in population assistance: UNICEF, WHO, and the World Bank.

Discussion:

With the exception of Switzerland, all of the major national donors in the field of population assistance will attend the meeting. Attachment A summarizes their recent contributions to UNFPA which is their principal channel for assistance. This is an opportunity to encourage countries to give more in the future or to return to earlier levels of assistance.

The international organizations in attendance either exercise substantial influence over LDC development policies (the Bank) or are the principal executing agencies for UNFPA-funded activities (WHO, UNICEF). The meeting provides an opportunity to indicate our desire - see State-AID Action Plan, Action Area No. 5 (Attachment B) - that these agencies assist UNFPA in focussing resources on family planning needs.

Suggested Talking Points:

-- Countries currently expected to reduce their contributions to UNFPA in 1984 are Australia, Belgium, Canada, and Sweden. You could encourage them to identify the reasons for their reduced contributions and the UNFPA activities that are most attractive to them and that we could encourage the Fund to stress. You could also encourage them to consider future increases in line with the U.S. increase in 1984.

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-- Other major donors plan to increase their UNFPA support in 1984. You could indicate that we were pleased to see that they, like us, are providing more support in this area and seek their best judgement on how further increases can be encouraged.

-- The Bank should be encouraged to use its influence to encourage LDCs to recognize the barriers to development objectives deriving from current rates of population growth.

-- You could remind WHO and UNICEF of their critical role as UNFPA executing agencies in implementing Governing Council directives to UNFPA to focus its resources on family planning needs.

Attachments:
A. Major Donor Contribution to UNFPA
B. Memorandum of Understanding

Clearances:
S&T/HP, J.Sarn _____ date 3-9-84
S&T/POP, S.Sinding _____ date 3/9

Drafted by: S&T/POP,CJHemmer:3/9/84:1777W

Attachment A

Major Donor Contributions to UNFPA
in $ thousands

Country	1967-80	1981	1982	1983	1984
United States	236,433.5	32,000.0	33,760.0	33,760.0	38,000.0
Australia	4,407.2	996.3	1,530.2	1960.8	1,400.0
Belgium	5,154.1	679.7	542.5	392.2	300.0
Canada	44,698.8	6,443.6	7,794.1	8,333.3	8,300.0
Denmark	27,447.5	5,068.7	4,467.7	4,684.2	4,900.0
France	923.8	75.9	143.9	196.1	n.a.
Germany	70,015.9	12,685.3	13,410.9	13,201.7	13,500.0
Italy	226.0	806.5	140.8	1980.2	2,200.0
Japan	64,202.7	21,300.0	24,500.0	29,500.0	30,500.0
Netherlands	71,280.0	11,182.0	11,315.3	10,890.3	12,200.0
Norway	63,288.5	12,077.5	14,220.4	10,988.1	11,700.0
Sweden	64,999.0	8,411.4	7,185.6	6,315.8	6,200.0
United Kingdom	37,192.8	4,518.4	4,662.9	4,035.0	4,500.0

MEMORANDUM OF UNDERSTANDING

SUBJECT : State-AID Action Plan to Encourage Increased UNFPA Support for Family Planning

The UNDP Governing Council session of 1982 directed UNFPA to provide "substantially more" assistance to family planning programs and "substantially less" assistance to other areas of population activity. The U.S. fully supports this directive of the Governing Council.

In order to ensure that the U.S., through both State and AID, provides maximum assistance to UNFPA in carrying out its mandate from the Governing Council, the attached State-AID action plan has been developed by the State and AID offices concerned with multilateral population assistance. The plan identifies problems that hinder increased UNFPA support for family planning and ensures that, in full cooperation with UNFPA, the U.S. government will lend its expertise and influence to assisting the Fund in expanding its support for family planning activities. The plan is in full accord with UNFPA's Policy Guidelines for Support to Family Planning Programs (issued February 18, 1983).

The State and AID offices responsible for executing this action plan will, through mutual consultation, determine the appropriate location of responsibility for each segment of the action plan.

_____ Date: ____

Richard E. Benedick
Coordinator of Population Affairs
Department of State

_____ Date: 18-5-83

Francis R. Herder
Acting Agency Director for Health
and Population
Agency for International Development

_____ Date: ____

Gordon L. Streeb
Deputy Assistant Secretary for
International Economic and
Social Affairs
Department of State

State-AID Action Plan
to Encourage Increased UNFPA Assistance for Family Planning

Introduction:

The United Nations Fund for Population Activities (UNFPA) is the principal source of multilateral population assistance of all kinds. Since its founding in the late 1960s, UNFPA has provided more than $1.1 billions in assistance to some 130 developing countries. Currently, UNFPA has an annual assistance program of $130 million. The United States, UNFPA's largest single donor, has contributed $366 million through 1983. In FY 1983, the U.S. contribution was $33,760,000.

As the largest single source of population assistance, the United States has a strong interest in the effective performance of UNFPA. In particular, the U.S. has for several years encouraged priority UNFPA attention to the assistance needs of family planning programs. The 1981 State-AID Review of UNFPA underscored the effectiveness of UNFPA programs in complementing U.S. population assistance objectives and noted that family planning activities should have increased priority in UNFPA's program. The Review also recommended continued U.S. contributions to UNFPA.

The following State-AID action plan is designed to clarify and facilitate U.S. efforts to collaborate with UNFPA in making increased and more effective multilateral population assistance available to the family planning programs of developing countries. Execution of the plan is primarily the responsibility of the following State and AID offices: State - Coordinator of Population Affairs, Bureau of Oceans and International Environmental and Scientific Affairs, and Office of International Development, Bureau of International Organization Affairs: AID - Office of Donor Coordination, Bureau for Program and Policy Coordination, and Office of Population, Bureau for Science and Technology.

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Overall purpose of plan:

To identify the State/AID actions that can encourage and support UNFPA efforts to achieve a substantially larger[1] commitment of its program resources to family planning programs[2] and, at the same time, to assist UNFPA in reducing the amount of other activities not directly related to fertility reduction that are often proposed for UNFPA support.[3] The purpose of this plan is not to eliminate UNFPA support

Notes:

1 The UNDP Governing Council (in decisions 81/7 and 82/20) has directed UNFPA to allocate substantially more resources for family planning

for population activities other than family planning but rather to provide useful and consistent U.S. support for the shift of UNFPA program resources towards family planning activities that the Fund is undertaking under the guidance of its governing body.

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Action Area No. 1

Tracking UNFPA progress in providing increased family planning support

Background:

Informed and effective actions, as proposed in this plan, require up-to-date U.S. assessments of UNFPA progress in giving greater assistance to family planning. Periodic comprehensive reviews of UNFPA progress, supplemented by specific information on particular UNFPA programs, are essential for relevant U.S. efforts to assist UNFPA in achieving this program objective.

Required actions

- AID staff will carry out a semi-annual review of progress in UNFPA

Notes: (continued from page 1)

and population education, and substantially less for other areas of population activity. In the course of the Council discussion, "two-thirds" of UNFPA resources was suggested by Denmark as an interpretation of "substantially more" but the Council did not adopt this target. In this plan, "substantial" increase carries the meaning of a target of about two-thirds to be achieved over the next 5-7 years.

2 "Family planning", in this plan, is a shorthand term for support for UNFPA assistance for "service delivery, family planning training, and family planning education".

3 As UNFPA indicates in its "Policy Guidelines for UNFPA Support to Family Planning Programs", UNFPA's assistance to family planning includes projects that provide considerable maternal-child-health and family health activities not directly related to fertility reduction. Similarly, population education and training programs often include family planning as a minor component - if at all. While UNFPA support for non-family planning activities may, in some cases, be a requirement for introducing family planning activity, the U.S. strongly supports UNFPA's judgment that the current and prospective shortage of UNFPA resources make it imperative to reduce its support of activities not directly related to fertility reduction.

support for family planning activities, including comparative levels of support, regional differences, near-term trends, current and prospective problems and, as far as possible, an assessment of the portion of UNFPA family planning activities not directly related to fertility reduction. To the extent appropriate, these reviews will be carried out in collaboration with UNFPA.

- The results of these comprehensive reviews will be circulated to State and AID officials expected to participate in the other actions outlined in this plan and will be shared with UNFPA. One of these reviews should be carried out in early May, as a part of the preparation of U.S. participation in the review of UNFPA at the annual June session of the UNDP Governing Council.

- AID staff will also develop reviews of UNFPA support in particular countries or programs as background material for specific meetings proposed in this plan.

Action Area No. 2

Encourage other major UNFPA donors and major LDCs to join in expressing their continuing support for substantially greater UNFPA assistance to family planning programs.

Background:

UNFPA is responsive to the wishes of donors and recipients in allocating program funds. An international consensus, expressed in the June 1981 and June 1982 decisions of the UNDP Governing Council, has directed UNFPA to provide substantially greater support for family planning activities. In judging the relative priority of requests for population assistance, it is essential that UNFPA be assured of the continuing international consensus that family planning remains its priority activity area.

Required actions

- OES/CP will cable major posts (donor and LDCs), informing them of the U.S. action plan and requesting them to urge country officials to join the U.S. in reaffirming their support for the Governing Council's emphasis on addressing family planning assistance needs.

Action Area No. 3

Meetings between U.S., UNFPA and other UN officials.

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Background:

Meetings with UN officials that deal with population assistance issues should normally include explicit or implicit reaffirmation of U.S. support for the Governing Council emphasis on increased UNFPA support for family planning programs and our readiness to assist UNFPA in achieving this objective. Special meetings of U.S. officials with UNFPA counterparts should be scheduled to assist UNFPA in making progress in meeting family planning needs.

Required Actions

- At least one high-level meeting of top-echelon U.S. and UNFPA officials should be scheduled each year to review the U.S.-UNFPA relationship and, in particular, UNFPA's progress in increasing support for family planning.

- State Department instructions to USUN/NY for its comments on presentation of the annual pledge letter or quarterly checks should normally include reference to U.S. support for UNFPA's efforts to expand its assistance to family planning; the periodic participation of State/AID Washington officials on these occasions could emphasize the importance of this issue and identify U.S. technical expertise that would be useful to UNFPA in pursuing its objective of increased family planning support.

- UNFPA's effort to provide increased assistance to family planning should receive special attention in the U.S. positions/ interventions at the annual UNDP Governing Council review of UNFPA and, as appropriate, in the Second Committee General Assembly debate of operational activities. The U.S. position should reaffirm U.S. support for Governing Council consensus on this issue. We should also encourage an active UNFPA search for alternative sources of external assistance for population activities not directly related to fertility reduction, with a view to shifting support for these activities, where possible, to other sources of development assistance.

- Bi-annual staff-level reviews of AID and UNFPA country programs for each geographic region should be scheduled in New York and Washington. These reviews can focus on current and prospective program coordination problems and/or assistance opportunities at the country program level, and can acquaint AID and UNFPA program officers with their counterparts (to facilitate program coordination between meetings).

- AID should cable its Mission Directors to encourage emphasis on U.S. support for UNFPA assistance to family planning programs in their discussions with resident UN assistance officials and with host country officials. In this context, the importance of host country policies that facilitate the achievement of population objectives should be emphasized.

Action Area No. 4

Give Special Attention to Proposed U.S. requests to UNFPA for assistance in non-family planning areas.

Background:

U.S. efforts to meet development assistance needs occasionally result in proposals from the U.S. that UNFPA provide assistance to activities outside of the area of family planning - e.g. census support, MCH programs, programs for the aging. Census support in particular can become a major drain on UNFPA resources. While any of these assistance proposals may be well-justified when considered separately and may, in the longer run, contribute to greater interest in family planning programs at the individual country level, a series of these requests can create the impression at UNFPA of weakened U.S. support for Governing Council emphasis on family planning. Over time, these proposals can redirect UNFPA program allocations to a point where they represent a serious obstacle to progress in achieving increased UNFPA support for family planning.

Required Actions:

- Inform State or AID offices/Missions that initiate or forward requests for UNFPA support of population activities other than family planning of U.S. support for the Governing Council's directive to reduce the share of UNFPA assistance provided for these activities.

- Provide a quarterly report on any recent requests of this kind to the AID Population Sector Council; request Council review and advice on the appropriate AID response to requests that may have a significant impact on the availability of UNFPA resources for family planning support.

- Assist UNFPA and requesting countries to identify alternative sources of assistance for these population activities.

Action Area No. 5

Remind UNFPA's UN executing agencies of the importance of emphasizing family planning program support.

Background:

UNFPA's reliance on other UN agencies (e.g. WHO/PAHO, ILO, FAO, UNESCO, UNTCD) to execute the major part of its programs will result in greater support of family planning activities if these other agencies carry out

their executing agency roles with full or greater recognition than heretofore of UNFPA's requirement to give greater priority to family planning. The mandates of these agencies generally attach little or no importance to family planning as priorities of their own institutions. The result is that when these agencies serve as UNFPA executing agencies they tend to place priority on areas of population assistance other than family planning. Their understanding and acceptance of the Governing Council's requirement that UNFPA provide greater assistance to family planning is essential for the expansion of effective UNFPA assistance in this program area.

Required Actions:

- The U.S. Delegations to the annual meetings of the governing bodies of UNFPA's executing agencies should encourage consideration of their roles as UNFPA executing agencies and the appropriateness of taking UNFPA's emphasis on family planning into account when they propose, design, and execute UNFPA-supported activities. We can also note that some areas traditionally defined as "population" assistance (in the non-family planning categories) are appropriate for the regular budget support of these agencies and deserve priority within their own mandates. We are not proposing increased regular budgets to accomodate population projects but rather an appropriate reallocation of regular budget resources to reflect the importance of selected population activities within the mandates of these agencies.

  The concerned State-AID population offices should take part in the development of Delegation instructions for these meetings. Where appropriate, a representative of these offices should serve as a member of the Delegations.

- At Washington briefings for UNDP country representatives, particularly in the case of UNFPA priority countries, we can remind them of our support for the Governing Council emphasis on family planning activities and of the importance of keeping this directive in mind in discussing/reviewing assistance requests proposed by host countries.

- Plan AID staff level consultations with UN executing agencies when this is consistent with other travel - with a view to conveying U.S. support for UNFPA's Governing Council directive on family planning support and to make U.S. experience and expertise available to these agencies in their work of proposing, designing, and executing UNFPA-supported projects.

Action Area No. 6

Encourage greater UNFPA use of NGO's (private sector institutions) as executing agencies.

Background:

About 70 per cent of UNFPA activity is provided in the form of country program assistance. In these cases, ministries of LDC governments specify the projects that they wish UNFPA assistance to support and the executing agency that they prefer. In many instances, UN specialized agencies help governments design the proposals which, on UNFPA approval, they will execute.

In this process, NGOs, whether indigenous or from donor countries, are typically "outsiders", and may be perceived by government ministries (and UN specialized agencies) as less experienced executing agencies for the activities under consideration. Nevertheless, NGOs have a proven capacity to complement the work of government agencies and provide a cost-effective delivery of family planning services to portions of populations not otherwise served. An expanded NGO role as UNFPA executing agencies is important for the achievement of increased UNFPA support for family planning. It should be noted that UNFPA currently employs NGOs as executing agencies for about 8-10 per cent of its program - a significantly larger role than they play in other UN agencies such as UNDP.

UNFPA has sometimes funded NGOs within "intercountry" activities - a program category outside of specific country agreements. Expansion of intercountry support is severely limited by the Governing Council's insistence that the share of UNFPA resources allocated to its intercountry programs should be reduced, as soon as possible, from its current 30 per cent share to about 25 per cent of total program resources.

Required Actions:

- Ensure that UNFPA receives regular reports from AID-supported private sector institutions on their current and prospective activities in family planning.

- Encourage/support UNFPA use of indigenous private sector institutions in LDCs as executing agencies for family planning promotion; ensure that USAIDs and centrally-financed intermediaries inform UNFPA of private sector groups in LDCs that need external assistance to promote family planning; assist UNFPA in seeking local government approval for its support of private sector institutions.

- Urge USAIDs to join with UNFPA in explaining to host governments the benefits of employing indigenous NGOs more frequently and more flexibly in their population programs.

- Focus one or more of the semi-annual AID-UNFPA program coordination meetings on the role of private sector institutions, and include experience with private sector institutions as an integral part of AID-UNFPA program discussions.

Where appropriate, encourage Governing Council approval of projects involving private sector institutions as a priority claim on UNFPA's inter-country program assistance budget.

Encourage other donor countries that value the role of NGOs to urge greater UNFPA use of NGOs as executing agencies.

Action Area No. 7

UNFPA training/orientation exercises.

Background:

UNFPA has recently begun a series of orientation meetings for field and headquarters staff, including the representatives of other UN executing agencies, in part to review the program implications of the Governing Council's directives to provide increased emphasis on family planning assistance. Systematic training programs to update staff on state-of-the-art approaches to family planning program support could also be helpful. In general, greater UNFPA support for family planning programs and effective implementation of these programs will be facilitated by the appropriate and early orientation and training of the staff members who are responsible for program implementation.

Required Actions:

- Encourage UNFPA's systematic use of regional meetings for its field representatives and field staffs of executing agencies to become familiar with the Fund's emphasis on family planning and the experience of other assistance agencies in promoting these programs. When requested by UNFPA, AID can offer reports on similar AID field meetings and/or can identify resource persons to assist at the UNFPA meetings.

- Share with UNFPA information on available professional in-service training programs that can provide UNFPA and executing agency staffs with state-of-the-art approaches to family planning assistance.

- In reviewing UNFPA's support for family planning, include the cost of reorientation/retraining programs as part of "family planning" support by UNFPA.

COMPARISONS OF DIFFERENT HEALTH INTERVENTIONS:

ORAL REHYDRATION THERAPY/IMMUNIZATION/FAMILY PLANNING

INTS FOR CONTRAST

ORT	IMMUNIZATION	FAMILY PLANNING
Preventive/curative	Preventive	Preventive
High community participation	Low community participation	High community participation
Professional administration not required	Needs an appropriately trained health worker	Professional administration is not required
Little equipment,	Equipment intensive,	Little equipment ,
Has mostly short-term effects	Long-term effects	Short- and long-term effects
Easier to integrate with MCH, health ed., etc.	Easier to integrate with birth weighing	Easy to integrate with all PHC package
Requires extensive education for home treatment	Little education required	Various amounts of education required
Generally "little-tech"	Generally "more-tech"	Generally "little-tech"
Many models exist	Basic model for delivery	Many models exist
More learning-process	Generally blueprint	More learning-process
More community-based management	More 'top-down' management	More community-based management
Easy to learn by doing	Little chance for hands-on learning	Easy to learn by doing
Little logistical difficulty	Temperature of major importance-'cold chain'	Logistical mechanisms vary
Not time specific	Time specific	Both specific and nonspecific depending on method
Cost efficient	Cost efficiency varies with vaccine	Generally cost efficient
Large potiental for private sector involvement (i.e. production and social marketing)	Minimal private sector potiental	Large existing private sector involvement

DIARRHEA AND IMMUNIZATION LINKAGE -- DIARRHEA DIALOGUE 2/84

Diarrhoea Dialogue

ISSUE No. 16

FEBRUARY 1984

Diarrhoea and immunization – a valuable ally?

Disentangling the causes of early childhood death in the developing world is complicated. The last issue of *Diarrhoea Dialogue* discussed the dangerous partnership between malnutrition and diarrhoeal disease. Improved feeding and widespread use of oral rehydration will prevent many unnecessary deaths and handicaps associated with impaired child growth and development.

Employing every strategy

The 1984 UNICEF report on The State of the World's Children recommends four techniques to make a 'revolution for children' a genuine possibility: oral rehydration therapy (ORT); growth monitoring; expanded immunization; promotion of breastfeeding and better weaning practices. All these strategies must be brought into play if the revolution is to succeed. All face similar constraints: cost; lack of local health care infrastructures; the time and the skills needed to educate families about how they can themselves make best use of limited resources to improve the quality of life for their children.

Shortcuts to bypass obstacles

In any battle, shortcuts to bypass obstacles can hasten overall victory. Measles, like malnutrition, seems inextricably linked with dangerous episodes of acute diarrhoea in young children. Two types of measles-associated diarrhoea are recognized. These are 'with-measles diarrhoea' occuring around the time of the illness, and 'after-measles diarrhoea', occuring sometimes several months later. The diarrhoea mostly appears as severe dysentery with blood and mucus, rather than the watery type. Infections like Salmonella and Shigella play a major role and mortality rates are high. It seems that measles infection lowers childhood resistance to diarrhoeal infections in the environment and that this effect may persist for a significant period. Less measles may go hand-in-hand with less deaths from childhood diarrhoea.

Effective and economical

Immunization has greatly decreased the incidence of measles among children in western or more prosperous societies. Measles immunization is now an integral part of the Expanded Programme on Immunization (EPI), to which many developing countries are committed with the support of the World Health Organization and UNICEF. There is no doubt that immunization against the six major infectious childhood diseases – measles, tetanus, whooping cough, diphtheria, polio and tuberculosis – must greatly benefit child health throughout the world. Cost is comparatively small for the long term protection. According to the 1984 UNICEF Report, it is approximately five US dollars per child to cover both delivery systems and vaccines.

A cost-effective intervention?

Should measles immunization be urgently pushed as a cost-effective intervention to reduce the child death rate from diarrhoea?[1] Malnutrition, diarrhoeal and other childhood infections interact together to kill. Measles immunization must be explored as a potential shortcut in diarrhoeal disease control and our main article in this issue sets a South Indian scene for this.

Investment bonus for the future

Investment in immunization technologies, training and delivery systems must, in any event, be a worthwhile use of resources because more effective vaccines against acute diarrhoeal infections are gradually being developed and their pathways to the periphery will already be in place. Progress with some new anti-diarrhoeal vaccines is reviewed on pages 3 and 7. Some readers may feel too much space in this issue is taken up with research matters. It may nevertheless reassure other readers to know that some effective anti-diarrhoea vaccines may become available before too long.

ORT still the front-line defence

Immunization is a preventive, protective intervention. Measles immunization may well turn out to be a valuable ally in the struggle to reduce diarrhoea morbidity and mortality among young children in the developing countries. Oral rehydration still remains the essential front-line treatment for all acute infectious diarrhoeas which cause dehydration, whether measles – associated or not.

KME and WAMC

[1] *Feachem R.G. and Koblinsky M.A. Bull. WHO. 1983. 61. 641–652. (Reprints from: Director, CDD Programme, WHO, 1211 Geneva, 27, Switzerland).*

In this issue . . .

AHRTAG

Appropriate Health Resources & Technologies Action Group Ltd

Swing to ORT in Britain

For the last ten years, most babies admitted with gastroenteritis to East Birmingham Hospital have been treated with oral rehydration. Over 90 per cent of the infants respond rapidly to the fluid given and can quickly return to their previous diet, whether breast milk feeds, cow's milk formula, or weaning foods. Infants who are in shock because of fluid loss, those in whom the diagnosis is unclear or where generalised sepsis is a possibility, and those too weak to drink are given intravenous fluids. Since about 1977, children with hypernatraemic dehydration have been treated on our unit with the same oral rehydration fluid as those with normonatraemic or hyponatraemic dehydration. Hypernatraemia has not in itself been considered a reason for intravenous therapy.

All babies are given a low sodium formula containing approximately 35 mmols of sodium per litre along with appropriate potassium and bicarbonate or lactate. This is a lower concentration than that recommended in the WHO formulation. However, in contrast to the WHO fluid, the formula is given as the only fluid intake, rather than alternating with free water. We have had no problems with this regimen. Probably the exact composition of oral rehydration solutions is of considerably less importance than some academic workers have suggested, except in cases of severe, watery, cholera-like diarrhoea. What is important is the use of *oral* rather than *intravenous* therapy in the vast majority of babies with acute gastroenteritis. In Birmingham, as in Bangladesh, the use of oral fluid has revolutionised the management of acute infant gastroenteritis.

M. J. Tarlow, Senior Lecturer in Paediatrics, East Birmingham Hospital, Birmingham B9 5ST, UK.

Hospital practice foreshadows changes in GP prescribing

Between September 1979 and March 1980 Dr Little and his colleagues at a general hospital in Chatham, Kent studied the 181 children admitted with acute diarrhoea[1]. Three years later, over the same eight months period, they again reviewed the 186 children admitted with diarrhoea[2]. During the first period, not a single case had been treated with oral glucose-electrolyte solution by the general practitioner before admission. By 1983, at least 10 per cent had received this specific oral rehydration therapy. It is not clear whether a greater awareness about the value of promoting drinking in diarrhoea was also associated with advice about increasing the ordinary fluid intake.

Other treatment prescribed by the GPs had changed even more. The number who had been given antibiotics had fallen from 22 to 7 per cent of cases, and those given 'anti-diarrhoeal drugs' like kaolin, had fallen even more sharply from 30 to 5 per cent.

(1) *Little T M 1981. British Medical Journal, 4: 1300.*
(2) *Little T M 1983. Personal communication.*

King Faisal International Prize

This important Saudi Arabian prize in medicine for 1983 has been awarded for work on diarrhoeal diseases. The outstanding and complementary research success of various groups has been recognized by equal division of the prize between: Professor John S. Fordtran, Department of Internal Medicine, Baylor University, Dallas, Texas; Dr William B. Greenough III, Director of the International Centre for Diarrhoeal Disease Research, Dhaka, Bangladesh; Professor Michael Field, Department of Pharmacological and Physiological Sciences, University of Chicago. The triumph of oral rehydration therapy in reducing mortality and morbidity due to cholera and other acute infectious diarrhoeal diseases is based on the discoveries of these three scientists and their colleagues over the last 20 years.

ICDDR, B Journal

Diarrhoea Dialogue 12 announced the beginning of the *Journal of Diarrhoeal Diseases Research*, to be produced and published by the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B). The first two quarterly issues are now available and will be reviewed in *Diarrhoea Dialogue* 17.

Readers may also like to know that the proceedings of an international conference on 'Shigellosis: a continuing global problem'*, held in Bangladesh in 1981, are now available from ICDDR,B, GPO Box 128, Dhaka 2, Bangladesh. The book will be reviewed in a later issue of *Diarrhoea Dialogue*.

**The cost is US$15.00 (developed countries) and US$10.00 (developing countries) by surface mail. Air mail costs 10 per cent extra in Asia and 20 per cent extra elsewhere.*

Early immunization against measles?

Measles immunization of young infants in high risk areas may soon be possible using a new aerosol (nose spray) vaccine. Babies inherit some protection against measles from their mothers but, where measles is a particularly common and serious infection, this may not last until the normal age (9–10 months) for immunization is reached. The new vaccine could be a valuable step forward and results from its field trials will be reported in a later issue of DD.

Sabin A B et al 1983 Successful immunization of children with and without maternal antibody by aerosolized measles vaccine Journal of the American Medical Association (JAMA) 249, 19. 2651–

New directions

The January 1983 issue of *Directions*, a newsletter published by the Program for Appropriate Technology in Health (PATH), is a practical source of immunization-related information. For a free copy of *Directions* write to: PATH, Canal Place, 130 Nickerson Street, Seattle, WA 98109, USA.

In the next issue

- Breastfeeding – another worthwhile intervention?
- Country reports.

Expectations for a vaccine

Tom Flewett considers the prospects for a rotavirus vaccine and its role in diarrhoeal disease control.

It is generally agreed that most acute infectious diarrhoea in young children is caused by viruses rather than bacteria and it is among young children that most deaths from acute diarrhoea occur.

In many hospital-based studies, as much as 60 per cent of cases of acute diarrhoea are due to rotavirus infections, but this varies from year to year and from place to place. In South Africa, only about 15–17 per cent have been attributable to rotaviruses[1]. Two questions arise:

1. Is it possible to develop a vaccine capable of preventing this disease?
2. Would this rotavirus vaccine make a significant impression on the number of fatal cases of acute infectious diarrhoea?

Serotype variation – a serious problem

The first great problem was to isolate rotaviruses in tissue culture to develop less powerful strains for use as a live oral vaccine. This has now been done. However, at least four serotypes exist which can be distinguished from each other by specific antibody. Will infection by one serotype provide immunity against infection by a different serotype? Nobody yet knows the answer to this. Dr Ruth Bishops's[2] group (see DD14) recently found that rotavirus infection of newborns did not protect them against re-infection later on, although it appeared to reduce the severity of subsequent infections. Thus a vaccine, even if it did not altogether prevent the disease, might still save lives!

Potential of new techniques

The techniques of genetic engineering open up new possibilities for making vaccines. Rotavirus antigen could be implanted in common bacteria which normally colonize the small bowel and they would reproduce the antigen and in this way immunize the patient. Alternatively, the strain of typhoid bacillus, Ty21a, used in the new anti-typhoid vaccine (see page 7) might carry the rotavirus antigen. The effectiveness of such vaccines is uncertain. The technology to make the experiment does, however, now exist.

Although some animal experiments suggest that infection by one rotavirus serotype does not give good protection against another[3], there are nevertheless hopeful prospects. If a vaccine can contain the two main sub-groups of rotavirus, this may provide a useful degree of protection. More information is needed about the prevalence and severity of the different rotavirus serotypes.

Cross-disciplinary research

New kinds of rotavirus have recently been identified. Two serotypes of 'standard' piglet rotavirus are well established and these share a common group antigen with the rotaviruses commonly found in children. Recently, two new piglet rotaviruses have been discovered. These are quite different from the earlier piglet rotaviruses and also from each other, with no serological cross-reaction. A vaccine prepared against one could not be expected to protect against any of the others. Serological tests[3] indicate that most pigs possess antibodies to these 'new' rotaviruses, so they must occur quite widely although rarely diagnosed.

Recent reports describe new human rotavirus strains in Australia, China, Brazil, France and Britain. They are serologically distinct, cannot be detected by current ELISA tests and are difficult to find on electron-microscopy. The best method of diagnosis so far may be to look for double-stranded DNA in faeces. The importance of these rotaviruses is unknown. They have not yet been cultured and there is no immediate be found to cause diarrhoea in humans.

Rigorous testing essential

Any vaccine launched which does not significantly reduce the total of diarrhoeal illness among young children will rapidly be discredited. The fact that there are various rotavirus serotypes and several other diarrhoea viruses means that manufacture will be difficult. Before a diarrhoea vaccine is marketed, fully adequate field trials must guarantee its effectiveness and these will need to be carried out over several years because of the variation in viruses and the periodic nature of viral diarrhoea. In the same place there can be 'good' and 'bad' years for rotaviruses.

ORT still the best bet

Prevention is always better than cure, but reliable vaccination against viral diarrhoea seems technically unlikely to become available soon. Luckily, the cheap, simple and life-saving technique of oral rehydration deals effectively with all acute infectious diarrhoeas, whatever their causal organism. It must be universally publicized and applied to save still more millions of the young children at risk.

Dr T.H. Flewett, Regional Virus Laboratory, East Birmingham Hospital, Birmingham, UK.

References

(1) *Schoub B D et al 1982 Variance in rotavirus infection rates in different urban population groups in South Africa. Journal of Medical Virology, 10: 171–179.*

(2) *Bishop R F et al 1983 Clinical immunity after neonatal rotavirus infection. A prospective longitudinal study in young children. New Eng Journal Med, 309: 72–76.*

(3) *Gaul S K et al 1982 Antigenic relationships among some animal rotaviruses; virus neutralization in vitro and cross-protection in piglets. Journal of Clinical Microbiology, 16: 495–503.*

(4) *Woode G N et al 1982 Studies with an unclassified virus isolated from diarrheic calves. Vet Microbiol., 7: 221-240.*

Priority intervention?

M. and V. I. Mathan consider whether measles immunization should be a priority in diarrhoeal disease control.

In 1961, an epidemic caused by *Salmonella* infection occurred in a village with a population of 527, close to Vellore in Southern India. There were 74 cases of acute diarrhoea. More than half the patients were children less than five years old and 17 of them had died by the time the field team reached the village. About a month before the diarrhoea epidemic there was an epidemic of measles in the same village. Fifteen of the 17 children with diarrhoea who died, mostly due to dehydration and electrolyte imbalance, had had measles four to six weeks before the diarrhoeal infection.

Measles and diarrhoea together often fatal

A prospective detailed study, in which 5,775 children in 12 villages in Bangladesh were observed for a year, showed that measles and diarrhoea appeared to interact synergistically* to increase mortality and the irreversible effects of nutritional deprivation[1]. Thirty-four per cent of diarrhoeal deaths were measles-associated. Measles was the single most important cause of death during the period and diarrhoea or dysentery was the most common complication of fatal measles cases.

For every 100 children below five years of age there are about 240 episodes of diarrhoea each year, and it is estimated that 2.1 to 5.2 per cent of such episodes are measles-associated[2]. In contrast to the average diarrhoea mortality rate of 1.4 per cent, five to 29 per cent of young children with measles-associated diarrhoea die.

Preventing more than 1 million deaths

An effective vaccine for immunization against measles has been available for some time and measles has almost been eradicated in several developed countries. Should measles immunization be a major priority in the control of diarrhoeal diseases? It has been estimated [2] that between 6.4 and 25.6 per cent of diarrhoea deaths could be prevented by measles immunization. Assuming five million deaths each year due to diarrhoea among preschool children in the developing world, this estimate suggests that between 60,000 to 1¼ million diarrhoea deaths a year could be prevented by an effective measles immunization campaign. Clinical experience suggests that the cases that would benefit most from this are the children who develop severe diarrhoea and, possibly, diarrhoea associated with invasive organisms.

Cost-effectiveness

A good deal of the limited funds available in the third world for the

Children Fund photograph

An older child receiving measles immunization in India. The recommended age is between 9–10 months.

prevention and control of diarrhoea is now spent on oral rehydration, with significant beneficial effects. To justify using some of these funds or to find extra funds for measles immunization as part of diarrhoeal disease control, the cost-effectiveness of such an approach needs to be carefully assessed. There is very little available in the way of hard data which directly estimates the effect of measles immunization on the incidence of acute diarrhoea and of severe diarrhoea leading to death. The cost of measles immunization has been variously estimated from US$2 to 15 per head, much of which will be spent in getting properly designed delivery systems in place and working successfully. Well-controlled studies of the cost-effectiveness of measles vaccination as a factor in the control of diarrhoea in selected population groups are urgently needed.

Simple one year study

A quick answer could come from a simple study in a population of three to five thousand children below the age of three years. A preliminary census survey will identify the children who have either already had measles or who have received measles immunization. The children will be followed up for a year, using minimally trained volunteers recruited from the community under the supervision of one or two public health nurses. At the end of the year, data on the incidence of new cases of measles, the incidence of acute diarrhoeal diseases, the number of severe diarrhoeal cases and of deaths would be available. Using the initial survey data, it should then be possible to show whether immunity to measles is a significant factor in the mortality and morbidity. The cost of measles immunization can be worked out by a pilot study at the end of the year of surveillance in the same population.

Useful extra weapon at small cost

A major constraint for the control of diarrhoeal diseases among children in developing countries is the prohibitive cost, if a meaningful number of individuals are to be covered. This is because the prevention of most episodes of diarrhoeal disease depends on factors such as improved sanitation and water supplies, better nutrition and extensive health education, most of which are interventions based on socio-economic progress.

WHO photograph

Measles immunization – preventing more than a million deaths?

Most clinicians who have experience with acute diarrhoea in developing countries feel that measles immunization would be a useful immediate weapon at a comparatively trivial cost, a feeling justified by (as yet) theoretical calculations. Some urgent but well-controlled field trials are obviously essential to determine cost-benefits, which could then present the policy makers with the possibility that 60,000 to 1¼ million deaths associated with diarrhoea in the vulnerable age groups can be prevented.

M. and V. I. Mathan, the Wellcome Research Unit, Christian Medical College Hospital, Vellore, 632 004, India.

(1) *Koster F T et al 1981. Bulletin of the World Health Organization, 59: 901–908.*

(2) *Feachem R G and Koblinsky M A 1983. Bulletin of the World Health Organization, 61: 641–652.*

* *Synergistically* – acting together, each making the other more powerful.

Practical advice series

Solving problems locally

The Gambia has effectively implemented a national immunization programme. Phil Gowers looks at the key role of organization and management at community level in achieving this success.

Even the best planned national immunization programmes can fail because of poor management at community level. These are some key factors that contribute to an effective programme:

Organization

Step 1: Examine the objectives of the plan and the population you serve. What is needed? Look for under-served areas. Calculate the number of immunizations to be given.

Step 2: Examine your resources carefully. Pay particular attention to transport, refrigerators, deep freezes, injection and sterilization equipment.

Step 3: What *tasks* must be carried out to achieve your objectives? The main areas of concern are the *systems* which ensure that your staff have done what is necessary to do the job properly. For example:

A. COLD CHAIN

- *Ordering replacements* – how do you order replacement refrigerators? Does the system work? If not, why not?
- *Spare parts* – are these available and does someone know how to repair your equipment? If not, train one or two team members and arrange for the supply of tools and spare parts. You should also have at least one, and preferably more, spare unused refrigerators.
- *Fuel supplies* – particularly kerosene, must be well organized. There must be a system for supply all the way to the clinics and an adequate reserve which will last while the request for replenishment is being processed.
- *Installation* – someone, probably your repair man, will need to check the siting of each refrigerator.
- *Monitoring* – someone at each clinic will need to be responsible for checking the temperature at least once a day. A chart should be hung on the door of the refrigerator.

B. VACCINES

- *Storage* – different vaccines have different storage requirements. Checklists on correct storage procedures will be necessary for each vaccine. A member of the team must be responsible for storage and checking when vaccines are going out of date. The same person should fill in the report forms and vaccine requests.
- *Receipt* – the person responsible for storage must also sign for all arriving vaccine and enter it into the stocks.
- *Monitoring* – forms will be needed to record vaccine used and people immunized. The forms should be *simple* to use.

C. INJECTION EQUIPMENT

- *What is needed* – what size of syringes and needles are needed and in what quantities? What method of sterilization will be used and what equipment needed? It is preferable to have enough syringes and needles sterilized to complete a whole clinic. Therefore the capacity of your method of sterilization is important – especially where there is no electricity. It may be necessary to use wood fires or kerosene stoves. If stoves are used, people must be trained to use and maintain them correctly. Your repair man will need the tools, spare parts and skills to repair the stoves.
- *Supply* – as with vaccines, look at the system of ordering, receipt and storage of equipment.

D. TRAINING

- *Trainers* – who is going to do the training and how? I think training should be carried out by your supervisors. The method should be based on teaching the tasks. The training modules produced by the WHO Expanded Programme on Immunization are an excellent aid[1].
- *Supervisors* – the trainers/supervisors must be trained themselves.
- *Method* – the system of training should be carefully designed. One way is to hold a 'main' training session of, say, a week for each centre and also have continuous training for supervisors when they visit centres.

Management

District Medical Officer (DMO)

The DMO will probably have overall responsibility but also has many other jobs to do. At community level, shared management where everyone takes some responsibility and which therefore leads to decisions everyone understands may be best. One way of achieving this is to have the staff of each immunization unit meeting together as a team. Encourage them to identify and resolve local problems locally. The DMO must visit each of these teams a few times each year.

Supervisor

The immunization programme will need special supervision because of the different components involved. Someone should be trained as a supervisor and visit several units once every six weeks or so to look at the *quality* of the tasks being performed[2]. By monitoring the process rather than simply the work done, the supervisor should be able to help and support the staff in their work. Supervision involves working along with others rather than just inspecting and instructing. Supervisors will need to be taught how to take on this role.

Phil Gowers (recently Medical Officer of Health, The Gambia), c/o London School of Hygiene and Tropical Medicine, Keppel Street, London WC1, UK.

[1] *EPI Training Modules – for information contact the Expanded Programme on Immunization, WHO, 1211 Geneva 27, Switzerland.*

[2] *Fitzgerald S and Gowers P 1983 Blueprint for Success: The Gambian Immunization Programme. World Health Forum, Vol 4, pp79–82.*

Further reading

See AHRTAG's two books – *How to look after a refrigerator* and *How to look after a health centre store* (mentioned on page 8 of this issue).

Outlook for the future

Mike Levine and others describe field trials of a new oral vaccine in Chile and Egypt.

Typhoid fever is still an important problem in many less-developed areas of the world. Injectable anti-typhoid vaccines have long been available and provide 70 to 90 per cent protection for up to 7 years. Because they tend to cause fever, pain and swelling at the injection site, and a general feeling of being unwell in about one in four vaccinees, these vaccines are poor public health tools. Similar vaccines given by mouth do not cause these unpleasant reactions. However, they give little or no protection this way against typhoid fever, even in multiple doses. A potentially major breakthrough has been the development by Germainier and co-workers of a new strain of typhoid bacillus, Ty21a, suitable for use as a live oral vaccine[1].

First evaluations

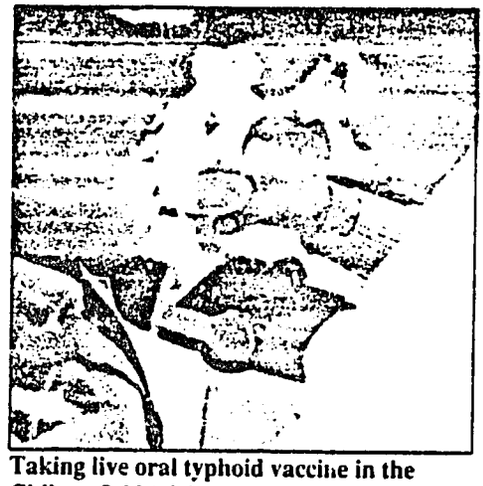
Initial evaluation in North American volunteers produced no adverse reactions and the live Ty21a freeze-dried vaccine was shown to be both genetically stable and effective. The first field trial was carried out among young Egyptian schoolchildren, who were given 1 gm of $NaHCO_3$ (sodium bicarbonate) to neutralize stomach acid before swallowing each of the three doses of the reconstituted vaccine. Three years of surveillance showed 96 per cent vaccine efficacy*[2].

Field trials in Chile

With these encouraging results from Egypt, further field trials in Chile are taking place with the following aims:

(1) to determine the efficacy of Ty21a given in a new form of enteric-coated capsules**
(2) to evaluate the efficacy of fewer vaccine doses
(3) to assess the vaccine's efficacy in an area where typhoid infection is particularly common and lethal.

During the first 18 months of surveillance, beginning in May and June 1982, there have been unexpected variations in vaccine efficacy among the initial group of 90,000 schoolchildren. It is not yet clear whether these are due to the different formulation, the different dosage schedules or the much higher force of typhoid infection that exists in Chile as compared with Egypt.



Taking live oral typhoid vaccine in the Chilean field trial.

Sorting out the variables

From July to September 1983, in an attempt to resolve the relative importance of the different variables, 150,000 Santiago schoolchildren were randomly allocated to one of five groups:

Group 1 – Children were given three doses of Ty21a vaccine in enteric-coated capsules within one week.

Group 2 – Children were given three doses of vaccine with $NaHCO_3$ within one week, both substances being contained in easily soluble gelatin capsules.

Group 3 – Children were given three doses of vaccine in enteric-coated capsules as in Group 1, but the doses were each separated by an interval of three weeks.

Group 4 – Children were given vaccine and $NaHCO_3$ in gelatin capsules as in Group 2, but the doses were each separated by an interval of three weeks.

Group 5 – Children received three doses of placebo***

Doses of vaccine, irrespective of formulation or schedule, were intended to deliver 1 to 3 thousand million live organisms per dose. Vaccinations were well tolerated and intensive epidemiological surveillance of the 150 thousand children is continuing.

Outlook for the future

In addition to Ty21a, other candidates for new anti-typhoid vaccines are already being investigated. The outlook for improved typhoid vaccines is therefore reassuring and the results from the extensive field trials in Chile are awaited with considerable interest.

Dr Myron M Levine, Dr Robert E Black and Dr Catterine Ferreccio, Center for Vaccine Development, University of Maryland School of Medicine, Baltimore.

(1) *Germainier R and Furer E 1975 Isolation and characterization of GalE mutant Ty21a of S. typhi: a candidate strain for live, oral typhoid vaccine. Journal of Infectious Diseases, Vol 131, pp 443–558.*

(2) *Wahdan M et al 1982 A controlled field trial of live S. Typhi strain Ty21a oral vaccine against typhoid: three year results. Journal of Infectious Diseases, Vol 145, pp 292–295.*

For further references, write to *Diarrhoea Dialogue.*

Authors' note

The Chilean field trials represent a collaborative effort on the part of the Chilean Ministry of Health, the Center for Vaccine Development of the University of Maryland School of Medicine, the Swiss Serum and Vaccine Institute, the World Health Organisation, the Pan American Health Organisation and the Walter Reed Army Institute of Research.

* Vaccine efficacy = degree of protection produced in a group who have been immunized compared with a similar unimmunized group.

** This special capsule covering resists acid digestion in the stomach and protects the live organisms for release when the capsules reach the more favourable environment of the small intestine. Such capsules would be more practical since treatment beforehand with $NaHCO_3$ would no longer be necessary.

*** A placebo is an inactive substance exactly similar in appearance to the active substance being tested.

letters...letters...letters...letters...

Attitudes, beliefs and practices

We are working in one of the Rural Health Service Projects, undertaken by K E M Hospital, Pune. For the last two years we have been involved in the programme of Oral Rehydration Therapy (ORT) among the rural communities near Pune. We made some observations on attitudes, belief and practices in relevance to the acceptance of ORT. We are interested in fact to communicate this observation to those who are working in the field of ORT. We would, therefore, appreciate it if you could consider our material experience for publication in *Diarrhoea Dialogue*.

Dr L. D. Puranik and Dr N. R. Chaudhari, King Edward Memorial Hospital, Sardar Mudliar Road, Rasta Peth, Pune 411 011, India.

These are some of the main observations made by the King Edward Memorial Hospital Team:

"Village women had many different beliefs, attitudes and practices about the treatment of diarrhoea. These differed according to the location of the village. In communities situated close to main roads (and urban influence) women believe strongly that only injections can relieve diarrhoea. This is a result of their constant exposure to private medical practioners who give injections frequently no matter what the illness. Also, women in these areas only consult doctors when the child has become seriously ill.

In more isolated areas, village women use herbal home remedies – not all of which are helpful. For example, one remedy 'Dikamali' is mixed with sugar and used for massaging the gums of children suffering from what mothers call 'teething diarrhoea'. This harmful practice is thought to make the gums stronger and teething easier so that the diarrhoea can then be controlled.

Nevertheless, with continuous health education and demonstrations of how to use ORT, over 80 per cent of rural women (especially those in more isolated communities) are now using ORT when their children have diarrhoea. A great deal remains to be done, however, in convincing mothers living in peri-urban communities about the value of ORT."

Honey in ORT

Many thanks for the issue of *Diarrhoea Dialogue* which I got yesterday. They are useful indeed. I do hope you will be able to send me copies of the next issues – 15 of each, so that I can forward them to our Health Units.

We are now entering the hot season and so we will get more and more children with diarrhoea. We are trying our best teaching mothers and health workers about oral rehydration which is proved to be so useful in many cases. We have great problems with water, being in the semi desert land of Northern Kenya. We also lack sugar but there is honey locally made – so it can help!

Our Samburu mothers are very clever and willing to learn as they love their children so much!

Sr Rosita Perino, Archer's Post C.M., P.O. Box 43, Isiolo, Kenya.

Stopping the leak

In issue 8 you said that "stopping the leak is wrong". It is a pity that the concept in Egypt is to stop the leak. Most of the pediatricians here give combinations of antimicrobials and antidiarrhoeals to their patients. As a senior house officer of paediatrics, I find infants are usually brought in to the hospital severely dehydrated after being given several prescriptions with these combinations.

– Before teaching mothers in Egypt, doctors should agree that it is dehydration that is fatal and not the diarrhoea itself.

Dr Bassma Nazmy, 10 Abou-El Karamat Street, Agouza, Guiza, Egypt.

Distributing ORS

This refers to your "Meeting the demand" note in the August 1983 issue of *Diarrhoea Dialogue*.

Maybe the producers of "fizzy drinks and cigarettes" could be asked to help in the distribution of ORS as part of their contribution to Health for All by the Year 2000?

Dr Eilif Liisberg, Public Health Administrator, Division of Family Health, WHO, 1211 Geneva 27, Switzerland.

Practical books

This issue of *DD* considers the interaction between measles and diarrhoea and the importance of measles immunization. Effective immunization programmes depend on supplies and efficient management at community level and proper maintenance of equipment and supplies. The Appropriate Health Resources and Technologies Action Group (AHRTAG) has published two books which deal with these important topics *How to look after a refrigerator* and *How to look after a health centre store*. Both publications are clearly laid out with many illustrations. They can be used by individuals or as the basis for training a team in a health centre.

Both books can be ordered from Teaching Aids at Low Cost (TALC), P.O. Box 49, St Albans, Herts, AL1 4AX, UK.

Price: How to look after a refrigerator £2.00 (plus p & p*)

How to look after a health centre store £3.00 (plus p & p)*

**Postage and packing rates*

- Air speeded post – add on 30% of the total cost of the books. (Minimum postage and packing is *£1.50*)
- Please send International Money Orders/cheques in £ sterling only.

Scientific editors: Dr Katherine Elliott (U.K.) and Dr William Cutting (U.K.)

Executive editor: Denise Ayres

Editorial advisers: Dr David Candy (U.K.), Dr I. Dogramaci (Turkey), Dr Richard Feachem (U.K.), Dr Michael Gracey (Australia), Dr N. Hirschhorn (U.S.A), Dr D. Mahalanabis (India), Dr Leonardo Mata (Costa Rica), Dr Mujibur Rahaman (Bangladesh), Dr Jon Rohde (Rockefeller Foundation), Ms. E. O. Sullesta (Phillippines), Dr Andrew Tomkins (U.K.), Dr Paul Vesin (France), Dr M. K. Were (Kenya).

With support from **WHO, UNICEF, and SIDA**

Diarrhoea Dialogue

Diarrhoea Dialogue is published by AHRTAG at 85 Marylebone High Street, London W1M 3DE. Tel. 01-486 4175.

INDIRECT COST -- CAUTIONARY COST COMMENT

Estimated Indirect Costs Associated with Differences in Person-Years Lived by Children, (Selected Ages and Countries, 1985 to 2000) Assuming Fixed Fertility and Various Trends in Mortality During the Period.

(in million US dollars)

Types of Indirect Costs	Estimated Indirect Costs				
	Constant Mortality vs. 50% Mortality Decline	Constant Mortality vs. U.N. Medium Variant Mortality Decline	Constant Mortality vs. 50% Decline Over U.N. Medium Variant Mortality	U.N. Medium Variant vs. 50% Mortality Decline	U.N. Medium Variant vs. 50% Decline Over U.N. Medium Variant Mortality
Health	$617	$286	$759	$336	$484
Education	$283	$155	$360	$127	$207
Food	$13,361	$6,676	$16,679	$6,743	$10,192
Total	$14,260	$7,117	$17,798	$7,206	$10,883

Notes:

(1) Selected Countries: India, Pakistan, Bangladesh, Indonesia, Nigeria, Mexico, Ethiopia, Zaire, Philippines and Brazil.

(2) Indirect costs computed on the basis of the following person-year cost estimates:

Health (population 0-4) ..... U.S. $8.00 per person per year.

Education (population 5-14)... U.S. $5.00 per person per year.

Food (population 0-14)....U.S. $100 per person per year.

Dr. Foege's paper cites direct immunization program costs in the billions. What may be less well appreciated is the order of magnitude of indirect costs (health, education, food) that are associated with the additional person-years lived as a result of the reductions in mortality. Similar costs would of course accrue from the same reductions in mortality through ORT, as opposed to immunization (although direct program costs would probably be less). The point though, is that the total bill is massive. And that means either additional resource generation or diversion of existing resources from other sectors -- and that argues for the critical need to look at relative costs and benefits, and complementarities, as you decide on health interventions to be put in place in particular settings.

(=$11 billion, conservatively)

**Estimated Person-Years Lived by Children,
(Selected Ages and Countries, 1985 to 2000)
Assuming Fixed Fertility and Various Trends
in Mortality.**

(in thousands)

Person Years Lived Under Various Mortality Assumptions

Childhood Age Groups	Constant 1985 Level Mortality	50% Decline in Mortality 1985-2000	U.N. Medium Variant Mortality Decline	50% Decline Over U.N. Medium Variant Mortality Decline
0-4	3,622,280	3,701,758	3,659,798	3,720,350
5-9	3,336,140	3,379,856	3,360,329	3,391,952
10-14	3,106,389	3,121,173	3,115,237	3,124,977
0-14	10,064,809	10,202,787	10,135,364	10,237,279

Notes:
(1) Selected Countries: India, Pakistan, Bangladesh, Indonesia, Nigeria, Mexico, Ethiopia, Zaire, Philippines and Brazil.
(2) Fertility levels as projected for 1985-2000 in U.N. Medium Variant Projections.

Source: Information prepared by staff of the Demographic Data for Development Project, Westinghouse. Estimates based on data in ESDS files for health, education and food costs. Methodology supplied on request.

Estimated Differences in Person-Years Lived by Children,
(Selected Ages and Countries, 1985 to 2000)
Assuming Fixed Fertility and Various Trends
in Mortality.

(in thousands)

Differences in Person Years Lived Under Various Mortality Assumptions

Childhood Age Groups	Constant Mortality vs. 50% Mortality Decline	Constant Mortality vs. U.N. Medium Variant Mortality Decline	Constant Mortality vs. 50% Decline Over U.N. Medium Variant Mortality	U.N. Medium Variant vs. 50% Mortality Decline	U.N. Medium Variant vs. 50% Decline Over U.N. Medium Variant Mortality
0-4	77,082	35,774	94,845	41,960	60,552
5-9	42,742	23,134	54,359	19,528	31,625
10-14	13,783	7,846	17,588	5,939	9,744
0-14	133,607	66,754	166,792	67,427	101,921

Notes:
(1) Selected Countries: India, Pakistan, Bangladesh, Indonesia, Nigeria, Mexico, Ethiopia, Zaire, Philippines and Brazil.
(2) Fertility levels as projected for 1985-2000 in U.N. Medium Variant Projections.

RELEVANT CORRESPONDENCE

SUBJ: MCPHERSON/INVITATIONS
HLS

The Rockefeller Foundation

1133 AVENUE OF THE AMERICAS, NEW YORK, N.Y. 10036

DEC 3 2 9 13 AP '83

AID
EXECUTIVE SECRETARIAT

CABLE: ROCKFOUND NEW YORK
TELEPHONE: (212) 869-8500

November 23, 1983

If Due 12/16/83
ACTION: AA/S&T coordinate w/AA/PPC & OPA for recommendation to McPherson
Info: McPherson logs
AA/PPC, OPA, A/AID:LByers

Mr. M. Peter McPherson
Administrator
U.S. Agency for International Development
320 21st Street, N.W.
Washington, DC 20523

Dear Mr. McPherson:

The children of the world continue to suffer and die from preventable diseases, a matter which is of great concern to several major global agencies and organizations including the World Health Organization, The United Nations Childrens Fund, the World Bank, and the Committee to Protect the World's Children. Halfdan Mahler, James Grant, Tom Clausen, Jonas Salk, and Robert McNamara believe that the time has come to consider the initiation of a massive thrust to universalize the protection of the world's children through the application of the effective tools now available, and the new and improved methods being rapidly developed by the biotechnology revolution. A first step will be a meeting to discuss this important global effort which will be held at the Rockefeller Foundation's Study and Conference Center, Villa Serbelloni, in Bellagio, Italy, on March 12-16, 1984, to which you are cordially invited.

This letter stems from a process begun early this year which was followed by a planning meeting in New York City on October 24, 1983. Those attending included the Director-General of the World Health Organization and three of his staff; the Executive Director of UNICEF and one staff member; Jonas Salk, Robert McNamara and an associate of the Committee to Protect the World's Children; William Foege, Director of the Center for Disease Control; Sir Gustav Nossal, President of the Walter and Eliza Hall Institute; and the Vice President and Director for Health Sciences of The Rockefeller Foundation. There were subsequent discussions with the President of the World Bank.

The result is a tentative plan to establish an organization to raise funds and to expedite and facilitate this essential program. A Consultative Group to Protect the World's Children might be jointly sponsored by UNICEF, WHO and the World Bank. The primary focus of this organization would be immunization of the great majority of the world's children against six lethal and disabling diseases of infancy and childhood

which take some five million lives annually and disable millions more. As required by the problem, the program would be a long-term, ongoing process building upon the WHO-UNICEF Expanded Program on Immunization and working either through existing primary health care systems or by fostering the development of such systems where they are inadequate or non-existent. As the current ferment in biotechnology leads to new and improved vaccines they will be added.

In addition to the primary focus of the Consultative Group, other relatively low-cost methods to markedly reduce childhood morbidity and mortality will be considered on a priority basis to be determined by the countries concerned in relation to prevalence, morbidity, mortality, feasibility of control and cost. These would include such measures as oral rehydration, breast feeding, and growth surveillance. Further measures might be added to eventually cover the full spectrum of child health including the crucial factor of family planning.

The World Bank, the World Health Organization, and UNICEF and the Committee to Protect the World's Children hope that other organizations who share a vision of what could be done for child health would agree to join in consideration of the development of a Consultative Group to Protect the World's Children. Members of such a Consultative Group could be representatives of these organizations, concerned donors from multilateral and bilateral aid organizations, foundation officers, and representatives from countries prepared to make a major effort to expand the coverage of their immunization and other child health services. The Group, expressing the shared interest and consensus of its members, would mobilize support and financing for projects, programs, and research in child health. It may appoint a Scientific and Technical Advisory Committee (STAC) to provide independent scientific and economic review of the activities being supported by the Group.

The Rockefeller Foundation has provided the facilities of its Study and Conference Center in Bellagio, Italy. Conferees can arrive at the Center on the afternoon of 12 March (the meeting itself will begin with a brief introductory session the evening of 13 March) and will depart on the morning of 16 March 1984. The meeting itself will last two days. Transportation will be provided to the Center from Milan or nearby points. Approximately thirty individuals will be invited to the meeting including Executive Director or Ministerial level personnel from WHO (Halfdan Mahler) UNICEF (James Grant), The World Bank (Tom Clausen) and regional banks, international development agencies, developing countries, and foundations, plus the Honorable Robert McNamara and Jonas Salk. The meeting will be based on the premise that an immunization program against major childhood communicable diseases integrated into the framework of a primary health care system and efficiently managed is among the most cost-effective means of substantially reducing morbidity and mortality levels over the short

run. A series of working papers will be available to all participants one month before the meeting and will be briefly presented for discussion in Bellagio. The papers will include: The nature and extent of the problem and the potential effect of immunization procedures; A description of the state of the art of immunization against childhood diseases; The biotechnology revolution and new vaccines; Strategies for the development of a comprehensive global childhood immunization program; and Childhood immunization as an impetus to primary health care.

Please join us in this great venture which will have a significant impact on child health.

Yours sincerely,

A. W. Clausen
President
The World Bank

Please send replies to the
Secretary of the Planning Committee:

Kenneth S. Warren
Director for Health Sciences
The Rockefeller Foundation
1133 Avenue of the Americas
New York, New York 10036

James P. Grant
Executive Director
UNICEF

Halfdan Mahler
Director General
World Health Organization

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

March 2, 1984

THE ADMINISTRATOR

Dear Dr. Warren:

In response to the invitation of Messrs. Clausen and Grant and Dr. Mahler to attend a meeting of a Consulting Group to Protect the World's Children in Bellagio, Italy, on March 12-16, 1984, it gives me great pleasure to accept on behalf of the Agency for International Development (A.I.D.). I will be accompanied at the Bellagio meeting by Dr. Nyle C. Brady, Senior Assistant Administrator for Science and Technology.

A.I.D. has had a long history of involvement in health programs and is actively involved now with program expenditures in health in excess of $140 million in FY 1984. Both our health policy documents and program strategies have emphasized our priority interest in primary health care and the inexpensive, cost-effective measures such as immunization, oral rehydration and family planning to improve the health of mothers and children in developing countries. Of particular interest to the United States Government is the determination to make substantial progress toward making ORT widely available throughout the developing world within five years.

This is based on repetitive analysis by UNICEF, WHO, our own Agency, and health experts, such as yourself. These analyses indicate that ORT has similar benefits to immunizations in reducing worldwide childhood morbidity and mortality.

Towards that end, I am prepared to lead the discussion of the importance of oral rehydration at the upcoming meeting. I would also appreciate the opportunity of providing appropriate background materials on ORT to participants of the Consultative Group prior to our meeting in Bellagio.

I look forward to a very fruitful and thought-provoking meeting.

Sincerely,

M. Peter McPherson

Dr. Kenneth S. Warren, M.D.
The Rockefeller Foundation
1133 Avenue of the Americas
New York, New York 10036

250

The Rockefeller Foundation
1133 AVENUE OF THE AMERICAS, NEW YORK, N.Y. 10036

KENNETH S. WARREN, M.D.
DIRECTOR HEALTH SCIENCES

CABLE: ROCKFOUND, NEW YORK
TELEPHONE: (212) 869 - 8500

lf

ACTION: AA/S&T w/attachments as appropriate
INFO: McPherson logs, AA/PPC, XA/OPA

MEMORANDUM

February 21, 1984

TO: ALL PARTICIPANTS

FROM KENNETH S. WARREN, M.D.

SUBJECT: BELLAGIO CONFERENCE MARCH 12-16, 1984

Enclosed please find the following:

1. A booklet containing the agenda and working papers
2. A list of participants as of 21 February
3. The State of the World's Children 1984, courtesy of UNICEF

2/21/84

List of Participants
Bellagio Meeting
12 March 1984

Mrs. Margaret Catley-Carlson
President
Canadian International Development Agency
Place du Centre
200 Promenade du Portage
Hull, Quebec K1A 0G4, Canada

Minister Sergio Cattani
Direzione Generale Affari Economici
Ministero Affari
Esteri - 00100 Roma

Mr. A.W. Clausen
President
The World Bank
1818 H Street N.W.
Washington, DC

Mr. F.X. de Donnea
Secretaire d'Etat a la Cooperation et au
Developpement
2, rue des Quatre Bras
B-1010 Bruxelles

Dr. William Foege
Director
Center for Disease Control
Building I, Room 2000
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Mr. Anders Forsse
Director General
Swedish International Develop
Authority
Birger Jarisgatan 61
S-105 25 Stockholm

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Executive Director
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866 U.N. Plaza
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Dr. Donald A. Henderson
Dean
Johns Hopkins School of Hygiene
and Public Health
615 North Wolfe Street
Baltimore, MD 21210

Dr. Ralph Henderson
Director
Expanded Program on Immunization
World Health Organization
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Mr. Mogens Isaksen
Under Secretary
Ministry of Foreign Affairs
Danish International Development Agency
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Denmark

Dr. Steve Joseph
Special Coordinator
Child Health & Survival
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Dr. Richard W. Lyman
President
The Rockefeller Foundation
1133 Avenue of the Americas
New York, NY 10036

Dr. Hafdan Mahler
Director General
World Health Organization
Geneva, Switzerland

The Honorable Robert S. McNamara
Suite 1110
1800 K Street, N.W.
Washington, DC 20006

Ambassador R. McGovern
Australian Ambassador to Sweden
c/o The Australian Embassy
Stockholm, Sweden

Mr. M. Peter McPherson
Administrator
U.S. Agency for International Development
320 21st Street, N.W.
Washington, DC 20523

Mr. John North
World Bank
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1818 H Street N.W.
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Sir Gustav Nossal
Director
Walter & Eliza Hall Institute
of Medical Research
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Royal Melbourne Hospital
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Administrator
United Nations Development Programme
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Dr. V. Ramalingaswami
Director-General
Indian Council of Medical Research
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Mr. T.P.Svennevig
Director General of Multilateral Department
Ministry of Development Corporation
Oslo Norway

Dr. Kenneth S. Warren ✓
Director
Health Sciences Division
The Rockefeller Foundation
1133 Avenue of the Americas
New York, NY 10036

MISCELLANEOUS

FOR BELLAGIO

ITEM	Monday 3/5	Tuesday 3/6	Wednesday 3/7	Thursday 3/8	Friday 3/9
1. McPherson's Speech	Brady's Comment	Revise	Present	Revise Finalize	"Last Minutes"
2. AID's ORT Data Base	Review	Finalize	Present	Revise Finalize	"
3. AID's Immun. Data Base	Review	Finalize	Present	Revise Finalize	"
4. Economic Analysis of ORT		Review Finalize	Present	Revise Finalize	"
5. Medical 'Caveats' of ORT	Finalize		Present	Revise Finalize	
6. Background of Issues of Bellagio Participants	Call PPC/DC	Review Finalize	Present	Revise Finalize	"
7. Trade-offs of different Health Interventions	Expand existing Material	Review Finalize	Present	Revise Finalize	"
8. Economic Assessment of Foege's paper	Review	Finalize			
9. Security Assessment	Check on Progress	Further Action if Needed			
10. ORT Papers to Warren	Brady's Comments and Finalize				
11. Bio-Date on Participants	Call PPC/DC	Review	Present	Revise Finalize	"
12. Pope Material	See Where we Stand	Further Action if Needed			

WORKPL OR BELLAGIO

ITEM	Monday 3/5	Tuesday 3/6	Wednesday 3/7	Thursday 3/8	Friday 3/9
1. McPherson's Speech	Brady's Comment	Revise	Present	Revise Finalize	"Last Minutes"
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3. AID's Immun. Data Base	Review	Finalize	Present	Revise Finalize	"
4. Economic Analysis of ORT		Review Finalize	Present	Revise Finalize	"
5. Medical 'Caveats' of ORT	Finalize		Present	Revise Finalize	
6. Background of Issues of Bellagio Participants	Call PPC/DC	Review Finalize	Present	Revise Finalize	"
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11. Bio-Date on Participants	Call PPC/DC	Review	Present	Revise Finalize	"
12. Pope Material	See Where we Stand	Further Action if Needed			

Reading Notes & Thoughts

Restraints for using WHO as a funding source

1. Resources within UN system do not offer major room for rapid expansion.
2. major proportion of potential resources for health lies with the bilateral donors. (Restricted, on the average, of disbursing more than 40% of their assistance through multilateral organizations

---

History of resource coordination.

Voluntary Fund for Health Promotion.

~~Funding efforts for Smallpox Program.~~

- ~~Special funds for ... Funds~~
- Funds for special program -
  - TDR - Tropical Disease Research and Training
  - HRP - Human Reproduction
  - OCP - Onchocerciasis Control.

— World Bank served as Funding Agent

- A consultative Health Resources 2000 Group.
  Dec. 1979 - in dept study of donor policies, programs and perspectives.

From Lee Howard

p. 333

Magnitude of all concessional aid for health purposes from all external sources is on the order of $3 billion annually.

This amount is in the absence of any formal resource mobilization system.

- Howard proposes ~~a WHO~~
  1). A WHO funded ~~collab~~ global network & Secretariat
  - with reassignment of personnel for support of this system
  ~~This is~~ One would have WHO & the UN agency as governance.
  2). Primary Health Care Initiative Fund ~~which would~~ with collaborative funding by donor & international agencies (proposed by the Health Resource Group)

(?) does it exist

"A limited number of donors have made ~~contr.~~ commitments to the

The present trend allocates around 10% of donor concessional flows to the health sector

- It is not unthinkable that the estimated current ODA flow of US $3 billion for health in 1990 could be increased by an additional 10% per year (US $300 million)
  - before recession -

- public sector allocations are estimated to be US $2.8 billion. for the 67 poorest countries excluding China -

Global Resource Mobilization System

- based on country-specific and external resource-specific data

- establishment of a collaborative pattern which will provide the background upon which major funding choices can be made

- WHO has a constitutional responsibility to bring into being the necessary cooperative mechanism for HFA: global mobilization system.

- Approximately 90% of estimated total current external resources for health are derived from sources other than WHO.

WHO Policy

- "There is an international consensus that WHO is the appropriate focus for catalyzing resource mobilization globally ~~with a broad two~~ ing~~s to be carried~~"

- The comparative advantage of WHO, in relation to other external resource institutions is the universal distribution and size of its professional staff (app. 2500 worldwide), which permits the potential for development of a system-wide global resource mobilization system.

POINTS FOR CONTRAST

ORT	IMMUNIZATION
Preventive/curative	Preventive
High community participation	Low community participation
Can be done at home	Needs a health worker
Little equipment	Equipment intensive
Has mostly short-term effects	Long-term effects
Easier to integrate with MCH, Health Ed., etc.	Easier to integrate with birth weighing
Requires extensive education	Little education required
Generally "little-tech"	Generally "more-tech"
Many models exist	Basic model for delivery
More Learning-process	Generally Blueprint
More Community-Based Management	More 'Top-Down' Management
Easier to Learn by Doing	Little change for hands-on learning
Little temperature problem	Temperature of major importance-'cold chain'
Not time specific	Time specific
Cost efficient	Cost efficient varies with vaccine
~~Same~~ target groups mothers & children	Involves a bio chemical response not
	Quality of vaccine can manufacturer differ from country to country. (batch to batch)
immediate payoffs.	target groups: mothers & children
	long-term payoffs

Questions for Dr. Lee Howard

Given: A group of donors consisting of Canada, Belgium, Sweden, Denmark, Norway, Italy, Australia, Japan, Austria, France, Netherlands, Germany, U.K. and the U.S.

Questions:

1. What are the donors' views on the overall PHC concept and specificially on Selective PHC?

2. What are they doing in ORT?

3. What are they doing in the field of immunizations?

4. How do they compare regarding preventive vs curative services (current and historical)?

5. Do certain donors stand out in the field of immunization and/or ORT?

6. How much flexibility do they have with their funding procedures? i.e. how fast can they generally move money into new areas?

7. Specifically for AID, how do we compare with other donors in ORT and Immunization activities?

8. Likelihood that ~~in~~ the project $ amounts can be raised in the donor community.

9. In A New Look at Development Cooperation in Health you talk about a Primary Health Care Initiative Fund proposed by the Health Resources Group (HRG). Stated also in text, "A limited number of donors have made commitments to the Fund." - So this fund available and where do it compare to the ~~Bellagio~~ C.G. concept

Notes on Bilaterals

France: The French have three different federal ministries and four different sources of funding for their program

- Provides support for vaccine production through the ~~Dead~~ Institute Pasteur in Dakar, Bangui, and Tananarive.

- The official development assistance in the health sector totaled $266 million in 1977 and $406 million in 1978. which is approximately 15% of the total Overseas Development Assistance.

- There is a clear preference to encourage a shift of programme content towards more innovative and simpler systems of preventive medicine.

- The French have expressed interest in the design of a major practical immunization program in Africa

JAPAN

1. Japan International Cooperation Agency (JICA) is the official aid program in Japan

2. The Japanese currently ~~[illegible]~~ gives assistance to approximately ~~70~~ 70 countries. ~~The countries which it provides~~ It ~~provides~~ supports bilateral health programs in the following countries:

(p. 472)

JICA does not support specific ~~Does not specify project~~ projects in immunization or ORT. but do have ~~been~~ five project in broad health care support

3. The estimate of 1980 funding for Overseas Development Assistance is $2.8 million which would make Japan the second largest donor with the DAC/OECD agency.

4. Japan is pursuing a policy of untied aid. and the grant element of ODA reached 75.1% in 1978.

5. The funds for health ~~increased from $6.2 million in~~ 1 were estimated at $87.6 million in 1978.

Donor Perspective on Health For All

- The drive for PHC and Health For All is not seen as a feasible objective inherent in broad development base.

Spectra

Health Sector Activities

#. Indonesia: Vaccine Production – $ 520,000

p. 368. – 370

Australia

- Australian Development Assistance Bureau (ADAB) is the official aid organization in Australia.

- In 1979, 52 countries and territories received development assistance with concentration in South Pacific & Asian countries. Over half of total bilateral aid is allotted to Papua New Guinea.

- The total estimated 1979/1980 funding for bilateral, multilateral, and NGO funding for health is $ 34 million.

- Australia is among the most liberal of Development Assistance Countries. All Overseas Development Assistance in 1978 was in grant form and approximately 75% was untied.

- ADAB maintain approximately 28 overseas representatives at the Australian Embassy or High Commission in Bangladesh, Fiji, India, Indonesia, Italy, Malaysia, Papua New Guinea, Singapore, and Thailand.

- ~~PHC~~ Views on PHC - Health for All by the Year 2000.

NORWAY

1. The Norwegian Agency for International Development (NORAD) is the official aid agency for Norway.

2. Norway & Sweden show top honor ~~among~~ for granting the highest percentage of GNP for official development assistance (0.9%)

3. By Policy, aid is untied and distributed equally between multilateral and bilateral disbursing mechanisms.

4. By administrative policy decision, approximately 10% of all Overseas Development Assistance (multilateral and bilateral) is allocated for health, nutrition, and family planning.

5. Norway currently supports immunization as a component of PHC.

6. Country Representation -
Norway has the following nine concentration countries ~~which it~~ to which it gives development assistance

— p. 543 —

In these countries, NORAD maintains a "Resident Representative" for general development.

Down Perspective on Health for All By the Year 2000.
Norwegian financial planning estimates are fairly firm, ~~can~~ could be modified to support the health for all

- Over half of Norwegian ODA funds are allocated to multi-bilateral agencies.

- NORAD is currently not contributing to projects in the area of health planning.

- NORAD has had only limited exposure to the health Small initiatives.

Sweden

1. The official aid agency is the Swedish International Development Authority (SIDA)

2. Sweden ~~gives~~ allocates 0.9% of its GNP for official development assistance, sharing the ~~top~~ honor of top % with Norway.

3. Approximately half of all proposed development assistance for 1979/80 went to six countries: Vietnam, Tanzania, ~~[illegible]~~, Zambia, Mozambique, India, and ~~Bda~~ Bangladesh. In all ~~21~~ 13 countries receive health development assistance ~~for 1979/80~~. ~~are~~ in 1980.
(Country List)

4. Ninety-nine percent of total commitments in 1978 were grants.

5. In their health portfolio, there is an absence of significant programs to improve nutritional planning capabilities.

6. SIDA currently ~~has programs~~ supports programs in immunization ~~and~~

7. SIDA is one of the largest ~~sup~~ donors to UNDP and UNICEF in addition to other multilateral programs.

Belgium

1. The official Belgium Aid Agency, AGCD. – Administration générale de la Coopération et du développement'

2. 60% of Belgium bilateral aid is channelled to three former colonies: Zaire, Rwanda and Burundi.

3. The three principal sectors of bilateral assistance are education, rural and agricultural development, and public health.

4. AGCD supports some 50 primary health care projects worldwide.

5. AGCD has provided special funds to WHO for the development of guidelines on diarrhoeal diseases.

6. Total Overseas Development Assistance (ODA) was ~$536 million in 1978.

7. Health funding ~~was $10 million in 1978~~ estimated at $18 million for bilateral programs plus some $25 million for support of technical aspects.

8. ~~AGCD~~ AGCD maintains "cooperative missions" in its larger emphasis countries (#18) ~~for 1978~~

The World Bank
INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT
INTERNATIONAL DEVELOPMENT ASSOCIATION

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U S A.

(202) 477-1234
Cable Address: INTBAFRAD
Cable Address: INDEVAS

February 17, 1984

Mr. Franz Herder
Deputy Director
Agency Directorate for Health
and Population
U.S. Agency for International
Development
Room 809 SA/18
Department of State
Washington, D.C. 20523

Dear Franz:

How quickly time has passed since our meeting! With the Bellagio Conference less than one month away, I'm sure that you, as we, are very much in the throes of final preparations for our "jefes". To hopefully ease the load, I am enclosing biographical sketches of the principal conference participants, as promised. The few missing ones are diligently being tracked by our reference center which hopes to complete the list within the next couple of weeks. We welcome any corrections or additions to the U.S. Who's Who profile of Mr. McPherson, also included.

Thank you for the summary of oral rehydration therapy activities in USAID-assisted countries. It will be a valuable resource not only for Bellagio but for our Operating Divisions in their country sector and lending work.

Both Tony and I enjoyed our meeting with Ann Van Dusen, Robert Clay and you, and look forward to continued liaison as Bellagio and other mutual health and population activities evolve.

Sincerely,

(KLH)

Karen Lashman Hall
Senior Economist
Population, Health and Nutrition Dept.

Enclosures

Contact at World Bank

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1 The proposed accelerated areas consist of the 10 developing countries with the highest vaccine preventable disease mortality. China's population was excluded because of the likelihood that external resources will not be required fo this initiative. Source: Demographic indicators of Countries. Estimates and Projections as Assessed in 1980. Department of International Economic Cultural Affairs. U.N. ST/ESA/SER. A/82. The median variance of each projection has been chosen.

2 Total infants and pregnant women at risk was estimated in year 1 by phasing in 3 countries for acceleration. Year 3 - additional countries (total 6) and by Year 6 - the last 4 countries included. The target population is infants in ea successive birth cohort. The backlog of unimmunized missed infants in each cohort is not considered a primary target The birth rate in the developing countries was assumed to be 3.0%, and slowly declining; to approximate the increase cohort size, a base year birth rate was increased by the population growth rate.

3 Total pregnant women at risk were considered all women 15-49 years of age. This projection does not take into accoun multiparity. Each pregnant woman is assumed to deliver one liveborn infant. This assumption ignores as much as 5% total wastage which necessitates vaccinating 105 women for each 100 liveborn children.

4 No economies of scale or dyseconomies of scale are assumed.

5 In the early years of program expansion, 3-4 years are expected at constant cost before the average cost of immunizin child and a pregnant woman may benefit from any economies of scale. There may be on the other hand, certain dyseconomies of scale and infrastructure development which inhibit any further fall in costs. In addition, increasin marginal costs may be observed as the program extends to the lease accessible populations.

Table 2

Proposed Membership and Functions of the Units of the Consultative Group to Protect the World's Children

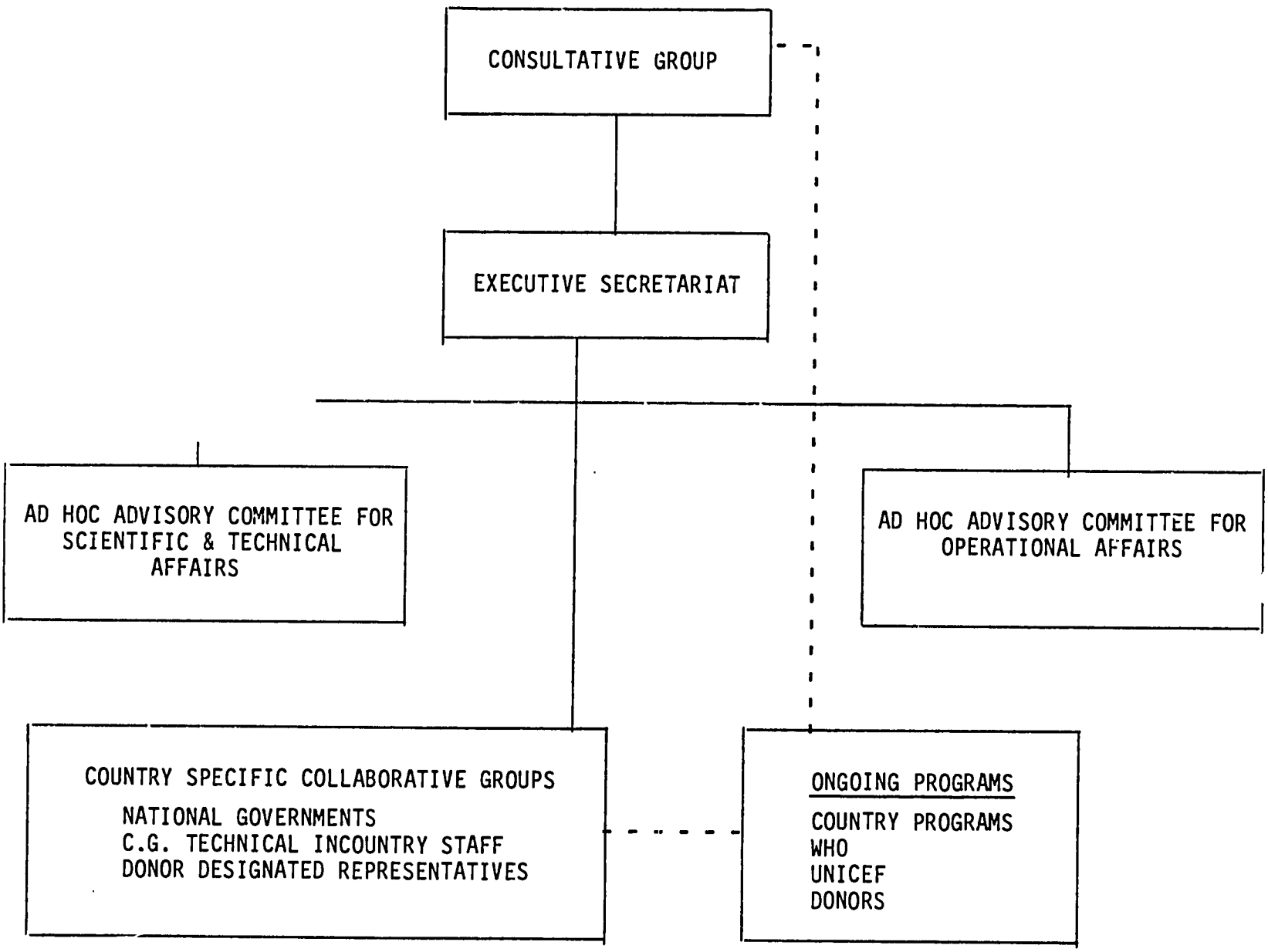
	Membership	Functions
1. Consultative Group to Protect the World's Children	WHO UNICEF World Bank Donor sources Interested parties	Advocacy to protect the world's children through immunization and other appropriate measures. Mobilization of world opinion and political commitment. Mobilization of new resources. Review of global activities.
2. Executive Committee of the Governing Board	Chairman, Governing Board Chairman, Scientific and Technical Advisory Committee Chairman, Operations Advisory Committee WHO UNICEF World Bank	Review and approval of criteria for selecting projects. Approval of allocation of funds. Report to the Governing Board.
3. Secretariat of the Consultative Group	Executive Director Administrative assistants Technical advisors as required	Liaison and focal point for bodies providing operational support. Review and approval of projects. Review of and report on ongoing projects.
4. Financial Administration	World Bank	Receipt and holding of funds generated. Allocation of funds approved by the Executive Committee. Review of expenditures.
5. Scientific and Technical Advisory Committee	Chairman Small group of independent experts Ad hoc advisory groups	Review and proposal of research projects to the Executive Committee. Review of research activities. Validation of techniques used for program implementation.
6. Operations Advisory Committee	WHO UNICEF World Bank UNDP Others	Review and Guidance to the selection of countries. Guidance to the implementation of program. Periodic review of progress of implementation.
7. Country-Specific Collaborating Groups	Nat'l Governments WHO UNICEF UNDP World Bank NGO's, bilateral agencies	Assist national governments in development of plans. Development of plan criteria Coordinate donors in health sector to accept a unified approach for child survival/ agreement on strategies. Coordination of activities at country levels including cash distribution.

2.7.

Proposed Membership and Functions of the Units of the Consultative Group to Protect the World's Children

1.	Consultative Group to Protect the World's Children	Donor sources Interested parties UNICEF World Bank WHO	Advocacy to protect the world's children through immunization, ORT and other appropriate measures. Mobilization of world opinion and political commitment. Review and endorsement of criteria for matching country programs and donors. Foster coordination among country specific donors. Foster the development of policies in support of (immunization/ORT) PHC initiatives. Mobilization of private resources for country representatives, PVO's and international organizations.
2.	Secretariat of the Consultative Group	Executive Secretary Administrative Assistants Technical advisors	Liaison and focal point for providing operational support. Review of reports from committees. Review of and reporting on ongoing
3.	Ad Hoc Advisory Committee for Scientific and Technical Affairs	Chairman from C.G. membership Technical advisors as required	Review and proposal of research projects to the C.G. Review of techniques proposed by Country Specific Collaborating Groups.
4.	Ad Hoc Advisory Committee for Operational Affairs	Chairman from C.G. membership Donor Representative Country Representative	Review and guidance for the selection of countries. Guidance for the implementation of program. Periodic review of progress of implementation.
5.	Country-Specific Collaborative Groups	National Governments WHO C.G. Technical In-Country Staff Donor Designated Representatives	Assist national governments in development of plans. Development of plan criteria. Coordinate donors in health sector to accept a collaborative approach for child survival and agreement on strategies. Coordination of activities at country levels.

PROPOSED ORGANIZATIONAL CHART FOR THE CONSULTATIVE GROUP TO PROTECT THE WORLD'S CHILDREN



Proposed Membership and Functions of the Units of the Consultative Group to Protect the World's Children

1.	Consultative Group to Protect the World's Children	Donor sources Interested parties UNICEF World Bank WHO	Advocacy to protect the world's children through immunization, ORT and other appropriate measures. Mobilization of world opinion and political commitment. Review and endorsement of criteria for matching country programs and donors. Foster coordination among country specific donors. Foster the development of policies in support of (immunization/ORT) PHC initiatives. Mobilization of private resources for country representatives, PVO's and international organizations.
2.	Secretariat of the Consultative Group	Executive Secretary Administrative Assistants Technical advisors as required	Liaison and focal point for providing operational support. Review of reports from committees. Review of and reporting on ongoing projects. Administrative support to consultative group.
3.	Ad Hoc Advisory Committee for Scientific and Technical Affairs	Chairman from C.G. membership Technical advisors as required	Review and proposal of research projects to the C.G. Review of techniques proposed by Country Specific Collaborating Groups.
4.	Ad Hoc Advisory Committee for Operational Affairs	Chairman from C.G. membership Donor Representative Country Representative	Review and guidance for the selection of countries. Guidance for the implementation of program. Periodic review of progress of implementation.
5.	Country-Specific Collaborative Groups	National Governments WHO C.G. Technical In-Country Staff Donor Designated Representatives	Assist national governments in development of plans. Development of plan criteria. Coordinate donors in health sector to accept a collaborative approach for child survival and agreement on strategies. Coordination of activities at country levels.

PROPOSED ORGANIZATIONAL CHART FOR THE CONSULTATIVE GROUP TO PROTECT THE WORLD'S CHILDREN

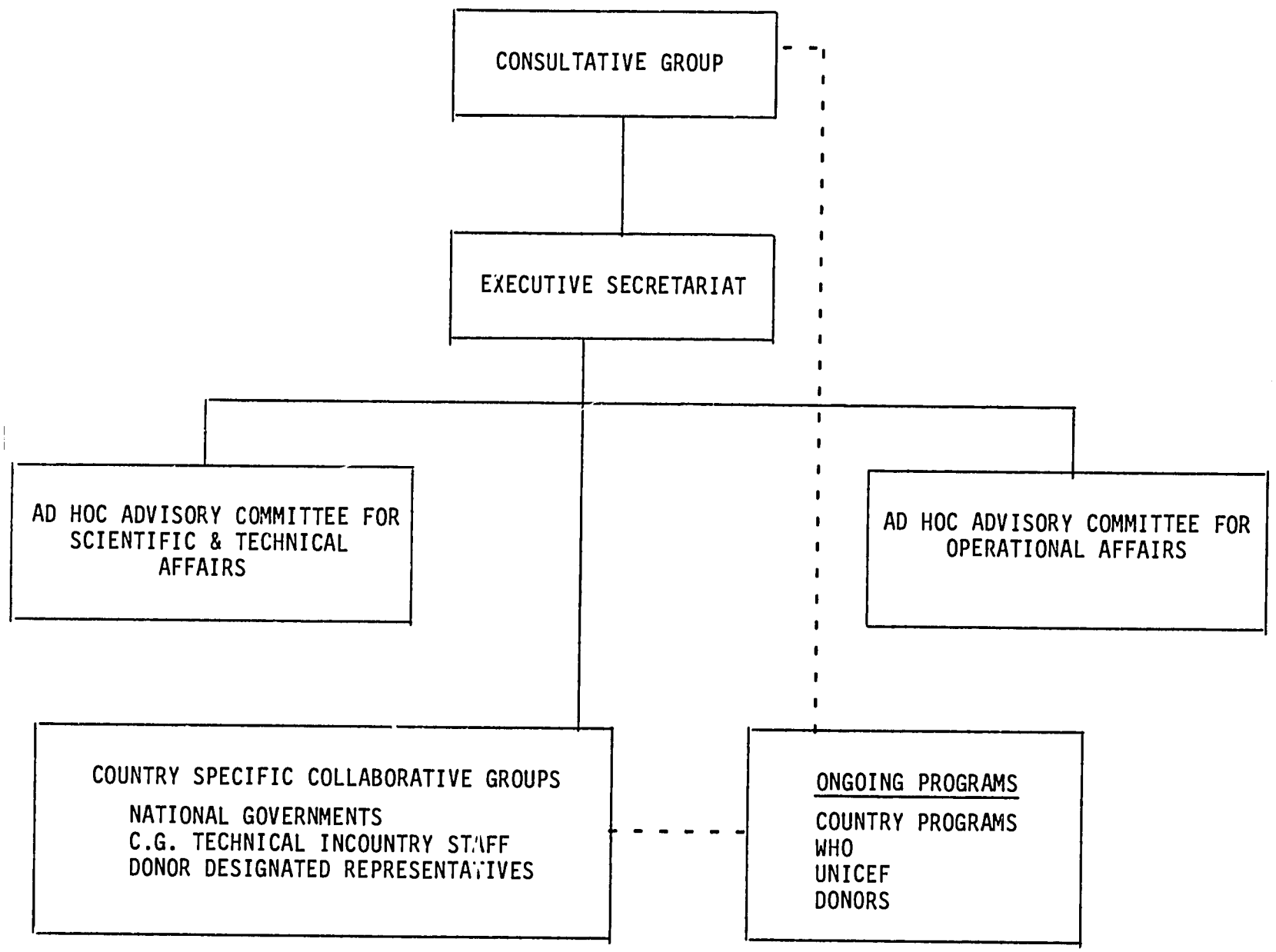
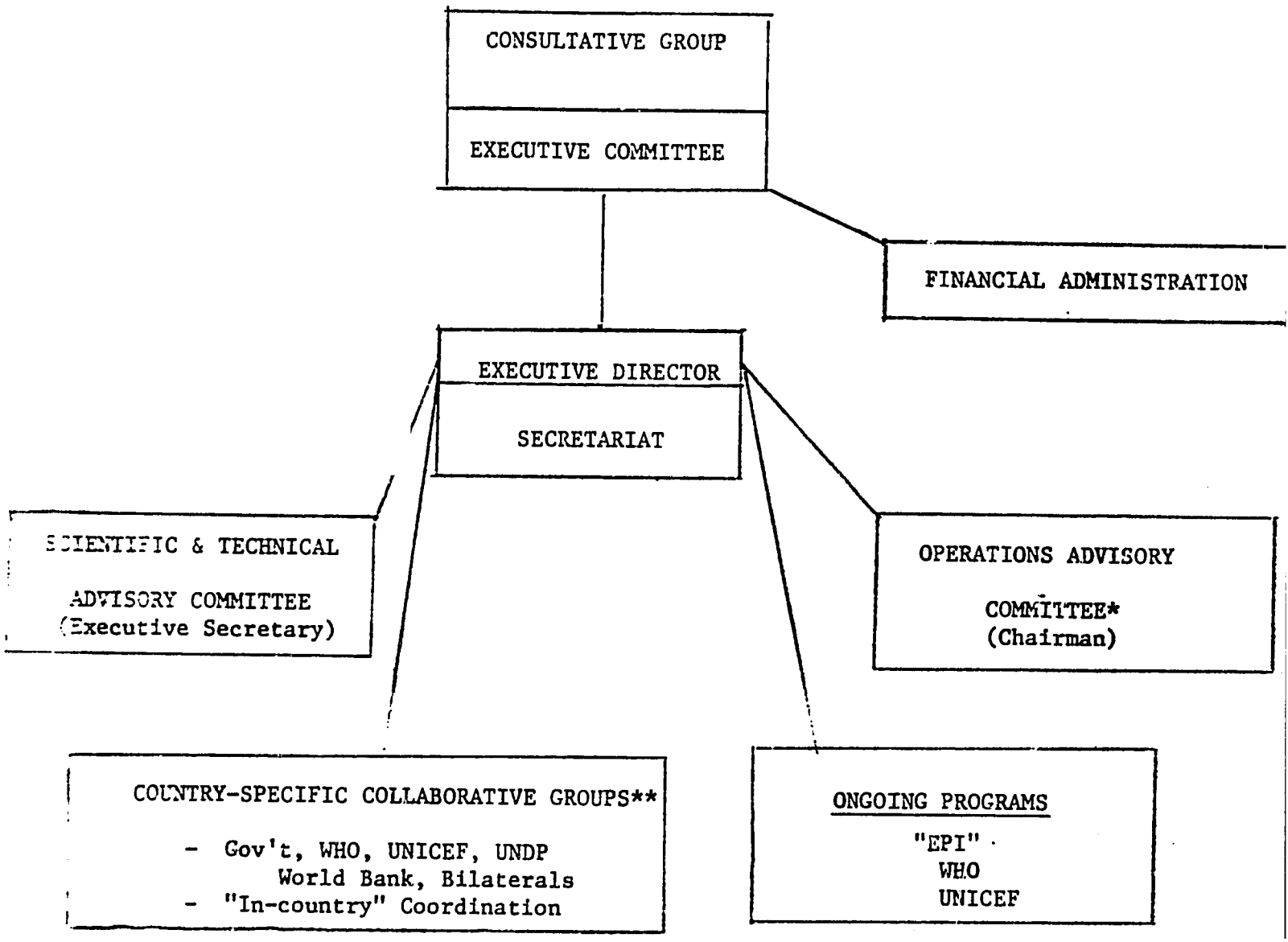


FIGURE 1

PROPOSED ORGANIZATIONAL CHART FOR THE CONSULTATIVE GROUP TO PROTECT THE WORLD'S CHILDREN



* WHO, UNICEF, UNDP, World Bank, etc.
** One Group in each location Accelerated Country

Table 6

Projected Maximum and Minimum Estimates
of Annual Total Costs in Current Dollars for
Varying Assumptions of External Program Support
in the Proposed Accelerated Areas

Year	Total Cost in Current US$[1]		External Support for Program, US$ (Maximum Cost Assumption)[2]		
	Max.	Min.	20.0%	50.0%	80.0%
	(000)			(000)	
1	-143,548	143,548	28,710	71,774	114,838
2	211,802	211,802	42,360	105,901	169,442
3	469,991	469,991	93,998	243,995	375,993
4	623,307	623,307	124,661	311,654	498,646
5	749,634	689,444	149,927	374,817	599,707
6	1,125,584	1,034,320	225,117	562,792	900,467
7	1,231,658	1,115,150	246,332	615,829	985,326
8	1,342,250	1,215,280	268,450	671,125	1,073,800
9	1,457,587	1,185,767	291,517	728,794	1,166,070
10	1,577,829	1,270,792	315,566	788,914	1,262,263
11	1,703,138	1,371,716	340,628	851,569	1,362,510
12	1,831,523	1,460,268	366,305	915,762	1,465,218
13	1,965,000	1,407,365	393,000	982,500	1,571,000
14	2,103,728	1,506,724	420,746	1,051,864	1,682,982
15	2,247,956	1,579,645	449,591	1,123,978	1,798,365
16	2,397,770	1,555,310	479,554	1,198,216	1,918,216

1 1985 dollars were inflated to current dollars using an inflation rate of 9.7% (this is a combination of a 10% national inflation rate weighted 0.9 to 0.1 with a 7% international rate). Source: World Bank.

2 National governments will be expected to contribute no less than they are now contributing to immunization programs. The current level has been maintained as a constant commitment.

Table 7

Projected Maximum and Minimum Estimates of Annual Total Costs in 1985 Dollars for Varying Assumptions of Cost per Fully Immunized Infant and Pregnant Women in the Ongoing EPI Areas[1]

Year	Target Infants	Projected Coverage	Cost per Infant[2] Max.	Min.	Target Pregnant Women	Projected Coverage	Cost per Pregnant Woman[2] Max.	Min.	Total Cost in 1985 US Max	Min
	(000)	(%)	(US$)		(000)	(%)	(US$)		(000)	
1	27,633	40	4.80	4.80	6,908	10	1.12	1.12	140,375	140,375
2	31,702	45	4.80	4.80	10,567	15	1.12	1.12	164,007	164,007
3	29,251	50	4.80	4.80	14,626	25	1.12	1.12	156,787	156,787
4	32,816	55	4.80	4.80	23,864	40	1.12	1.12	184,233	184,233
5	33,463	55	4.80	4.48	34,429	50	1.12	0.96	194,696	179,120
6	31,002	60	4.80	4.48	28,419	55	1.12	0.96	180,639	166,172
7	34,220	65	4.80	4.48	31,588	60	1.12	0.88	199,637	181,105
8	34,867	65	4.80	4.48	34,867	65	1.12	0.88	206,414	186,888
9	38,259	70	4.80	4.00	38,259	70	1.12	0.82	226,493	184,255
10	38,982	70	4.80	4.00	38,982	70	1.12	0.77	230,774	185,867
11	42,506	75	4.80	4.00	39,672	70	1.12	0.77	248,461	200,491
12	43,258	75	4.80	4.00	40,374	70	1.12	0.72	252,858	202,102
13	44,024	75	4.80	3.52	44,024	75	1.12	0.72	260,621	186,661
14	44,803	75	4.80	3.52	44,803	75	1.12	0.72	265,234	189,965
15	48,636	80	4.80	3.52	45,596	75	1.12	0.64	284,519	200,379
16	49,496	80	4.80	3.20	49,497	80	1.12	0.64	293,020	190,067

1 The ongoing EPI areas are defined as all those countries considered as developing by the UN classification excluding the 10 countries included in the accelerated areas. Developing countries are phased into the accelerated areas.

2 The cost per fully immunized infant or pregnant woman is estimated to be 1/3 the costs of immunization programs in t accelerated areas based on Table 3 (the sum of recurrent costs for vaccines, transport and miscellaneous).

Table 8

Projected Maximum and Minimum Estimates of Annual Total Costs in Current Dollars for Varying Assumptions of External Program Support in the Ongoing EPI Areas

Year	Total Cost in Current $US[1]		External Support for Program, Current $US		
	Max.	Min.	Maximum Cost Assumption[2]		
			20.0%	50.0%	80.0%
	(000)			(000)	
1	140,375	140,375	28,075	70,187	112,300
2	179,916	179,916	35,983	89,958	143,933
3	189,086	189,086	33,858	84,646	135,433
4	242,506	242,506	48,501	121,253	194,005
5	277,967	255,730	55,593	138,983	222,374
6	278,257	255,971	55,651	139,128	222,605
7	330,259	299,602	66,052	165,130	264,207
8	365,229	330,680	73,046	182,614	292,183
9	427,121	347,469	85,424	213,561	341,697
10	462,356	372,384	92,471	231,178	369,885
11	527,358	425,543	105,472	263,679	421,886
12	567,111	453,275	113,422	283,555	453,689
13	616,212	441,341	123,242	308,106	492,970
14	659,717	472,500	131,943	329,858	527,773
15	743,051	523,311	148,610	371,525	594,441
16	802,055	520,252	160,411	401,027	641,644

1 The cost per fully immunized infant or pregnant woman is estimated to be 1/3 the costs of immunization programs in the accelerated areas based on Table 2.

2 1985 dollars were inflated to current dollars using an inflation rate of 9.7% (this is a combination of a 10% national inflation rate weighted 0.9 to 0.1 with a 7% international rate).

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ORAL REHYDRATION THERAPY

AID'S ORT DATA BASE

ORAL REHYDRATION THERAPY (ORT) ACTIVITIES

AGENCY FOR INTERNATIONAL DEVELOPMENT

MARCH 1984

REGIONAL SUMMARY OF ORT ACTIVITIES - 1983

REGION	National ORT Program	A.I.D. Supported ORT Projects	Private Sector ORT Activities	ORT Packets Programs	Home-Based Programs	Local ORS Production
AFRICA	Yes - 9	Yes - 16	Yes - 11	Yes - 18	Yes - 11	Yes - 8
	No - 11	No - 9	No - 8	No - 1	No - 4	No - 11
	Not Reported - 3	Not Reported - 1	Not Reported - 6	Not Reported - 5	Not Reported - 9	Not Reported - 5
	No Reply - 15	No Reply -12	No Reply -13	No Reply -14	No Reply -14	No Reply -14
ASIA	Yes - 9	Yes - 7	Yes - 5	Yes - 9	Yes - 3	Yes - 9
	No - 0	No - 2	No - 0	No - 0	No - 0	No - 0
			Not Reported - 4		Not Reported - 6	
LATIN AMERICA	Yes - 14	Yes - 7	Yes - 9	Yes - 17	Yes - 8	Yes - 10
	No - 4	No - 11	No - 9	No - 0	No - 7	No - 7
				Not Reported 1	Not Reported 3	No Reported 1

REGIONAL SUMMARY OF ORT ACTIVITIES - 1983 (Continued)
Page 2

REGION	National ORT Program	A.I.D. Supported Projects	Private Sector Activities	ORT Packets Used in Program	Home-Based Programs	Local ORT Production
NEAR EAST	Yes - 1	Yes - 5	Yes - 1	Yes - 5	Yes- 0	Yes - 2
	No - 1	No - 1	No - 0	No - 0	No - 0	No - 0
	Not Reported - 5	Not Reported - 1	Not Reported - 6	Not Reported - 2	Not Reported - 7	Not Reported - 5
TOTAL	Yes 33(46)*	Yes 35(49)	Yes 26(36)	Yes 49(68)	Yes 22(30)	Yes 29(40)
	No 16(22)	No 23(32)	No 17(24)	No 1(01)	No 11(15)	No 18(25)
	Not Reported 8(11)	Not Reported 2(03)	Not Reported 16(22)	Not Reported 8(11)	Not Reported 25(35)	Not Reported 11(15)
	No Reply 15(21)	No Reply 12(17)	No Reply 13(18)	No Reply 14(19)	No Reply 14(19)	No Reply 14(19)

*Numbers in() are % of Total

LATIN AMERICAN - REGION - SUMMARY OF ORT ACTIVITIES - 1983

COUNTRY	National ORT Program	A.I.D. Supported ORT Projects	Private Sector ORT Activities	ORT Packets Programs	Home-Based Programs	Local ORS Production
1. Belize	Yes	No	No	Yes	Yes	No
2. Bolivia	Yes	No	Yes	Yes	Yes	No
3. Brazil	Yes	No	No	Yes	Not Reported	Yes
4. Carribean	No	No	No	Yes	Not Reported	No
5. Costa Rica	Yes	No (Future support planned)	Yes (No A.I.D. support)	Yes	Yes	Yes
6. Dominican Republic	No	Yes	No	Yes	Yes	Yes
7. Ecuador	Yes	Yes	Yes (No A.I.D. support)	Yes	No	Yes
8. El Salvador	Yes	Yes	Yes (But Weak)	Yes	No	Yes
9. Guatemala	Yes	Yes	No	Yes	No	No
10. Guyana	Yes	No	No	Yes	Yes	Yes
11. Haiti	Yes	Yes	Yes (But Weak)	Yes	No (But might be added later)	Yes
12. Honduras	Yes	Yes	No	Yes	No	Yes

LATIN AMERICAN - REGION - SUMMARY OF ORT ACTIVITIES - 1983 (Continued)
Page 2

COUNTRY	National ORT Program	A.I.D. Supported ORT Projects	Private Sector ORT Activities	ORT Packets Programs	Home-Based Programs	Local ORS Production
13. Jamaica	Yes	No	No	Yes	No	No
14. Mexico	No	No	Yes	Yes	Yes	No
15. Nicaragua	Yes	No	No	Yes	Yes	Yes
16. Panama	Yes	No	Yes	Yes	No	No
17. Paraguay	No	No	Yes	Not Reported	Not Reported	Not Reported
18. Peru	Yes	Yes	Yes	Yes	Yes	Yes

SUMMARY

	Yes - 14	Yes - 7	Yes - 9	Yes - 17	Yes - 8	Yes - 10
	No - 4	No - 11	No - 9	No - 0	No - 7	No - 7
				Not Reported 1	Not Reported - 3	Not Reported - 1

AFRICAN - REGION - SUMMARY OF ORT ACTIVITIES - 1983

COUNTRY	National ORT Program	A.I.D. Supported ORT Projects	Private Sector ORT Activities	ORT Packets Programs	Home-Based Programs	Local ORS Production
1. Botswana	Yes	Yes	No	Yes	No	No
2. Burundi	No	Yes	Yes	Yes	Not Reported	Yes
3. Cameroon	Not Reported	No (Requesting)	No (Interest Exist)	Not Reported	Not Reported	Not Reported
4. Cape Verde	Yes (Plans to Begin)	No	No	No	Yes	No
5. Central African Republic *						
6. Chad	No	No	Not Reported	Not Reported	Not Reported	Not Reported
7. Comoros*						
8. Congo*						
9. Djibouti	Yes	Not Reported	Yes	Yes	Yes	No
10. Equat. Guinea *						
11. Gabon *						
12. The Gambia	Yes	Yes	No	Yes	Yes	No

* No Cable has been received from the Mission

AFRICAN - REGION - SUMMARY OF ORT ACTIVITIES - 1983 (Continued)
Page 2

COUNTRY	National ORT Program	A.I.D. Supported ORT Projects	Private Sector ORT Activities	ORT Packets Programs	Home-Based Programs	Local ORS Production
13. Ghana	No	No	No	Yes	Yes	No
14. Guinea *						
15. Guinea-Bissau	No	No	No	Yes	No	No
16. Ivory Coast *						
17. Kenya	No	No (Planned FY84)	Yes	Yes	No	Yes
18. Lesotho	No	Yes	Yes	Yes	Yes	Yes
19. Liberia	Yes	Yes	Yes	Yes (a little)	Yes	No
20. Malawi	Not Reported	No	Not Reported	Not Reported	Not Reported	Not Reported
21. Mali	No	Yes	Not Reported	Yes (a little)	Yes	Yes
22. Mauritania	No	Yes	No	Not Reported	Not Reported	No
23. Niger	Yes	Yes	No	Yes	No	Yes
24. Nigeria *						

* No cable has been received from the Mission

AFRICAN - REGION - SUMMARY OF ORT ACTIVITIES - 1983 (Continued)

COUNTRY	National ORT Program	A.I.D. Supported ORT Projects	Private Sector ORT Activities	ORT Packets Programs	Home-Based Programs	Local ORS Production
25. Rwanda	No	No	Yes	Yes	Yes	Yes
26. Sao Tome *						
27. Senegal	Yes	Yes	Yes (limited to research)	Yes	Not Reported	Yes
28. Sierra Leon*	(Not from Cable)		Yes			
29. Somalia	No	Yes	Not Reported	Yes	Not Reported	No
30. Sudan	Yes	Yes	Yes	Yes	Yes	No
31. Swaziland*	No (planned for FY84)	Yes	Yes	Yes	Yes	No
32. Tanzania*	(Not from Cable)	Yes				
33. Togo*	(Not from Cable)	Yes				
34. Uganda	No	No (proposed in FY 84)	Not Reported	Yes	Not Reported	Not Reported

* No Cable has been received from the Mission

AFRICAN - REGION - SUMMARY OF ORT ACTIVITIES - 1983 (Continued)

COUNTRY	National ORT Program	A.I.D. Supported ORT Projects	Private Sector ORT Activities	ORT Packets Programs	Home-Based Programs	Local ORS Production
35. Upper Volta	Not Reported	Yes	Not Reported	Not Reported	Not Reported	Not Reported
36. Zaire	Yes	Yes	Yes	Yes	Yes	Yes
37. Zambia *						
38. Zimbabwe *						

* No Cable has been received from the Mission

SUMMARY						
	Yes 9	Yes 16	Yes 11	Yes 18	Yes 11	Yes 8
	No 11	No 9	No 8	No 1	No 4	No 11
	Not Reported - 3	Not Reported - 1	Not Reported - 6	Not Reported - 5	Not Reported - 9	Not Reported - 5
	No Reply -15	No Reply -12	No Reply -13	No Reply -14	No Reply -14	No Reply -14

Africa Bureau is not planning support at this time for ORT to:
1. Angola, 2. Mazambique, 3. Republic of South Africa, 4. Seychelles, 5. Mauritius, 6. Madagascar
7. Namiba, 8. Ethiopia, 9, Benin, and 10. Reunion

ASIA REGION - SUMMARY OF ORT ACTIVITIES - 1983

COUNTRY	National ORT Program	A.I.D. Supported ORT Projects	Private Sector ORT Activities	ORT Packets Programs	Home-Based Programs	Local ORS Production
1. Bangladesh	Yes	No	Yes	Yes	Yes	Yes
2. Burma	Yes	Yes	Not Reported	Yes	Not Reported	Yes
3. India	Yes	Yes	Not Reported	Yes	Yes	Yes
4. Indonesia	Yes	Yes	Yes	Yes	Not Reported	Yes
5. Nepal	Yes	Yes	Not Reported	Yes	Yes	Yes
6. Pakistan	Yes	Yes	Not Reported	Yes	Not Reported	Yes
7. Philippines	Yes	Yes	Yes	Yes	Not Reported	Yes
8. Sri Lanka	Yes	No	Yes	Yes (limited)	Not Reported	Yes
9. Thailand	Yes	Yes	Yes	Yes	Not Reported	Yes
SUMMARY	Yes - 9 No - 0	Yes - 7 No - 2	Yes 5 No - 0 Not Reported - 4	Yes 9 No 0	Yes 3 No 0 Not Reported - 6	Yes 9 No 0

NEAR EAST REGION - SUMMARY OF ORT ACTIVITIES - 1983

COUNTRY	National ORT Program	A.I.D. Supported ORT Projects	Private Sector ORT Activities	ORT Packets Programs	Home-Based Programs	Local ORS Production
1. Egypt	Yes	Yes	Not Reported	Yes	Not Reported	Yes
2. Jordan	Not Reported	Yes	Not Reported	Yes	Not Reported	Not Reported
3. Lebanon	No	Not Reported	Not Reported	Yes	Not Reported	Not Reported
4. Morocco	Not Reported	Yes	Not Reported	Yes	Not Reported	Yes
5. Tunisia*	Not Reported	Yes	Not Reported	Not Reported	Not Reported	Not Reported
6. West Bank	Not Reported	No	Yes (CRS)	Not Reported	Not Reported	Not Reported
7. Yemen	Not Reported	Yes	Not Reported	Yes	Not Reported	Not Reported

* Planned Phase-Out country for A.I.D.

SUMMARY												
	Yes	1	Yes	5	Yes	1	Yes	5	Yes	0	Yes	2
	No	1	No	1	No	0	No	0	No	0	No	0
	Not Reported	- 5	Not Reported	- 1	Not Reported	- 6	Not Reported	- 2	Not Reported	- 7	Not Reported	- 5

AFRICAN BUREAU

BOTSWANA

1. ORT HEALTH STATISTICS

- Mortality (Due to Diarrheal Diseases)	Morbidity
-1982 - 86 deaths	-1982 - 19,327 cases
-1983* - 25 deaths (*first 39 weeks of 1983)	-1983* - 24,206 cases (*first 39 weeks of 1983)

2. HOST COUNTRY ORT PROGRAM

ORT Program - 1981

- Limited to the use of packets provided by UNICEF
- Part of the family health component of the PHC program
- Packets distributed by Health Outreach Workers

3. AID SUPPORTED ACTIVITIES

Health Services Development Project - (633-0078)

- ORT an integral part of this project which purpose is to uncrease the capacity of the GOB/MOH to provide comprehensive health services through a PHC strategy. Primary focus of the project is manpower development and institutional building.

4. PRIVATE SECTOR ORT ACTIVITIES

None

5. SACHETS/HOME MIX BASES

- Imported UNICEF packets
- Home-made solutions discouraged

6. LOCAL ORT SUPPLY

UNICEF supply only

- 1983: 300,000 packets
- 1984 - 1986: 200,000 packets

Comprehensive coverage: (600,000 packets annually)

7. POSSIBLE ORT EXPANSION

- Only minimal involvement by USAID/Botswana expected in the future

- Training activities planned ($50,000)

- Could use an intensive mass media communication campaign

- Strengthen the availability of ORT packets ($120,000)

Total $320,000

BURUNDI

1. ORT HEALTH STATISTICS

Mortality (Due to Diarrheal Diseases)	Morbidity
-1982: 673 deaths leading cause of deaths in children under 5	1982: 82,609 deaths (In children under 5 - 48,822 deaths in 1982)

2. HOST COUNTRY ORT PROGRAM

No National ORT Program

3. AID SUPPORTED ACTIVITIES

CCCD Project (698-0421) proposal
$185,000 - over four-year period
However not slated for 1984 start-up

4. PRIVATE SECTOR ORT ACTIVITIES

CRS - preparing educational material on home preparation of ORS

National Pharmaceutical Office (ONAPHA)

- parastatal - mixes ORS using imported ingredients

5. SACHETS/HOME MIX BASES

ORT produced by National Pharmaceutical Office (ONAPHA)

6. LOCAL ORT SUPPLY

ONAPHA - producing one kilo bulk packages

UNICEF - providing packages

7. POSSIBLE ORT EXPANSION

Possibility to couple with other successful MOH programs (ie. EPI)

CAMEROON

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

- -

3. AID SUPPORTED ACTIVITIES

Government is planning to request a CCCD project

4. PRIVATE SECTOR ORT ACTIVITIES

Interest with various church medical facilities in ORS package distribution Requesting 10,000 ORS packets for distribution to Protestant and Catholic Institutions.

5. SACHETS/HOME MIX BASES

- -

6. LOCAL ORT SUPPLY

- -

7. POSSIBLE ORT EXPANSION

- -

CAPE VERDE

1. ORT HEALTH STATISTICS
1980 - deaths due to diarrheic diseases 259
- morbidity - 13,065
1979 - approximately the same

2. HOST COUNTRY ORT PROGRAM

Pilot ORT program in Cape Verde at Santa Catrina on Santiago Island (15% of Population) (supported by UNICEF and French aid agency

Administered by Maternal Child Health Program - GOCV plans to provide national ORT coverage through training of PMI Personnel without appreciable cost

3. A.I.D. SUPPORTED ACTIVITIES

- -

4. PRIVATE SECTOR ORT ACTIVITIES

None

5. SACHETS/HOME MIX BASES

Only home preparations, no packets

6. LOCAL ORT SUPPLY

N/A

7. POSSIBLE ORT EXPANSION

CHAD

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

No Maternal ORT Program

- GOC extremely interested in ORT programming
- ORT provided on a limited scale through hospitals and few urban health centers

3. A.I.D. SUPPORTED ACTIVITIES

- ORT could be incorporated within existing framework if additional funds are available
USAID assistance - small Ndjamera - centered ORT program. Operation ceased due to the civil war.

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

- -

6. LOCAL ORT SUPPLY

- -

7. POSSIBLE ORT EXPANSION

- Develop a parallel Sahel regional project
- Need staff training and ORT Programming
- Want $90,000 made available for ORT projects - planning, designing and one year of program funding for ORT. (sent breakdown of cost)
- Want Dr. Taylor CCD or Dr. Knebel of SDPT If they can't come - budget increases to $270,000 due to additional time required for staff technician

DJIBOUTI

1. ORT HEALTH STATISTICS

Not Available

(One Health Center): 30% consultation for diarrheal disease or vomiting

2. HOST COUNTRY ORT PROGRAM

UNICEF National Campaign

- Distribution of salts to all dispensaries and hospitals in the country

- Education of local people on how to use salts is poor

3. AID SUPPORTED ACTIVITIES

- -

4. PRIVATE SECTOR ORT ACTIVITIES

CRS - Food and Nutrition Project

- ORT activities will be developed into major initiative Requesting technician for assessing ways and means for expansion in March, 1984

- Collaborates with UNICEF

- Education component

Food and Nutrition: Promotion and Health Education

- $115.000 grant from UNICEF for two years

- ORT a part of this grant

- No private or commercial sales of salts

- Preparing for Phase II design

5. SACHETS/HOME MIX BASES

Both: packets and local production

6. LOCAL ORT SUPPLY

UNICEF supplies all goods

7. POSSIBLE ORT EXPANSION

- Training of health professionals
- Mass Media Training
- Audio-visual material
- ORT health talks
- Month campaign on ORT promotion
- WHO workshop in Djibouti on infant diarrhoeal control in 1984

THE GAMBIA

1. ORT HEALTH STATISTICS

No accurate nationwide statistics

Estimates: 25% mortality rate among children under five

1974-1975 - 25-30% prevalence rate among children 0-5 years

2. HOST COUNTRY ORT PROGRAM

A National ORT Program (1980)

- All health workers have been trained in ORT

- governed by: Diarrhea Disease Control Committee

- designing a diarrhea manual and other ORT educational materials

- 150 Rural Health Staff have been trained in ORT

3. AID SUPPORTED ACTIVITIES

Mass Media for Infant Health Project

- 3 years - $387,000

- (Ends - April 1984)

- Proposed CCD funding for Health Education Unit (HEU)

4. PRIVATE SECTOR ORT ACTIVITIES

None

5. SACHETS/HOME MIX BASES

Both

6. LOCAL ORT SUPPLY

UNICEF supply - 1983 - 100,000

7. POSSIBLE ORT EXPANSION

Wants funding for ORT training workshop instead of Central ORT unit

GHANA

1. ORT HEALTH STATISTICS

Not Available

2. HOST COUNTRY ORT PROGRAM

No National ORT Program

3. AID SUPPORTED ACTIVITIES

- No A.I.D. funded ORT programs in Ghana
- UNICEF provides input to certain paediatric clinics
- Could have add-ons with Chets Project

4. PRIVATE SECTOR ORT ACTIVITIES

None

5. SACHETS/HOME MIX BASES

- UNICEF provides packets
- Some home preparation training in this area

6. LOCAL ORT SUPPLY

UNICEF supplier of locally available ORS

7. POSSIBLE ORT EXPANSION

- Suspension of new assistance to GOG
- If lifted, possibility of an ORT/CHETS Program with an ORT add-on

GUINEA-BISSAU

1. ORT HEALTH STATISTICS

Mortality Due to Diarrhea:

15-20 thousand in children under five.
(mortality is normally ascribed to various diseases which have diarrhea as symptom.

2. HOST COUNTRY ORT PROGRAM

No national ORT program.

3. AID SUPPORTED ACTIVITIES

UNICEF: GOBI Project: (1984-1988)
- 5-6,000/year for ORS

4. PRIVATE SECTOR ORT ACTIVITIES

None.

5. SACHETS/HOME MIX BASES

- ORT program based on ORS packets
- Ingredients and conditions for home preparation are lacking.

6. LOCAL ORT SUPPLY

Packets come from UNICEF supply.

7. POSSIBLE ORT EXPANSION

Waiting till statistician assesses the problem.

KENYA

1. ORT HEALTH STATISTICS

Satisfactory statistics not available.

-Total number of patients under 5 treated in Kenyatta National Hospital
- 121,000
- 30,000 estimated diarrhea cases
- 2,800 severe diarrhea
- only 2 deaths in 191 randomly selected patients below 5 at KNH

-Estimated 90-100 IMR

2. HOST COUNTRY ORT PROGRAM

- No ongoing Formal ORT Program
- All community health nurses, registered nurses, and health technicians have had ORT training (home use)
- Kenya Medical Research Institute and MOH discussing a pilot ORT intervention project on which a national pilot program may be based (may cover 7 districts)
- Proposed Program might include
  1. Local manufacturer
  2. National workshop for lower level health workers
  3. Deployment of ORT units in all medical center
  4. Outreach services to communitties through public and private sector personnel

USAID is in the process of assisting the Medical Research Center of Kenya to develop a diarrhea disease control (ORT) pilot activity under the Health Planning and Information Project.

3. A.I.D. SUPPORTED ACTIVITIES

Plan FY84 - small study in-country to assess opportunities of appropriate ORT interventions.

Plan - small Pilot project ($200,000) test impact of ORT on infant and child mortality is districts of Western Kenya. (Kenya National Research Institute and CIBA-GEIGY)

A.I.D. is not actively funding any ORT activities

OPG Grant
- Kitui Primary Health Care Project Phase II (ORT education and instructions to mothers on use of home preparation of ORT).

4. PRIVATE SECTOR ORT ACTIVITIES

- Searle, Beachum, Armour and Abbott have tried selling over the counter and by reps visiting M.D.'s - not to successful.
- CIBA-GEIGY - introducing Servidrat a fizz tablet, by a big mass media ORT campaign

5. SACHETS/HOME MIX BASES

Packets

6. LOCAL ORT SUPPLY

- Kenyatta National Hospital (KNH) produces - 200 litres of Oral Parrows Sol'n of which 50 litres used for - outpatients; 150 litres used for inpatients

- Loitokitok district hospital manufacturing plant produces, ORT salts, Production level not known

- UNICEF - supplies a limited quantity of sachets bulk Electrolyte salts are not produced locally - procured from external sources.

7. POSSIBLE ORT EXPANSION

- -

LESOTHO

1. ORT HEALTH STATISTICS:

Mortality:
1981: 88 deaths (hospitals only)

Morbidity:
1981: 604 cases (hospitals only)

2. HOST COUNTRY ORT PROGRAM

- 119 health centers and outpatient departments of hospitals teach about and employ ORS in treatment.

3. AID SUPPORTED ACTIVITIES

Rural Health Development Project: (632-0058)
- focusses on ORT techniques in teaching/planning nurse clinician training programs.

CCCD Project will also support ORT approach.

4. PRIVATE SECTOR ORT ACTIVITIES

ORS salts to be provided by WHO, UNICEF, GOL, and others at estimated $240,000. MOH estimates private sector contributes 50 percent of PHC budget directed to ORT.

5. SACHETS/HOME MIX BASES

- packets used in clinics and hospitals
- home preparation is used and taught

6. LOCAL ORT SUPPLY

- produced locally (no data provided)

7. POSSIBLE ORT EXPANSION

LIBERIA

1. ORT HEALTH STATISTICS

Mortality (children 0-4 years) 387 (18% of all reported deaths in age group)

Morbidity:
- Not Available but 9.9% of all outpatients in 1980 had diagnosis of diarrhea.
- However DATA IS NOT RELIABLE.

2. HOST COUNTRY ORT PROGRAM

National CDD Program:
- Coverage: 10% - principally through use of homemade ORS.
- Just been revitalized by help of WHO short-term consultant

3. AID SUPPORTED ACTIVITIES

AID Assisted CCCD Project: (698-0421.03)
- 1983-87: $91,000

UNICEF:
- $2,000/year for packets over last 5 years.

WHO:
- $60,000: short-term consultants made up half of this amount

Primary Health Care Project: (669-0165)
- Provides ORT as an integral component of project
- Approximate $200,000 during 5 year life spand

CCCD Bilateral Project (proposed)
- Diarrheal Disease Control one of three major interventions.

MCH/CS Health Manpower Development Project (proposed)
- Training in management of use and impact of ORT

4. PRIVATE SECTOR ORT ACTIVITIES

Christian Health Association of Liberia (CHAL):
- Coverage: 10%
- No commercial ORT activity

5. SACHETS/HOME MIX BASES

Mostly home preparation but packets too.

6. LOCAL ORT SUPPLY

- not produced locally
- provided by UNICEF
- CCCD will provide packets during 4-year project life.

7. POSSIBLE ORT EXPANSION

- through CCCD project and WHO-CDD experts- project meeting planned national coverage by 1987

MALAWI

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

- -

3. AID SUPPORTED ACTIVITIES

At present USAID/Malawi does not provide bilateral or POG support in the health sector. However the following two proposals have been developed which, if approved, will provide support to ORT:

1. CCCD bilateral - includes components of training, commodities, transport for ORT supervision and management, service delivery and research and evaluation of ORT interventions.

2. MCH/Child Spacing Health Manpower Development Project - an institutional development and technology transfer project designed to strengthen the in-country training capacity of the Ministry of Health. The project expects to retrain a large number of health service personnel, giving them up-to-date knowledge and skills in MCH/child spacing techniques and management. Diarrheal Disease Control including the benefits, management of use and impact of ORT will be included in all training modules and new curriculum

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

- -

6. LOCAL ORT SUPPLY

- -

7. POSSIBLE ORT EXPANSION

MALI

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

Two ORT units established at government expense.

3. AID SUPPORTED ACTIVITIES

- Extension of Rural Health Services Development (688-0208)
- Four ORT units to be established and VHW's trained through March 31, 1985.

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

Mostly home preparation;, however, not following WHO standards.

6. LOCAL ORT SUPPLY

Local Production Plants:
- Dakar (Orana) uses rice powder instead of glucose
- OR Packets are almost nowhere available in the Sahel
- Powdered ingredients are available

7. POSSIBLE ORT EXPANSION

- -

MAURITANIA

1. ORT HEALTH STATISTICS

NOT AVAILABLE

Individual Studies:
- 53.2% + 6.9% deaths due to diarrhea
- average # of episodes: 9.8 + 04
- 53% of children reported episodes of diarrhea within the past two weeks in one area.
- prevalence varies according to access to water and health facilities.

2. HOST COUNTRY ORT PROGRAM

NO NATIONAL ORT PROGRAM
- inservice training for nurses and midwives.
- government interested to start ORT unit in hospital

3. AID SUPPORTED ACTIVITIES

Rural Health Services: (682-0230)
- funding of ORT unit; training of ORT unit; training of VHW's and fixed center personnel
- ORT key primary health care intervention

Rural Medical Assist. Project: (682-0202)
- ORT training

WHO Project: Oral Rehydration Unit in Central Hospital
- comprehensive training program (funds not received as yet); $354,000 for five years.

UNICEF: supplies the nation's 26 MCH centers with ORS packets

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

- -

6. LOCAL ORT SUPPLY

- -

7. POSSIBLE ORT EXPANSION

- collaboration with WHO and the MOH for OR units in hospitals and MCH centers nationwide.
- continue emphasize ORT in VHW training.

NIGER

1. ORT HEALTH STATISTICS

MORTALITY: 19,800 deaths due to diarrheal diseases

MORBIDITY: 2.2 million cases of diarrhea for children 0-5 years. (Average of 2-3 episodes of diarrhea per year per child)

2. HOST COUNTRY ORT PROGRAM

Niger has a National ORT Plan

GOAL: coverage: 46% of 0-5 age group by 1985

3. AID SUPPORTED ACTIVITIES

The Rural Health Improvement Project: (683-0208)
- training and education of VHW teams in the use and preparation of ORT solution.

Other Donors: WHO, UNICEF and the Belgians.

4. PRIVATE SECTOR ORT ACTIVITIES

Commercial ORT activities are fairly non-existent at this time.

5. SACHETS/HOME MIX BASES

Existing policy to use ORS packets.

6. LOCAL ORT SUPPLY

UNICEF: 1.5 million packets
GON establishing local production capability at ONPPC.
GON estimates the selling price of ORS packets to be 55 FCFA ($0.11) which is higher than other areas. (ORANA in DAKAR estimates that their rice based packets can be produced at cost under 10 FCFA/packet ($0.02)

7. POSSIBLE ORT EXPANSION

- Support national ORT Plan's goal
- Mass media campaign
- Training mothers in the use of home preparation of the ORS solution
- Needs more dialogue with MOH

RWANDA

1. ORT HEALTH STATISTICS

Accurate statistics are not available.

2. HOST COUNTRY ORT PROGRAM

NO NATIONAL ORT PLAN

3. AID SUPPORTED ACTIVITIES

CCCD assessment which might lead to development of national ORT program.
UNICEF: provides ORS packets.

4. PRIVATE SECTOR ORT ACTIVITIES

BURMAR: An organization of religious medical groups
- ORT training and provision of ORS mixtures to clinics

5. SACHETS/HOME MIX BASES

Based on ORS packets and home preparations.

6. LOCAL ORT SUPPLY

UNICEF & BURMAR: suppliers of ORS
Potential for new ORS production at Butare Pharmaceutical Laboratory

7. POSSIBLE ORT EXPANSION

CCCD Project Proposal: $1 million for a four-year period. Slated for a 1984 CCCD project for $61,000.

SENEGAL

1. ORT HEALTH STATISTICS

Not available

A Sine Saloum study with these figures will be available mid-December.

2. HOST COUNTRY ORT PROGRAM

National Program to Combat Diarrheal Diseases:
- not effective
ORANA/ORSTOM: An active research program.

- The GOS has recently decided to develop its DDC Program in collaboration with its nutrition program.

3. AID SUPPORTED ACTIVITIES

WHO: $25,000 to study causes of diarrhea in Senegal.
USAID: Senegal Rural Health Project II
- an active ORT component.
Belgium: PHC program with active ORT component

4. PRIVATE SECTOR ORT ACTIVITIES

Only private research organizations: ORANA/CRSTOM

No.

5. SACHETS/HOME MIX BASES

Packets

6. LOCAL ORT SUPPLY

ORANA/ORSTOM: locally packaged ORS (rice substitute) (1/3 cost of Oralyte)
- Belgium: dispensary level mixing

7. POSSIBLE ORT EXPANSION

$1 million to double the use of ORT for the next five years:
- Joint initiative of GOS and Orana with training, OR, and evaluation.

- The Nutrition Unit in the MOH, referred to as the DANAS, has great potential to implement a DDC program. The DANAS are under the leadership of Medecin-Commandont Dr. SY.

- USAID looks to the DANAS with input from the ORANA to oversee implementation of the DDC component of the Phase II Senegal rural health project.

SOMALIA

1. ORT HEALTH STATISTICS

Not available, but diarrhea is one of the major causes of infant mortality.

2. HOST COUNTRY ORT PROGRAM

No National Policy per se
- All health workers are trained in ORT
- ORT is an integral part of the relatively new PHC program

3. AID SUPPORTED ACTIVITIES

Rural Health Delivery Project: (649-0101)
- $15 million
- training to trainers of village health workers, traditional birth attendants, and sanitarian (200 trained) as of October 1983
- 50,000 ORS packets have been ordered

Six other Donors Involved:
- Italy, WHO/UNICEF, German Caritas, Australian Community Action Abroad, British Save The Children, Swedish Church Relief.

Asking for PRICOR Funding:
- feasibility of recovering recurrent cost
- determine capacity of local institutions/private business to produce and/or market drugs (ORS)

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

- -

6. LOCAL ORT SUPPLY

UNICEF: import $700,000 of ORS over next 3 years.
PVOs rely on UNICEF-provided ORS packets.
Refugee Unit: uses ORS in programs
Little local production.

7. POSSIBLE ORT EXPANSION

1. Support government's PHC program.
2. Provision of ORS to hospitals:
   - lack supplies to carry out activities.

TANZANIA

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

Muhimmli Medical Center officials are planning to carry out studies on electrolyte composition of young coconut water to determine if it can be used at home as an oral rehydration fluid.

3. AID SUPPORTED ACTIVITIES

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

- -

6. LOCAL ORT SUPPLY

- -

7. POSSIBLE ORT EXPANSION

UGANDA

1. ORT HEALTH STATISTICS

Precise information not available

1981 - 9% of total deaths of all ages attributed to dysentery or gastroenteritis

2. HOST COUNTRY ORT PROGRAM

No Natural Program on

3. A.I.D. SUPPORTED ACTIVITIES

Design of ORT Project for early FY84. (UNICEF/USAID)

- UNICEF - Long-Term Technical Advisors, Transportation, Equipment, Drugs

- USAID - ORT Components, Salt Solutions, Training Material, Short-Term Consultants

Goals - 0.9 million - 1986 (population reached)

ORS packets/child - 15 (1st year)
" " " 12 (2nd year)
" " " 10 (3rd year)

Budget - FY84 - 1.2 million
" FY85 - 1.1 million
" FY86 - 1.3 million

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

- -

6. LOCAL ORT SUPPLY

UNICEF - 300,000 packets (1983)

USAID - to procure 1/2 litre packages from U.S. source

7. POSSIBLE ORT EXPANSION

ZAIRE

1. ORT HEALTH STATISTICS

Data incomplete

- Mortality - 65,000 cases of diarrheal deaths/year
- Morbidity - 13 million cases (children under five)
- Assume 2.5 episodes of diarrhea/child/year

2. HOST COUNTRY ORT PROGRAM

Zaire has a National Diarrheal Disease Control Program which is an element of the Primary Health Care (PHC) program
Coverage of under five estimated at 10-20% in 1982
Current policies include local production, distribution, and promotion of ORT. GOZ requires patients to purchase ORS, as well as other drugs, regardless of whether they are imported within the framework of a project or produced locally.

3. A.I.D. SUPPORTED ACTIVITIES

- CCCD - (698-0421) 1983 expenditures $125,000

- Basic Rural Health (660-0086) implemented by Protestant PVOs ($4.8 million dollars)
- ORT component - (10%) - $500,000 for five years
village level training on the use of home made sugar/salt soln.

4. PRIVATE SECTOR ORT ACTIVITIES

PVOs are active:
- account for 80% of health care delivered outside the capital - responsible for most ongoing ORT activities

5. SACHETS/HOME MIX BASES

Both.
- Packets restricted to clinics and hospitals
- home preparations - mothers and village health committees.

6. LOCAL ORT SUPPLY

- Laphaki - a Belgian-Zarian Parastatal - introduces ORT salts for sale Started in 1982
- Plan to produce most if not all ORS locally by 1985
- Potential for more local production
- Laphaki produced 370.000 doses in 1983. Cost/dose - $0.005

7. POSSIBLE ORT EXPANSION

Assess and support local production

Goal - expand coverage from current 10-20% to approximately 60% by end 1986

A.I.D. support - estimated at $800,000 through 1986

The Zaire ORT program receives substantial UNICEF, ($500,000) WHO, and Belgian government support ($150,000) and USAID ($300,000) ($300,000)

April 1984, UNICEF imported raw material for one million packets in an effort to upgrade local production capacity...

ASIA BUREAU

BANGLADESH

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

National CDD Program

production and distribution of ORS

3. AID SUPPORTED ACTIVITIES

Family Planning Social Marketing Project

- AID/W and USAID/Bangladesh to test market ORS (with lemon flavoring) while giving family planning services

- No current support for other ORT activities

4. PRIVATE SECTOR ORT ACTIVITIES

- BRAC - covers more than 10% of population

Attempts to sell ORS through CRS program

- NORAD - Norwegian A.I.D. Agency expressed an interest to supply flavored UNICEF mixture

- CEIBA - GEIGY offered to sell 2 million 500 cc sachets

- AID - hestitant to add another product to SMP at this time

5. SACHETS/HOME MIX BASES

Both - BRAC : 15% of households given ORT instructions

6. LOCAL ORT SUPPLY

Two million packets produced by Gonoshastho Kendra - no advertising support, instructional or motivational materials

Need approximately 30 million packets/year for full coverage

7. POSSIBLE ORT EXPANSION

- A country review is not viewed as necessary at this time

- No funds are available for discrete ORT projects

BURMA

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

National Diarrhea Disease Control Program (1978)

ORS not readily available (Through not much is know about this, speculation is that it is limited)

3. AID SUPPORTED ACTIVITIES

Primary Health Care 482-0002

- 5 year project - $7.1 million
- Target population - 25% of the total population
- Equipping health workers with ORS
- Training how to administer ORS
- TA package to provide all necessary consultants for ORT
- Extra funds specifically for importation of ORS packets

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

Packets

6. LOCAL ORT SUPPLY

- Local production of ORS but on limited basis
- Imports packets from UNICEF

7. POSSIBLE ORT EXPANSION

- Reprogramming of up to $0.9 million
- Looking for program assessment and survey review

CARRIBEAN

1. ORT HEALTH STATISTICS

-- 1979 cases		1979 rate/1,000
Antigua	271	27
Barbados	372	16
Antigua	271	27
Belize	747	29
Dominica	339	25
Monteserrat	90	55
St. Kitts	780	93
St. Lucia	897	44
St. Vincent	986	63
-- 1981 cases		1981 rate/1,000
Antigua	246	37
Barbados	145	6.9
Belize	566	27
Dominica	87	8.1
Montserrat	10	13
St. Kitts	655	120
St. Lucia	377	20
St. Vincent	1,336	91

2. HOST COUNTRY ORT PROGRAM

Mortality data not readily available. 1981 CAREC reports 85 deaths. 1978 Total diarrheal disease mortality in Antigua, Barbadosm Dominica, St. Lucia, and St. Vincent 115, 1.14/1,000. No specific ORT programs in the eastern Caribbean. ORT is handled as element of MCH services available through government health centers. Geographic coverage and access good, by worldwide standards.

3. A.I.D. SUPPORTED ACTIVITIES

Programs supported by PAHO/UNICEF through provision of commodities and technical assistance.

4. PRIVATE SECTOR ORT ACTIVITIES

Mission not aware of any private sector or commercial ORT activities.

5. SACHETS/HOME MIX BASES

Programs are using packaged ORS. Packets are distributed by PAHO.

6. LOCAL ORT SUPPLY

--

7. POSSIBLE ORT EXPANSION

ORT coverage already good. Any additional assistace should focus on public education and further technical training for physicians. Estimated cost of public education campaign U.S. $50,000. Estimated cost of training U.S. $5,000-$10,000/country.

INDIA

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

- Plan for National Diarrhoeal Disease Control Programme (1982)
- Short-term objectives - Mortality reduction
  1985 - 35%
  1990 - 75%
  2000 - 95%

- Diarrhoeal Disease Cell established - Assist. Director
  General of Health Services is in charge

- 1984-1985 $160,000 budget

- Training for physicians, health workers, and health guides

- ORS packets to supplied to all health centers and health workers

- RESULTS: unvalidated reports from Madhya Pradesh - 80% reduction in Diarrhoeal deaths

- Usage estimated by WHO - less than 5%

- Pamphlets also being distributed for preparation of home
  made ORS and packets

3. AID SUPPORTED ACTIVITIES

- Integrated Child Development Services (386-0476)
  Small ORT set of activities

- Integrated Rural Health and Population Project

Remedial modules are being developed to retrain workers in
ORT knowledge

Project focuses heavily on the education of mothers in homemade ORS

KAP studies of communities towards ORT being done

In-Service training modules have been completed and will be used beginning March/April 1984.

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

Both - Educating Mothers in Homemade ORS

6. LOCAL ORT SUPPLY

Indian Drugs and Pharmaceutical Limited (IDPL)

- will be building a new plant

Need - 20 million packets/year

Current production by Government - 10-20 million packets

7. POSSIBLE ORT EXPANSION

- 1 Million add-on to ICDS. Would require $10,000 in PD&S money for admending project

- Possible innovative ORT activities in IRHPP

- "Principal questions remaining concern not the desirablility of ORT per se but rather the practicality of adding another piece to projects which by their nature are already relatively complicated and staff intensive."

INDONESIA

An estimated 600,000 deaths occur annually in Indonesia among pre-school infants due to diarrheal dehydration.

1. ORT HEALTH STATISTICS

- IMR: 1983 95-100 range
- Next five year plan hopes to reduce to mid seventies
- Indonesia has 65,000 villages.

2. HOST COUNTRY ORT PROGRAM

Estimated about 13% of theoretical demand is met through locally produced ORS and contributions from international agencies

National CDD Program

- Budget - excess of $1 million

- Impact - 1/3 to 1/2 of mothers know of ORS

- 15% usage

3. AID SUPPORTED ACTIVITIES

o Village Family Planning/MC Welfare Project

- Distribution of ORS
- ORT education and training

o Stimulation of National DD Program

- $1.8 Million
- Planning, research, training and manpower development

o The Health Training Research and Development Project (497-0273)

- Admendment signed mid-1983

o CHIPPS Project - Aceh Province

- 14 private production centers

- The Integrated Health and Family Planning Program

  - tried in East Java on a pilot basis with USAID support
  - the objectives of the program are to use family planning infrastructure to reduce morbidity and mortality through combined efforts in immunization, nutrition programs, oral rehydration and fertility reduction.
  - aims at pregnant mothers, newborns and young children.

4. PRIVATE SECTOR ORT ACTIVITIES

PIACT/PATH transfering technology for the development of a ORS Tablet which used a citrate base

5. SACHETS/HOME MIX BASES

Packets

6. LOCAL ORT SUPPLY

Government production: 2 million packets at two differerent centers

Private Sector: 14 private production centers

7. POSSIBLE ORT EXPANSION

- Dependent on $1.8 million effort - will design a separate diarrheal disease control project in FY 85

- Market survey of ORT Tablet campaign

8. Extra

Development of Health Centers is still insufficient to meet the needs of the people, and therefore it is important to make use of the family planning organization and community structure throughout Indonesia.

ORS packets currently available include:

1). Krystalyte 200 and 600 by Squibb

2). Eltolit by Prafa Laboratories

3). Pharolit by Pharos

4). Oralit and Oratrolit by Kimia Farma.

NEPAL

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

National CDD Program (this year)

- ORS is not particularly widespread (less than 5%)

- Need more training

- Less than 5% ORS accessibility

- The real problems are low demand, low use and difficult distribution in a logistically difficult country.

3. AID SUPPORTED ACTIVITIES

Integrated Rural Health and Family Planning Project

- This project supports development of primary health care by the integrated community health services project of the Ministry of Health, under which more than five thousand field workers are supported to promote use of ORT by mothers among their other tasks. The IRH/FP project also supports ORS distribution through the Contraceptives Retails Sales, private company limited which has recently signed a contract with UNICEF to distributie ORS in Three Zones of Nepal on a trial basis. In the educational system, A.I.D. has supported teacher training through radio, with Southern Illionis University technical assistance, in which curriculum and broadcasts ORT was promoted and explained

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

Both - home preparation programs since early 1970s

6. LOCAL ORT SUPPLY

UNICEF to supply ORS packets to Nepal CRS program

Royal Drugs LTD produces more ORS (JEEBAN JAL) than demanded.

7. POSSIBLE ORT EXPANSION

PAKISTAN

1. ORT HEALTH STATISTICS

Diarrheal disease accounts for nearly 25% of all morbidity

2. HOST COUNTRY ORT PROGRAM

Accelerated Health Program (AHP) 1982
-major ORS campaign (May, June 1984)

- Director-General of the project - Burney

3. AID SUPPORTED ACTIVITIES

- A.I.D. provides $2 million for ORS and EPI activities in AHP (for purchase of ingredients for producing ORS)

- Primary Health Care Project - general training, management improvement, and research in PHC - ORT component

- USAID/Pakistan requested to make funds available for purchased of raw materials for local production of ORT.

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

Packets

6. LOCAL ORT SUPPLY

Produced by:

1. National Institute of Health (NIH)-4 million/year

2. Local private production

Target - 10.8 million packets (1983-84)

7. POSSIBLE ORT EXPANSION

Indept country review late April or May 1984 to evaluate how well the GOP has reached its targets

PHILIPPINES

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

National CDD Program (1980)

- 80% of packets reach the field

- Coverage levels (20%-30%)

3. AID SUPPORTED ACTIVITIES

National PHC project

Regional PHC projects

- Purchase kits (ORS included) for VHWs

- Support training and information programs on ORS

Proposal: Social Marketing of Oral Rehydration Salts

4. PRIVATE SECTOR ORT ACTIVITIES

Several active private non-profit organizations managing ORT programs

1982 - Total Drugstore sales of ORS - 3 Million Pesos ($890,000)

5. SACHETS/HOME MIX BASES

Packets

6. LOCAL ORT SUPPLY

Government production: 5 million packets of ORS in 1983

Goal: 9-10 million in 1984

7. POSSIBLE ORT EXPANSION

SRI LANKA

1. ORT HEALTH STATISTICS

Diarrhea Disease accounts for roughly half of the infectious disease deaths in the country

2. HOST COUNTRY ORT PROGRAM

National ORT program (for 2 years)

- Distribution of ORS packets through Molt system

- Will planned and strong staff

- Implementation is slow

3. AID SUPPORTED ACTIVITIES

A.I.D. does not currently support ORT activities

4. PRIVATE SECTOR ORT ACTIVITIES

State Pharmaceutical Corporation (SPC) - primarily a drug importer with little prior experience in production and no experience in marketing.

5. SACHETS/HOME MIX BASES

Packets

6. LOCAL ORT SUPPLY

- CRS Production Facility in Ratmalana: Trial production began around January 25, 1984. Production plant is adequate but unlikely to meet production goal of 3.0 million packets in first year.

- Production will serve MOH needs and secondarily serve commercial markets.

- Some question whether to mix in 750 ml bottles (which are more available or the 1 liter packets).

- Machinery has been purchased and production should start soon.

- Distribution is limited to Colombo and neighboring districts.

7. POSSIBLE ORT EXPANSION

Mission reviewing overall strategy and will propose ne project based on this.

USAID received request for ORT program assistance.
Raw Materials, Packing materials: by Mary 1984
Consultancy - Marketing and health education for maximum duration possible.
Electric generator.

THAILAND

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

National CDD Program (1979)

- More than 30% usage rate of ORS for children under 5
- 50% level of accessibility
- Training of more than 200,000 VHW

3. AID SUPPORTED ACTIVITIES

- -

4. PRIVATE SECTOR ORT ACTIVITIES

- Active in distribution and sale of ORS through pharmacies and commercial outlets
- Most sold to adults as means to maintain strength in hot weather
- Two private firms producing glucose for packets (exports)

5. SACHETS/HOME MIX BASES

Packets

6. LOCAL ORT SUPPLY

18 different commercial producers

7. POSSIBLE ORT EXPANSION

Mission has conducted a health sector assessment to determine future programming plans

LATIN AMERICA

BELIZ

1. ORT HEALTH STATISTICS

   January - June 1983 deaths 10
   January - June 1983 morbid 1,220

2. HOST COUNTRY ORT PROGRAM

   Yes. Program concentrated in Belize City, where predominant number of cases occur. All rural health centers have continuous supply of ORS packets.

3. A.I.D. SUPPORTED ACTIVITIES

   No. PAHO supplies ORS.

4. PRIVATE SECTOR ORT ACTIVITIES

   No. Unofficially does ~~fe~~ some work through private sector clinics.

5. SACHETS/HOME MIX BASES

   Yes. Both.

6. LOCAL ORT SUPPLY

   No. Source of supply from PAHO, WHO and UNICEF

7. POSSIBLE ORT EXPANSION

   Mission unable to provide requested information at this time

BOLIVIA

1. ORT HEALTH STATISTICS

Mortality under 1 year	21.9%
- 1-5 years	14.5%
Morbidity under 1 year	33.9%
- 1-5 years	29.4%

-Figures may be unreliable. Figures are based on sample studies. Total numbers of cases N.A. for recent years

2. HOST COUNTRY ORT PROGRAM

MOH has not implemented a national ORT program. However has completed the following →
Ministry of Social Welfare & Public Health (MSW/PH) has initiated a national ORT program using oral rehydration units at the community level.

3. A.I.D. SUPPORTED ACTIVITIES

MSW/PH program is supported by UNICEF. No current AID funding involved. ORS are to be included among those drugs to be purchased for The Disaster Recovery Project.

Mission exploring possibility of undertaking an ORT program in upcoming months through the more than 1,500 Mother's Clubs that are beneficiaries of PL 480 Title II programs.

Mission is prepared to procure ORT commodities from funds to be generated from a Title II monetization program to be presented to FVA.

UNICEF - provide $200,000 for CDD Program - $60,000 for mass media campaign.

4. PRIVATE SECTOR ORT ACTIVITIES

-Project Concern and Foster Parents Plan do include ORT in their training and services. USAID supports a primary health care OPG with Radio San Gabriel, which has a coverage of 23,000 people. Program includes home preparation of ORS. No commercial ORT program at present.
-AID/W provides funds centrally for the international PVO's but not specifically for ORT programs. USAID/Bolivia does not fund any of these activities.

- Pediatrics Association - very interested in ORT.

5. SACHETS/HOME MIX BASES

The national ORT program includes both packets of ORS and instruction for home preparation of solution.

6. LOCAL ORT SUPPLY

INTI laboratories producing ORS packets ($0.45)
~~No local production of ORS packets~~. Discussions underway with UNICEF to discuss local production. Current supply is from Argentina. UNICEF has given MOH 1 million packets. (little control over distribution)
Brazil products can be purchased and imported → $0.12

7. POSSIBLE ORT EXPANSION

Mission believes ORT coverage could be expanded through community pharmacies, cooperatives, mothers' clubs and syndicates. No cost estimates available. GOB/UNICEF program already using the concept of community health

BRAZIL

Infant mortality rates in poor regions reach 150 per thousand and in some localities exceed 700 per thousand. Brazil has some 10 million "street children"

1. ORT HEALTH STATISTICS

1980 Deaths under five 36,215
No statistics available on morbidity

2. HOST COUNTRY ORT PROGRAM

Brazil started national ORT program in October 1982. Now in initital phase of implementation. Information on coverage not available.

3. A.I.D. SUPPORTED ACTIVITIES

No. ORT program supported by GOB with technicians from UNICEF and PAHO. Annual budget of UNICEF is only $900,000 which supports a "Childhood Survival Package". ORT promotion is included

4. PRIVATE SECTOR ORT ACTIVITIES

No. Program is implemented by MON and INAN. (National Institute of Feeding and Nutrition)
No.

5. SACHETS/HOME MIX BASES

In packets

6. LOCAL ORT SUPPLY

ORS packets are produced locally for free distribution.
During 1982 Brazilian Manufacturers produced some 12 million ORS packages
UNICEF is considering procuring packages for other Latin American Countries from Brazilian sources.

7. POSSIBLE ORT EXPANSION

Embassy suggests that ORT be implemented with PVOs working in the FP field once Brazillian ORT program is fully government-funded

committees and the URSs from the Nicaragua experience. Ministry of Education is experimenting with health brigades of students which could distribute ORS packets and instruct students and families on ORT.

COSTA RICA

1. ORT HEALTH STATISTICS

Statistics unavailable on deaths due to diarrhea or reported cases.

2. HOST COUNTRY ORT PROGRAM

Yes. There is a national ORT program - MOH and Caja Costaricense de Seguro social provide ORS packets and instructions. Estimated 50% of population covered, as supplies do not cover total demand.

3. A.I.D. SUPPORTED ACTIVITIES

ORT program will be supported by the Health Services Support Loan 515-042

4. PRIVATE SECTOR ORT ACTIVITIES

Local laboratories mix and package ORS under contract by the CCSS. At least one company distributes for sale. Estimated 1 - 5 percent of population covered by commerical sales.

No.

5. SACHETS/HOME MIX BASES

Yes. ORS packages for 803 bottles.

6. LOCAL ORT SUPPLY

Yes. ORS produced locally.

7. POSSIBLE ORT EXPANSION

DOMINICAN REPUBLIC

1. ORT HEALTH STATISTICS

Health information in DR extremely unreliable, however...1979 Enteritis major cause of death in age group below 5 years, 1981 Gastroenteritis ranked first among reported diseases, with incidence 5,919 cases/100,000 population. Morbidity reporting is very limited and misleading for programmatic purposes.

2. HOST COUNTRY ORT PROGRAM

No national ORT program functioning in the DR at present. The Secretariat of Health (SESPAS) currently developing intervention for launcing a national mass media orientation program for the utilization of ORS.

3. A.I.D. SUPPORTED ACTIVITIES

ORS have been ordered by USAID/DR with funds from health sector loan. PAHO is providing TA for the preparation of educational techniques, messages and materials.

4. PRIVATE SECTOR ORT ACTIVITIES

No private sector organization presently involved in ORT, except for the production of ORS. Cibal Geigy has shown interest in assisting ORT programs and already has approved SESPAS. Private laboratory presently producing ORS at relatively high cost per packet. At least two additional laboratories have the technical capability of producing ORS.

USAID/DR funded an assessment of local laboratories to see if they had the capability of producing ORS.

5. SACHETS/HOME MIX BASES

SESPAS utilizes ORS packets, although in very limited amounts, mainly in their hospitals and periurban services. Home preparation was developed through the SBS, although its utilization at present is also limited.

6. LOCAL ORT SUPPLY

ORS packets are produced locally in limited amounts and at a price not competitive with UNICEF.

7. POSSIBLE ORT EXPANSION

TA needed for the coherent development of interventions. Not possible to determine costs.

ECUADOR

1. ORT HEALTH STATISTICS

-Morbidity and mortality data not very reliable, but diarrheal diseases clearly leading cause of death and illness for under 5 population.
-1975 Total cases 6,912 Enteritis and diarrheal diseases twice as many cases as second leading illness.
-1977- 27 of every 100 deaths reported for hospital patients were due to diarrheal disease

2. HOST COUNTRY ORT PROGRAM

-Yes. There is a national program, one of the formally-declared priority programs of the MOH. — began 1979
-Oral rehydration units funded by UNICEF operate in 8 provinces. Medical personnel in hospitals have been trained in all provinces of the country.

3. A.I.D. SUPPORTED ACTIVITIES

Regional seminars have been held. The MOH has purchased 1 million packets of ORS from UNICEF. MOH recently launched three-province pilot program financed by AID, integrating use of mass media/radio programs, development of educational and packaging materials, training of local health workers and community leaders and establishment of ORS distribution network. (MMdHP project) Dr. Reynaldo Pareja

USAID loan funding approximately $50,000 pilot program plus long-term advisor through central S&T/ED contract. UNICEF is also providing funding for training and rehydration units.
AID Integrated Rural Health Project - training community leaders beginning in 1982.

4. PRIVATE SECTOR ORT ACTIVITIES

-Yes. Ciba-Geigy recently began commercial distribution through its retail men and pharmacies (small stores). Too early to define coverage.
-Talks have begun w/Ciba-Geigy on how to coordinate advertising, packaging and distribution efforts. Since importing from UNICEF difficult, MOH is expected to negotiate local purchasing through Ciba-Geigy.

5. SACHETS/HOME MIX BASES

Based on UNICEF and Ciba-Geigy packets (4.27) - not home preparations.

6. LOCAL ORT SUPPLY

See number 4.

7. POSSIBLE ORT EXPANSION

EL SALVADOR

1. ORT HEALTH STATISTICS

Due to Diarrhea

-1981 Reported deaths under 5 years	1,743
-Reported cases under 5	161,722

2. HOST COUNTRY ORT PROGRAM

Yes. National ORT program began around 4 years ago, as a pilot in the western health region. Since, has been phased into other regions. Est. country coverage, excluding regions where activities are just staring, is 53% of all reported diarrheal cases.

3. A.I.D. SUPPORTED ACTIVITIES

USAID complementing national program through ORT training and service in three health regions. To date, around 20,000 children have received services through project.

4. PRIVATE SECTOR ORT ACTIVITIES

-Systematic ORT activities in the private sector not a clear yes. ORT concept partially accepted. At least five different ORS units of issue are available on the local market, conforming well to WHO/UNICEF standards.

5. SACHETS/HOME MIX BASES

MOH and USAID origins utilize packets administered at MOH service delivery points. MOH purchases from UNICEF, USAID from the U.S.

6. LOCAL ORT SUPPLY

ORS packets produced locally, average price 20¢/packet

7. POSSIBLE ORT EXPANSION

MOH estimates $60,000 U.S. to implement the ORT program in remaining two regions in the eastern part of the country.

GUATEMALA

1. ORT HEALTH STATISTICS

1980- 9,301 cases known mortality
50,807 cases known morbidity

2. HOST COUNTRY ORT PROGRAM

Yes. Coverage is estimated at 10% in 1983. Not verified.

3. A.I.D. SUPPORTED ACTIVITIES

AID and UNFPA are only donors.

4. PRIVATE SECTOR ORT ACTIVITIES

No.

5. SACHETS/HOME MIX BASES

Based on Packets

6. LOCAL ORT SUPPLY

UNICEF is the source

7. POSSIBLE ORT EXPANSION

The MOH has a program planned to extend the use of ORT nationwide but lacks funding sources.

GUYANA

1. ORT HEALTH STATISTICS

1977	366 Mortality Reported
1978	1,668 Morbidity Reported
1982	5,313 Morbidity Reported

2. HOST COUNTRY ORT PROGRAM

Yes. National ORT program through MCH centers of the MOH. Coverage of under 5 years estimated at 40%

3. A.I.D. SUPPORTED ACTIVITIES

The ORT program currently entirely supported by the Government of Guyana. Proposal made to IDRC of Canada for financing and expanded program in one region.

4. PRIVATE SECTOR ORT ACTIVITIES

-No private sector or commercial ORT activities.
-AID does not fund any ORT activity in Guyana.

5. SACHETS/HOME MIX BASES

Use of both packets and home preparation is promoted.

6. LOCAL ORT SUPPLY

Packets are produced locally by the Guyana Pharmaceutical Corporation (GPC); are distributed through the MOH. Small percentage of production available for sale at GPC outlets. GPC obtains its supplies of raw material from international commercial sources.

7. POSSIBLE ORT EXPANSION

MOH intends to proceed with expanded coverage by a) training more personnel, b) making more packets available through commercial, outlets and village shops, & c) improving packaging to increase shelf life. A fully implemented national program is estimated to cost about $2 million U.S. Mission staff believes ORT is necessary intervention in Guyana, given reported increase in gastroenteritis morbidity, and suspected, but not confirmed, increase infant mortality.

HAITI

1. ORT HEALTH STATISTICS

-Mortality estimated at 20-25,000 annually due to diarrhea
-Morbidity - 1078 survey found 48% w/diarrhea prevalence in previous week. Repeat survey in 1981 found prevalence of 48% calculates to 20 episodes/child/year.

2. HOST COUNTRY ORT PROGRAM

National program in Haiti initiated July, 1982.

3. A.I.D. SUPPORTED ACTIVITIES

Current support by USAID is modest and indirect, through rural health services project - T.A. for planning media and education programs, reporting system and program management support.

UNICEF-supports activities
PAHO-supports activities
FY 1984 Title I counterpart support

4. PRIVATE SECTOR ORT ACTIVITIES

ORT program is intended to also involve PVOs, particularly those providing health services. Coverage limited due to infancy of project, although program is national in scope.

5. SACHETS/HOME MIX BASES

ORS packets are basis for initial phase of program, but home preparation element may be added later

6. LOCAL ORT SUPPLY

Monthly 100,000 packets locally produced; capacity is 4 million packets annually. Distribution of packets to health regions and to commercial sales points being made by manufacturer. Packets are available in pharmacies throughout Haiti. MOH has experienced some delays in developing local level sales distribution networks within health services structure.

7. POSSIBLE ORT EXPANSION

Improvement potential 1) Development of program information & management system 2) Development of operational research component 3) expansion of program reach 4) Strengthening of program supervisory system. Est. cost $660,000 initially, and $100,000/year subsequently for (2) and (4). Lack of financial resources not key constraint to program expansion.

HONDURAS

1. ORT HEALTH STATISTICS

1983 Reported Deaths	1,211
(Estimated Actual	8,819)
1983 Reported Cases	155,515
(Estimtated Actual	2,200,000)

2. HOST COUNTRY ORT PROGRAM

Yes. National ORT program. Coverage is nationwide, but only benefits the estimated 50% of population with access to health services.

3. A.I.D. SUPPORTED ACTIVITIES

ORT is supported by AID in ongoing projects. PAHO & UNICEF also support program.

4. PRIVATE SECTOR ORT ACTIVITIES

No significant private sector ORT activity

5. SACHETS/HOME MIX BASES

ORT program based on ORS packets, not home preparation.

6. LOCAL ORT SUPPLY

Annual local production of about 2 million packets. Other packets provided by UNICEF or AID. Packets are distributed through government health centres.

7. POSSIBLE ORT EXPANSION

Coverage could be expanded by commercializing sale of packets. GOH is developing a drug sales program through "popular pharmacies" which would require no significant additional cost to donors. Need for future commercialization will have to be estimated in approximately one year.

JAMAICA

1. ORT HEALTH STATISTICS

Diarrheal Disease:
-1978 Morbidity under 1 359/100,000
(pop. at Risk 584,000)
- Morbidity 1-4 186/100,000
(pop. at Risk 197,000)

2. HOST COUNTRY ORT PROGRAM

ORT program concentrated in Kingston corporate area where prevalence of diarrheal diseases is highest. Around 22% coverage of population 0-5 (around 781,000 children in 1978). National program, through MOH MCH Division, began in 1981.

3. A.I.D. SUPPORTED ACTIVITIES

National ORT program not supported by USAID/Kingston. Other donors: World Bank - mass media nutrition, education project. PAHO - ORT packets, equipment and training, program support, WHO - training, UNICEF - audio-visual materials, ORT packets, CUSO - program support

4. PRIVATE SECTOR ORT ACTIVITIES

-No PVO involvement in program. Local private sector pharmaceutical company will do short runs.

5. SACHETS/HOME MIX BASES

Packets. Home preparations are not used due to problems of hygiene in the home.

6. LOCAL ORT SUPPLY

All ORS packets have been purchased through UNICEF at a subsidized cost. Packets are distributed through clinics and are not yet available through commercial outlets.

7. POSSIBLE ORT EXPANSION

MOH has developed a comprehensive national ORT expansion program, which when implemented, would provide a minimum of 60% coverage to the population at risk. Approximate cost of program is U.S. $1.5 million, which includes training, commodities, immunizations, improved sanitation and water supply, etc. Funding required and welcomed.

MEXICO

1. ORT HEALTH STATISTICS

1979 41,806(?) deaths in children under five years. Attack rate was 400/100,000 population (Not much confidence in data)

2. HOST COUNTRY ORT PROGRAM

No. Mexico does not have a national ORT program. Although there are plans for such a program, based on the experience of pilot projects which were conducted in two states.

3. A.I.D. SUPPORTED ACTIVITIES

Currently AID does not have a funding mechanism to support ORT programs other than research or pilots. Both UNICEF and PAHO are providing TA to GOH health officials. Unable to give estimate of dollar contribution.

4. PRIVATE SECTOR ORT ACTIVITIES

-Private family planning organization, PROFAM which has plans to market ORS with a grant from the Population Crisis committee. PROFAM also presented a proposal to PRICOR to do market research on ORS Local company manufacturing salts solution in bottles of 1/2 or 1 liter for sale in drug stores. No data available on sales.
-No.

5. SACHETS/HOME MIX BASES

Health officals in the MOH and the Social Security system tend to favor programs based on packets (perhaps due to influence of UNICEF and PAHO) National Institute of Nutrition program based on home preparation.

6. LOCAL ORT SUPPLY

ORS solutions are produced by Pedyalite (Abbot Lab) and cost approximately $1.20 U.S./liter.

7. POSSIBLE ORT EXPANSION

Target population would be some 8 million (?) to build the infrastructure to make ORS widely available to the target population. Program would probably take 2-3 years; however, most of the costs could be mobilized locally. With an external donor investment of $1 million/year for 3 three years. GOM officials could and would launch an effective national ORT program.

Dr. Rodolfo Chavez, Director of National Nutrition Institute who has a pilot primary primary health care program operating in Southern Mexico and includes Home Based Approach to ORT. Dr. Chavez feels a conference or workshop for Mexico or the Region might be best approach to call attention to the importance of ORT.

NICARAGUA

1. ORT HEALTH STATISTICS

1980 Reported cases	147,509
Reported deaths	510
1981 Reported cases	210,400
Reported deaths	291
1982 Reported cases	241,401
Reported deathas	265

2. HOST COUNTRY ORT PROGRAM

Yes. Rehydration services have nationwide coverage. 285 health posts and 9 health centers have UROs

3. A.I.D. SUPPORTED ACTIVITIES

No.

4. PRIVATE SECTOR ORT ACTIVITIES

No.

5. SACHETS/HOME MIX BASES

Both

6. LOCAL ORT SUPPLY

ORS are manufactured by a local company "RARPE" under two different names. "El Oral" U.S. $0.59/packet and "Kindergold" U.S. $1.54/4oz packet. Also import American, Mexican and Guatemalan ORS

7. POSSIBLE ORT EXPANSION

Bilateral assistance prohibition

PANAMA

1. ORT HEALTH STATISTICS

MOH figures

1982 Reported cases 41,000
Reported deaths 150

2. HOST COUNTRY ORT PROGRAM

ORT program is integrated with MCH program, which reaches an estimated 263,000 children under five years.

3. A.I.D. SUPPORTED ACTIVITIES

Ongoing ORT program is supported by MOH. AID terminated i health program in 1982. No additional funding for ORT program planned by Mission

4. PRIVATE SECTOR ORT ACTIVITIES

In the commercial sector, pharmacies in Panama have drugs available that control diarrhea. Figures on coverage not available.

AID does not fund any of these activities.

5. SACHETS/HOME MIX BASES

Integrated ORT program in MOH provides ORS in packets.

6. LOCAL ORT SUPPLY

ORS packets are not produced locally. Source of supply is Colombia.

7. POSSIBLE ORT EXPANSION

According to MOH officials, ORT coverage in Panama through the integrated MCH system and through pharmacies is viewed as requiring no expansion.

PARAGUAY

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

Little or no response from MOH about ORT Program

3. A.I.D. SUPPORTED ACTIVITIES

A.I.D. has no bilateral health programs in Paraguay

4. PRIVATE SECTOR ORT ACTIVITIES

Three commercial laboratories (manufactores) are interested in possibility of producing ORT - Asuncion, Farmaco, and Lasca

5. SACHETS/HOME MIX BASES

- -

6. LOCAL ORT SUPPLY

- -

7. POSSIBLE ORT EXPANSION

- -

PERU

1. ORT HEALTH STATISTICS

- Mortality
1980 Under 1 year 4,296
or 8.7/1000 live births
- 1-5 years 3,370
or 1.3/1000 live births
-1980 Morbidity
-- under 1 year 18,459
or 16,692/100,000 live births
-- 1-5 years 17,854
or 4,794/100,000 children
-1982 Morbidity
-- under 1 year 49,922
or 25,624/100,000
-- 1-5 years 54,555
or 10,829/100,000

2. HOST COUNTRY ORT PROGRAM

Yes. Nationwide program began in ~~1981~~ 1980 - 1m 168,435 ORS packets distributed to all health regions of the country. In 1982, 317,080 packets were distributed. MOH has revitalized program; promotion pamphlets for health promoters, parents, doctors and nurses have been printed.

3. A.I.D. SUPPORTED ACTIVITIES

USAID supports the ORT activities through three PHC projects which cover 15 of the 17 national health regions. In addition to purchasing 2.8 million ORS packets, USAID is working with the MOH and a private advertising firm to develop a nationwide mass media campaign. All donors in health sector are promoting use of ORS including PAHO/UNFPA, World Bank, german government.

4. PRIVATE SECTOR ORT ACTIVITIES

PVOS are supporting ORT activities across the country. Programs small, and mostly supported by religious groups. est. population coverage by PVO's just over 2 million. Labs in Peru manufacturers ORS packets, sell to MOH for free distribution at MOH establishments. Not usually recommended by pharmacists, but are available at U.S. $0.23/packets. At least four other ORS products are locally available.

→ Laboratorios Unidos S.A -- "Salvandon"
Instituto Sanitas " Hidrosal"
Tritorma - "Electrosal"

5. SACHETS/HOME MIX BASES

USAID doesn't fund any private sector activities. It is expected that forthcoming mass media campaign will result in increased commercial sales of ORS.

6. LOCAL ORT SUPPLY

MOH program teaches use of both ORS prepackaged salt and home preparation.

Besides locally-made products over the past two years, salts have been purchased for the MOH from Argentina, Guatemala and Colombia by UNICEF and USAID.
LUSA - principal domestic supplier of ORS in both public and the private sect

7. POSSIBLE ORT EXPANSION

Expansion will require major educational programs for health professionals and other audiences. (Pharmacists, health workers, public). $500,000 U.S. has been programmed for mass media campaign, $125,000 of which will support ORT messages. An additional $50,000 will fund six months of T.A. USAID has earmarked U.S. $300,000 for purchase of 2.8 million packets of ORS.

NEAR EAST BUREAU

EGYPT

1. ORT HEALTH STATISTICS

   - -

2. HOST COUNTRY ORT PROGRAM

   National ORT program
   - ORT Integral part of MCH services

3. AID SUPPORTED ACTIVITIES

   Largest A.I.D.-funded ORT Project in the World ($26 Million)
   (1) National Diarrheal Disease Control Program
   (2) Strengthening Rural Health Services Delivery Project
   (3) Urban Health Delivery Systems
   - to train physicians and nursing personnel in ORT
   - to teach families in ORT
   - to establish a reliable inventory and distribution system for ORT.

4. PRIVATE SECTOR ORT ACTIVITIES

   - -

5. SACHETS/HOME MIX BASES

   Use of Sachets

6. LOCAL ORT SUPPLY

   - Local Production: 5 million packets
   - UNICEF packets: stockpiled from previous years--are used in CRS clinics around the country.
   - A.I.D.: 50 million packets of ORS imported from U.S.

7. POSSIBLE ORT EXPANSION

   - Could have more in support for machinery needs for production and distribution.
   - National Conference on ORT - 1984 (GOE) event)

JORDAN

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

Physician Training in Amman and IRBID on the Use of ORT

3. AID SUPPORTED ACTIVITIES

- USAID/J - Health Education Project support to the National Multi-media education campaign on the prevention and treatment of diarrheal diseases (use of ORS included)

- ORT training for care providers and mothers

- Health Management and Services Development Project 1984: special study on ORS usage in Jordan

- University of Jordan - establish a diarrheal disease control center.

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

ORS packets are available at all MOH facilities (400)

6. LOCAL ORT SUPPLY

- -

7. POSSIBLE ORT EXPANSION

- In-country production of ORS could be supported through private and public channels.

- Extend support for media production of health education messages on diarrheal disease and ORT.

UNICEF reports that ORT & Breastfeeding are being introduced through MCH service.

LEBANON

1. ORT HEALTH STATISTICS

Not available

2. HOST COUNTRY ORT PROGRAM

- GOL plays a minor role in health services

- ORT available in limited clinic and dispensary networks.

- Offered by private practice physicians

3. AID SUPPORTED ACTIVITIES

- -

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

packets

6. LOCAL ORT SUPPLY

- -

7. POSSIBLE ORT EXPANSION

Additional resources for new program restructuring

MOROCCO

1. ORT HEALTH STATISTICS

   3.5 million children under five years of age

2. HOST COUNTRY ORT PROGRAM

   Government run clinic-based and health outreach programs (300 MCH clinics)

   GOM Ministry of Public Health (MOPH) has specifically identified ORT and greatly expanded Immunization effort as key elements of MOPH's Primary Health Care Program.

3. AID SUPPORTED ACTIVITIES

   Pritech could support ORT and EPI programs.

4. PRIVATE SECTOR ORT ACTIVITIES

   - -

5. SACHETS/HOME MIX BASES

   packets

6. LOCAL ORT SUPPLY

   Manufactured by MOPH and the private sector and is being distributed at MCH clinics country-wide and through the VDMs Program in 13 provinces.

7. POSSIBLE ORT EXPANSION

   Additional resources for new program restructuring for increased attention to information material development for health service consumers

TUNISIA

1. ORT HEALTH STATISTICS

   6 million popu'.ation

2. HOST COUNTRY ORT PROGRAM

   Tunisian post-university course in nutrition

3. AID SUPPORTED ACTIVITIES

   - Rural Community Health Projects (664-00296) (1978-1985)

     Predominantly rural provinces of Central Tunisia

   - Proposed Operations Research Activities

   - S&T/Nutrition Education Project

   - Phase-Out Country in A.I.D.'s portfolio

4. PRIVATE SECTOR ORT ACTIVITIES

   - -

5. SACHETS/HOME MIX BASES

   - -

6. LOCAL ORT SUPPLY

   - -

7. POSSIBLE ORT EXPANSION

WEST BANK

1. ORT HEALTH STATISTICS

- -

2. HOST COUNTRY ORT PROGRAM

- -

3. AID SUPPORTED ACTIVITIES

- Catholic Relief Services
- program of educational activities in the area of nutrition

- No potential for bilateral projects.

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

- -

6. LOCAL ORT SUPPLY

- -

7. POSSIBLE ORT EXPANSION

- -

YEMEN

1. ORT HEALTH STATISTICS

Total Population - 6 million

2. HOST COUNTRY ORT PROGRAM

Notable interest among MOH officials desirability of doing more to make ORT available in Yemen

3. AID SUPPORTED ACTIVITIES

- Tihama Primary Health Care Project (279-0065) 1984 amendment - amodest expansion of ORT activities in the project

The Health Manpower Institute (HMI) is just beginning a revision of the PHC worker and local birth attendant curriculum where ORT might be added

4. PRIVATE SECTOR ORT ACTIVITIES

- -

5. SACHETS/HOME MIX BASES

packets

6. LOCAL ORT SUPPLY

UNICEF packets are available at hospitals and health centers

7. POSSIBLE ORT EXPANSION

A market survey of the feasibility of in-country production and/or packaging, marketing and distribution would be useful.

Possibility of adding an ORT component to the MCH/FP project (279-0079)

Through PRITECH: 1) design an ORT component for the Tihama Primary Health Care Project 2) Technical Assistance to the Health Manpower Institute for developing a module on ORT for training PHC workers and local birth attendants

ROCAP
(Regional Office for Central America and Panama)

1. ORT HEALTH STATISTICS

2. HOST COUNTRY ORT PROGRAM

3. A.I.D. SUPPORTED ACTIVITIES

INCAP receiving S&T/Pop funds to assist in evaluation of PRINAPS Promoter project in Guatemala, which includes delivery and use of ORS as important component of integrated PHC System. Also SINAPS project in Guatemala.

4. PRIVATE SECTOR ORT ACTIVITIES

INCAP providing TA in ORT to GOG, under community based health and nutrition Systems Project.

5. SACHETS/HOME MIX BASES

--

6. LOCAL ORT SUPPLY

--

7. POSSIBLE ORT EXPANSION

INCAP is developing proposal to submit to AID for a regional project to promote use of ORS. Proposal includes TA, information dissemination and exchange, training, operational research and evaluation components.

AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

SENIOR ASSISTANT ADMINISTRATOR

MAR 7 1984

MEMORANDUM:

TO: All Participants
Conference on the Protection of the World's Children
Bellagio, Italy

FROM: S&T, N. C. Brady NCB

SUBJECT: Background Materials on Oral Rehydration Therapy (ORT)

Based on discussions between Dr. Warren and Administrator McPherson, I am pleased to provide you with two brief papers which provide background for Mr. McPherson's presentation on Wednesday, March 14, 1984. Attached please find:

1. ORT Fact Sheet

2. "Diarrhoea and ORT" by Sumi Krishna Chauhan. This paper presents an overview of the field from a non-technical perspective.

3. "Oral Fluid Therapy in Diarrhea and Dehydration: Current Concepts and Practical Considerations" by Robert L. Parker. This is a technical paper dealing with issues in delivering ORT services.

ORT is extremely promising in terms of both feasibility and health impact. The goal of the conference requires us to consider the appropriate role of this important technology in the protection of the world's children.

Attachments:
1. ORT Fact Sheet
2. "Diarrhoea and ORT"
3. "Oral Fluid Therapy and Diarrhea and Dehydration: Current Concepts and Practical Considerations"

BACKGROUND PAPERS ON ORT

(Copies distributed to participants by AID)

An ORT fact sheet

* One in every 10 children born in Africa, Latin America and Asia dies of diarrhoea before the age of five.

* Diarrhoeal disease is a major contributory factor to malnutrition.

* The major causes of diarrhoea are: viruses, bacteria and parasites.

* Diarrhoeal disease is transmitted by faecal contamination of food and water, and by person to person contact.

* During diarrhoea the body rapidly loses fluid and salts - sodium, potassium, chloride and bicarbonate.

* Breast-feeding of infants helps reduce the incidence of diarrhoea.

* The conventional treatment for diarrhoea is intravenous infusion of lost fluid and salts.

* Oral rehydration is an alternative method of restoring body fluids and salts lost during diarrhoea.

* The scientific basis of oral rehydration therapy rests on the discovery that glucose helps the absorption of sodium through the intestinal wall.

* Scientific oral rehydration solution is a solution of glucose, sugar or rice powder, salts and water.

* ORT helps control dehydration and reduce diarrhoea deaths.

* It was first used on a large scale among refugees from the war in Bangladesh, near Calcutta, India, in 1971.

* The solution is comparatively inexpensive and can be prepared by health workers, or mothers in their own homes.

* Community-based ORT is among the priorities of WHO's Programme for the Control of Diarrhoeal Diseases.

* Future research is directed at traditional food-based mixtures, such as cereal solutions and carrot soup.

-Ed.

Diarrhoea and ORT

Sumi Krishna Chauhan

In less than the time it takes you to read this page, nine children will have died of diarrhoea. Every minute, between eight and nine children below the age of five die of diarrhoea in the low and middle income countries of the world. This is one in every 10 children born.

More serious even than the rate of diarrhoeal death is the extent of diarrhoeal illness, and its possibly cumulative, retarding effect on the growth of children.

Diarrhoea has now been recognised as a leading cause of illness and death, especially in developing countries (1). In 1978 the World Health Organization (WHO), supported by the United Nations Children's Fund (UNICEF), spurred international efforts to control diarrhoeal diseases and reduce deaths by launching a Programme for the Control of Diarrhoeal Diseases (2).

However, it was only in 1982 that a comprehensive and accurate global survey of the magnitude of acute diarrhoeal disease became available. This analysis of three decades of data from selected studies in the developing countries showed that diarrhoea occurs most frequently in infants aged between six and 11 months, and that the rate of diarrhoea deaths is highest among infants and children below the age of two years.

A child below the age of five years suffers an average 2.2 episodes of diarrhoea every year. On the basis of this, it was estimated that in 1980 there were between 744 and 1,000 million episodes of acute diarrhoea in children under the age of five years in Africa, Asia (excluding China) and Latin America. At least 4.6 million of these episodes led to death (3). The startling statistic of between eight and nine child deaths per minute is derived from this estimate.

The magnitude of such statistics is, perhaps, even more striking at the community level. A village health worker, who has to care for a population of 5,000, would encounter nearly 3,000 diarrhoea cases a year among 750 pre-school children. On any given day roughly 75 children would be suffering from diarrhoea. Of, say, 50 childhood deaths annually, between 10 and 20 would be caused by diarrhoea (4).

The two main "killers" in developing countries are diarrhoeal diseases and respiratory illnesses (such as pneumonia) - both left out of traditional tropical diseases research. Instead, for decades Western medicine focussed almost exclusively

on selected infectious diseases, (such as malaria), presumably because of "the interests of doctors who are fascinated with parasites and their life cycles" (5).

For the individual, diarrhoea may be a medical problem. For a community or a nation, diarrhoeal disease is but one of many symptoms of poverty and underdevelopment. Medical care alone may treat the symptom, but it cannot deal with the social and economic germs of the illness.

Medical causes of diarrhoea

Many of the specific bacteria, viruses and parasites which cause acute diarrhoea* have been discovered only during the last decade. Bacterial infection of the gut, however, is usually prevented by various factors, such as the acid in the stomach, the movements of the intestine, the natural colonisation of the gut by symbiotic bacteria and the production of natural antibodies.

The bacterial organisms that cause acute diarrhoea fall into three groups:

* Vibrio cholera and some types of Escherichia coli release proteins, called exotoxins, which reduce the normal absorption of sodium and chloride in the intestine, and increase the secretion of bicarbonate. This results in watery diarrhoea, and a severe loss of fluid and electrolytes (salts).

* Shigella and some other strains of E. coli bacteria invade the mucous lining of the intestine, causing inflammation and ulceration. This leads to bloody diarrhoea (dysentery), which may contain mucus.

* The third group of bacteria are represented by Salmonella - the organism associated with food poisoning.

Recently, it has been established that viruses are also a major cause of diarrhoea. Of these, called the "rotavirus", is the most common. Rotavirus diarrhoea is most prevalent in the cooler months, and particularly affects infants (6).

Parasites such as Giardia and Entamoeba histolytica can also cause prolonged diarrhoea, aggravate malnutrition, and thus lead to death. But it is not known how these organisms cause chronic diarrhoea.

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* Acute diarrhoea, according to the WHO definition, is an attack of sudden onset, which usually lasts three to seven days, but may last for up to 10 to 14 days.

Improved techniques now help to determine the specific organism that causes a particular episode of diarrhoea. Rotavirus, E. coli and Shigella are among the most significant causes. But despite the new techniques, the cause of between two and five out of 10 attacks of diarrhoea still cannot be identified.

Diarrhoeal dehydration

Dehydration deaths from diarrhoea occur because the body loses water and electrolytes - sodium, potassium, chloride and bicarbonate salts. In watery diarrhoea, the capacity of the intestine to absorb water and electrolytes is reduced, and the secretion of electrolyte-rich fluid increases. The loss of predominantly alkaline fluids can lead to severe metabolic acidosis (concentration of acids in the body), which can be dangerous.

When the body loses up to 5% of its weight in fluid, this causes thirst, but usually no other symptoms. As more fluid and salts are lost,

* there is severe thirst,
* the pulse becomes weaker and more rapid,
* the elasticity of the skin is reduced,
* the eyes become sunken,
* the soft skin-covered spot in a baby's head sinks,
* less urine is passed, and
* the blood pressure drops.

A loss of more than 10% of the bodyweight may lead to:

* stupor (coma),
* kidney damage and permanent failure,
* collapse of the peripheral blood vessels, and
* metabolic acidosis (concentration of acids).

The result is death (7).

Dehydration can be particularly rapid in infants and young children. But many doctors agree that it is very difficult to recognise life-threatening dehydration at an early stage (8).

Diarrhoeal death is also linked to malnutrition. Recurrent attacks of diarrhoea can aggravate existing malnutrition. Children suffering from diarrhoea may lose their apetite, or their mothers may believe that feeding is bad for diarrhoea, or food may be withheld as a positive remedy for diarrhoea. Studies have also shown that diarrhoea affects the body's capacity to absorb sugar, fat, protein, certain vitamins and trace minerals. Diarrhoea may also be accompanied by the breakdown of body protein (9; 10). Nutrients may also be lost because of vomiting.

Of all the major nutrients, the absorption of carbohydrate (energy food) is least affected during a diarrhoeal episode. Research in Bangladesh has shown that in rotavirus infection carbohydrate absorption is as high as 74%, even during acute diarrhoea (11).

The spread of diarrhoea

The organisms that cause diarrhoea are transmitted by multiple routes, but mainly through food and drink contaminated by infected faeces - what is known as the faecal-oral route. Cholera is a waterborne disease. The E. coli, which cause watery diarrhoea, are found in unhygienically prepared food, especially weaning food, dirty utensils and contaminated water. Rotavirus and Shigella are infectious in comparatively small doses, and can be passed on by person-to-person contact (12).

There are three ways in which the spread of diarrhoeal disease can be contained:

* by breaking the transmission route,
* by improving the body's defence against disease, and
* by drug treatment and ORT.

The transmission of the disease-causing organisms may be prevented, for instance, by improved water supply and sanitation facilities, by better personal, domestic and community hygiene, and safer food preparation. But studies in Bangladesh have shown that even cholera is not controlled by providing clean drinking water (13; 14; 15).

Or, the body's capacity to deal with the disease may be improved, by better nutrition and by immunization. It is now well established that feeding, particularly breast-feeding, during diarrhoea should not be discontinued (16). There is no physiological basis for "resting the bowel" during or after acute diarrhoea (17). But most doctors in the West continue to recommend resting the bowel, believing that only poorly-fed children in developing countries should continue to be breast-fed during diarrhoea.

There is, at present, no effective immunization for the diarrhoeal diseases. No vaccinations are available for rotavirus, E. coli or Shigella. The cholera vaccine, which has been used worldwide for 70 years, has been proven to be ineffective and perhaps, even dangerous (18). More than a decade ago, WHO declared the cholera vaccine unnecessary, and in 1983 only 20 countries still officially required vaccination certificates for travellers coming from infected areas. But most allopathic (Western medicine) doctors, both in developed and developing countries, are not up-to-date with the research, or the revised regulations, and they continue to recommend the vaccination in the mistaken belief that it can do no harm and may do some good.

On these two most crucial areas - continued breast-feeding during diarrhoea, and stopping the use of the cholera vaccine - allopathic doctors are much harder to convince than community workers in the low and middle income countries.

Researchers are investigating potentially effective vaccines for rotavirus and cholera, but these have yet to be tried successfully on a large scale, in natural conditions.

However, because measles is often accompanied by critical diarrhoea, immunization for measles may help control the diarrhoea that is associated with it. Theoretical calculations show that measles immunization can significantly reduce the diarrhoeal death rate for children under five years, but this has yet to be confirmed in community research (19).

Medicines do not help in the routine treatment of diarrhoea. Commonly used anti-diarrhoeal preparations such as kaolin and pectin have no proven use. Some drugs, such as neomycin, damage the intestinal wall and affect absorption. However, drugs are indicated for cholera sometimes, for severe Shigella dysentery, amoebic dysentery and acute giardiasis (20).

Rehydration for diarrhoea

A person who has an attack of acute diarrhoea begins to lose water and salts from the very beginning. Dehydration can kill. The first, and only, effective treatment for the dehydration which accompanies diarrhoea is to replace the water and salts. This can be done by replacing the lost fluid and salts either orally or intravenously. Rehydration does not cure diarrhoea, but it counteracts dehydration.

Intravenous (IV) therapy, which allows the fluid solution containing salts to drip slowly through a needle into the patient's veins is an expensive procedure and requires hospitalisation. It was initially tried in Russia and Scotland in the early 1830s, during the first worldwide epidemic of cholera, when three out of four patients admitted to hospital died (21). But this was abandoned because it did not cure diarrhoea.

Until the early 20th century the recurrent, worldwide epidemics of cholera claimed more lives than any other infectious disease. At that time, cholera was usually treated with calomel (mercurous chloride) and by blood-letting (deliberate bleeding) (22).

In the 1890s Leonard Rogers in Calcutta revived intravenous therapy using saline (a solution of the common salt, sodium chloride, in water), and succeeded in almost cutting the hospital death rate by half. In 1909 Andrew Sellards improved the solution by adding bicarbonate to restore the body's acid-alkali balance.

In the 1940s Daniel Darrow in the US added potassium to the solution, thus giving the formula all its modern ingredients. This was perfected in the 1950s and 1960s by Robert Phillips at the US Naval Medical Research Institute at Taipei, Taiwan, and effectively used in cholera epidemics in Asia and the Middle East (23; 24). This progress was complemented by the discovery of the cholera toxin by Indian microbiologists (25; 26; 27).

The modern, scientifically prepared and administered intravenous solution can reduce the hospital death rate to less than 1%. But the majority of people in the less developed countries of the world are not within easy reach of hospitals. The hospitals in these countries are also overburdened with patients, and their facilities are stretched to the utmost. To get all patients with diarrhoeal dehydration to hospital for treatment is impossible. And this is unnecessary, since oral rehydration therapy can be effectively administered even in the village home.

Sugar and salt solutions

Traditionally, in the Indian subcontinent, in China and elsewhere in Asia, a widely-used home treatment for diarrhoea has been ricewater (the drained off excess water in which rice is cooked), with salt added to taste. Laboratory analysis of such a solution, today, has shown that even the proportion of salt is very nearly the same as is scientifically required (28).

Another effective home treatment for diarrhoea is carrot soup, used in North Africa. Elsewhere, with perhaps less success, a variety of juices, coconut water and weak tea are used (29).

The use of a glucose-and-salt solution as oral therapy for dehydration was recommended by Darrow in 1949 (30), Chatterjee in 1952 (31), Harrison in 1954 (32), and Menghello in 1960 (33). In these early oral rehydration solutions glucose (grape sugar) or sucrose (common household cane or beet sugar) was used for its food (calorie) value, and to make the solution taste better.

The aim of scientific rehydration in acute diarrhoea is, first, to counteract the excess secretion of fluid from the intestinal wall and any loss in the capacity to absorb fluid, and then, to maintain hydration. Normally, water and salts are absorbed through the wall of the small intestine. The question was, how did the sugar-salt solution act as a lifeline for diarrhoeal dehydration?

It was only in the 1960s that researchers understood that diarrhoea does not significantly affect the absorption of glucose (which is a simple carbohydrate). They recognised that the transport of glucose is linked with the transport of sodium through the wall of the small intestine, and that giving additional glucose accelerates the absorption of salts and water (34; 35; 36; 37).

During diarrhoea, sodium, chloride and bicarbonate are secreted in excess through one part of the intestinal wall. In another part of the intestinal wall, glucose, and sodium, continue to be absorbed through an active pumping mechanism. The glucose carries the sodium across. Other sugars, such as lactose and sucrose, are broken down by enzymes in other parts of the intestinal wall. All these processes go on simulutaneously, and diarrhoea does not affect the pumping action that absorbs glucose. The absorption of sodium can be improved simply and effectively by giving a diarrhoeal patient glucose, orally.

This discovery forms the basis of scientific oral rehydration therapy. Many years later, in 1978, the discovery was described by the British medical journal, "The Lancet", as "potentially the most important medical advance this century" (38).

In the mid-1960s ORT was clinically tried, with success, among cholera patients, both adults and children (39; 40; 41; 42; 43). In 1969, in Bangladesh (then East Pakistan) the Cholera Research Laboratory (now ICDDR,B) began using ORT routinely in its field hospital in Matlab.

In 1971, ORT was first used on a large scale in West Bengal state in India, during a cholera epidemic among refugees from the fighting in Bangladesh. The Calcutta-based Johns Hopkins Centre for Medical Research and Training treated more than 3,700 patients in an emergency centre near the India-Bangladesh border. Two out of five of the patients were children. Severely dehydrated patients were given intravenous therapy, followed by ORT; others were only given ORT. Packets of measured salts, to be mixed in water, were also distributed in the refugee camps. The death rate was 3.6% (44).

The formula

Since the late 1960s different compositions of the oral rehydration solution have been tried. The standard formula, recommended by WHO/UNICEF, provides the dry salts in a prepackaged form, to be reconstituted when required. The formula consists of:

Sodium chloride
(common household salt)..... 3.5 grams

Sodium hydrogen carbonate
(sodium bicarbonate)..... 2.5 grams

Potassium chloride..... 1.5 grams

Glucose..... 20.0 grams

to be dissolved in one litre of clean drinking water (45).

Several variations of the standard formula have also been successfully tried.

Because glucose is much more expensive and is not available in many of the countries which suffer the most from diarrhoea, sucrose (common white sugar) has been used instead (46; 47; 48). Trials have shown that dehydrated infants can be successfully treated with ORT using sucrose. But the sucrose solution works more slowly than the glucose solution, and a higher percentage of patients require more than 24 hours of therapy. So although sucrose can replace glucose, where there is a choice glucose is recommended (49).

In some countries mollasses or unrefined sugar, which is much cheaper, is used instead of glucose. In Bangladesh, a locally-produced crude sugar, called "gur", is used (50).

When ordinary sugar is substituted for glucose in the standard formula, twice as much is required: 40 grams of sucrose instead of 20 grams of glucose. Increasing the quantity of sugar beyond this prescribed amount is potentially dangerous, because too much sugar worsens diarrhoea by its osmotic effect (51; 52).

Doctors are also concerned that too much salt can be very dangerous, particularly for infants (whose kidneys are less efficient at excreting a sodium load). An excess of sodium can be lethal. Because of this, doctors generally give only qualified approval to home-based oral rehydration solutions. They would much prefer to see everyone use measured, pre-packaged salts. However, this would require a complex system of production and distribution, and is not practicable in many poor countries.

Some doctors feel that the potential danger of using too much salt in the solution may be counteracted by using a lower concentration of salt than is contained in the WHO formula (53; 54). Others feel that the WHO formula may be used with additional supplementary fluids to reduce the risk (55; 56).

If glucose could be substituted by sugar, the next step was to investigate whether sugar - which is expensive, and not always available - could be replaced by something else.

In Bangladesh, A. Majid Molla pioneered the use of a rice-based oral rehydration solution. His team found that an otherwise standard solution, using 30 grams of rice powder (boiled in water) produced the same results as 20 grams of glucose (57). When the proportion of rice powder was increased to 80 grams for a litre of standard solution, this halved the duration of diarrhoea, and provided valuable nutrition (58).

ORT in the community

The effectiveness of ORT was dramatically proved under the adverse conditions of the epidemic among refugees from war. But the successful use of ORT as part of the daily health care of a community requires organisation and communication on quite a different scale.

Community-based ORT programmes either provide pre-packaged salts using the standard formula, or teach mothers how to prepare sugar and salt solutions in their own homes.

The foil-packed Oral Rehydration Salts (ORS) are now being produced by some pharmaceutical companies, by a few national governments and by UNICEF. The pre-packaged salts only have to be mixed in the correct quantity of water. This requires a vessel to measure one litre, and sufficient boiled, or uncontaminated, water.

The cost of the UNICEF ORS packet is reported to be equivalent to "the profit on a single UNICEF greeting card" (59). But for a less developed country even this cost may be too high. In Bangladesh, for instance, the UNICEF ORS packet costs about eight US cents. A child in Bangladesh needs, on average, six packets a year. So, the annual cost of the ORS packets per child would amount to roughly half the country's per capita expenditure on health (60).

This cost can be reduced in several ways. Many countries, encouraged by WHO and UNICEF, are producing their own packets. National production may initially be more expensive than the UNICEF packets, but the cost could come down as production increases. Indonesia has been producing more than a million ORS packets every year. However, few nations have the capacity to produce as many packets as are required. For instance, in 1980 Egypt was expected to need between 50 and 60 million ORS packets for child diarrhoea, but was expected to produce only one tenth of this (61).

Subsidised packets, whether imported or locally produced, can be distributed through commercial channels, and sold at a low price. The procedure is called "social marketing", and has been used for contraceptive distributon. Many community workers, however, feel that the whole concept of foil-packaged and marketed salts unnecessarily makes a simple household therapy part of a complex system of supply and distribution.

Another alternative is to supply the necessary salts in bulk to a community packaging centre, where the packets can be made up in cheap polythene bags. This has been tried successfully in Haryana state, India. By separating the sugar from the salts in two separate bags, these Indian packets have a shelf life of nine months. In Bangladesh, the new rice powder ORS has the rice powder separated from the salts.

In some community centres in India and elsewhere the quantity of ORS has been halved, so that the solution is made up to half a litre. By doing so the cost, per packet, is also approximately halved, and there is less chance of the solution being wasted. Among people who have already become dependent on the medicines doctors prescribe, something that comes in a packet appears to be like medicine, and is, therefore, more quickly accepted (62).

The alternative to pre-packaged salts is to encourage and teach mothers and community workers to prepare oral rehydration solutions in the home. These household sugar and salt solutions can provide all the ingredients in the standard formula, except potassium and bicarbonate. Some community centres recommend the addition of household soda to provide the bicarbonate. Supplementing the rehydration drink by eating bananas can make up for the lack of potassium.

However, mixing exact quantities of salt, sugar and water can become very complicated, if measuring spoons and containers are not available. The generally accepted method is to use a pinch of salt and a scoop of sugar, but each individual doing the mixing has a different idea of a pinch and a scoop. Too little salt does not help rehydration; too much can be lethal. In Indonesia, a special ORS measuring spoon is available to make up one glass of solution.

The big advantage of home-based solutions is that treatment can be started as soon as the diarrhoea begins. The only way to ensure that this is done on a large scale is to reach mothers, and teach them how to mix the solution and when to give it. The Bangladesh Rural Advancement Committee, a voluntary, non-government organisation, has aimed to teach ORT to 2.5 million households in five of the country's 20 districts (63).

Many community health specialists see ORT as an effective way of linking traditional healers with primary health care. In northeastern Brazil, the old ritual chants over sick children to ward off the "evil eye' now include new references to "diarrhoea".

Severe cases of dehydration cannot be treated in the home, and require intravenous therapy in a hospital or treatment centre. Ensuring that such treatment is available means setting up an effective referral system. This has been tried with some success in some projects. A "boat ambulance" brings serious diarrhoea patients to the ICDDR,B's field hospital in Matlab in Bangladesh.

The test of effectiveness is not a single project, but the capacity to replicate the success on a large scale. Although hospital-based or community programmes in many countries have shown that ORT reduces the diarrhoeal death rate by half, the therapy has not yet been tried on a nationwide scale anywhere in the world (64). This is the challenge.

ORT and primary health care

Oral rehydration is akin to first aid. It is an emergency treatment, not a magic cure for all ills. Rehydration by itself is not enough, because diarrhoea is both an infectious and a nutritional problem (65).

Controlling diarrhoea, therefore, involves achieving several different goals: improving the food value of oral rehydration solutions, promoting breast-feeding and better weaning practices, monitoring the growth of children before the stage when malnutrition becomes evident, and effective immunization.

Controlling diarrhoea also involves improving water and sanitation facilities, and personal and domestic hygiene. These goals do not apply to the control of diarrhoeal diseases alone, but are the goals of primary health care.

Diarrhoea is a major killer, but it is only one symptom of poverty and underdevelopment. It must not divert health officials from the creation of complete primary health care systems.

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ORAL FLUID THERAPY IN DIARRHEA AND DEHYDRATION: CURRENT CONCEPTS AND PRACTICAL CONSIDERATIONS

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Oral Fluid Therapy in Diarrhea and Dehydration: Current Concepts and Practical Considerations

Widespread interest has been developing over a number of years in the use of oral fluid therapy for the treatment of water and electrolyte losses associated with diarrhea. Giving special oral fluids to diarrhea patients is not new, [1,2,3] but rapid increases in knowledge about its rationale, appropriate composition and indications for use have occurred in the last 10-15 years. Recent experience with the use of oral fluid therapy in many developing country settings resulting in significant reductions in diarrhea mortality [4,5,6,7,8] has catapulted this health intervention into global recognition as one of the few widely applicable and technically simple approaches that could substantially reduce infant and child deaths around the world. The comparative simplicity and effectiveness of oral fluid therapy is particularly attractive because of the technically more complex requirements and higher costs of intravenous rehydration and the much more difficult and protracted actions required to implement primary prevention through environmental sanitation programs and health education. National governments, WHO, UNICEF, and other international agencies such as AID, are increasingly emphasizing oral fluid therapy as an important component of primary health care, often as the major health intervention in simplified health, nutrition, family planning or development projects. [9,10] With this growing interest, a great variety of approaches using oral fluid therapy have sprung up around the world. Simultaneously, concern has been expressed by some

clinicians and investigators about the potential harm of inappropriate us of oral fluid therapy. They are encouraging more deliberate and careful testing and implementation of new approaches.[11,12] The general consens however, is that the magnitude of the diarrhea problem and our current level of knowledge warrant rapid implementation of the most widely accept oral fluid th rapy approaches. Dissemination of information about the benefits, risks and unresolved questions associated with oral fluid thera should be built into any implementation plan. Thus, important program decisions can be made and implementation can move ahead while refinements of our understanding about the most effective and practical approaches can be encouraged by means of careful program evaluation and focussed research studies.

This review is, therefore, an attempt to briefly describe the major approaches to oral fluid therapy of diarrhea in children, important considerations in implementation of these approaches and unresolved issues that should be kept in mind when designing programs. This is not a "how-to-do-it" manual. Detailed guidelines for program development are current available[13,14,15] and more up-to-date ones are being developed by the Diarrhoeal Disease Control Programme, WHO and the Center for Disease Control, Atlanta.

Magnitude of the Diarrhea Problem

Diarrhea, including its interaction with malnutrition, is considered by many to be the single most important health problem and cause of death in children under five throughout the less developed areas of the world.

Various estimates indicate that in these areas children under five may average five or more episodes of diarrhea a year and have diarrhea on at least 20 to 30 days out of every year.(5,16,17,18) In these same areas approximately 10 to 20 percent of all children will have died from the effects of diarrhea before they reach their fifth year.(19) Diarrhea causes death acutely due to large scale losses of water and electrolytes from the body beyond tolerable limits, i.e., "dehydration." Most acute diarrheas are directly the result of a wide variety of bacterial, viral or parasitic agents. However, in special studies designed to identify the causative agents, specific identification of the agent has been possible in only 50 to 80 percent of episodes.(6,17,20) The severity of the diarrhea, especially in relation to the amount of fluid lost varies considerably by age, nutritional status, causative agent, immunity, and other factors. It has been estimated that less than one percent of diarrhea episodes progress to life threatening levels of dehydration.(5,21) However, it is difficult to know in the early stages of diarrhea which cases will involve significant dehydration.

On the other hand, the impact of diarrhea on nutritional status involves the cummulative effect of multiple episodes acting through a number of mechanisms. These include the temporary reduction in food intake due to loss of appetite or the deliberate withholding of food, the metabolic breakdown of body tissues during the illness itself, and reduced intestinal absorption during and following the episode.(6,19) The susceptibility of malnourished children to the effects of diarrhea, along with an increased incidence completes the cycle which all too often continues in a downward "spiral" of diarrhea-malnutrition-diarrhea-malnutrition leading to death.

The Use of Oral Fluid Therapy

From the preceding discussion it should be clear that the use of oral fluids does not prevent diarrhea but acts mainly as a means of replacing water and electrolytes being lost because of the diarrhea. This can also be done by giving water and electrolyte mixtures intravenously, the method that has been preferred in the past. However, with earlier empirical evidence of the usefulness of giving oral fluids, (1,2,3) and more recently the demonstration that glucose and other sugars added to electrolyte solutions facilitated absorption, even in severe diarrhea with large losses of fluid in the stools, (10,19,22) it has become increasingly evident that oral fluid therapy can take the place of most intravenous fluids in cases of diarrhea and dehydration. Good results have been achieved among all ages, including the first month of life, in diarrheas of differing etiologies and in varying states of nutrition. (7,8,10,23,24) This evidence has led to two distinct uses of oral fluids in diarrhea.

1. In children who have lost large amounts of fluid and show signs of dehydration, the use of oral fluid therapy has been demonstrated to be as effective as intravenous therapy in <u>rehydrating</u> and <u>maintaining</u> 80 to 95 percent of such cases. (8,10,18,23,24,25,26)

2. Less clearly documented, but felt by many to be equally important, is the use of oral fluids to <u>prevent</u> the progression of fluid loss leading to dehydration by continually replacing lost fluid right from the start of the episode. (5,7,27,28)

In summary, advantages of oral fluid therapy include:

a. the limited training and technology required for its use;

b. the ready availability of most of the supplies needed for its preparation;

c. its low cost in contrast to intravenous therapy;

d. the elimination of the trauma and chance of infection associated with intravenous therapy;

e. the use of thirst of the child as a safeguard to prevent overhydration in contrast to the very real chance of overhydration in children receiving intravenous therapy without adequate monitoring;

f. its potential to prevent the progression of diarrhea to severe dehydration requiring intravenous therapy;

g. the potential for having even the most remote health worker trained in use of oral fluid therapy in contrast to the limited number of facilities that would be capable of providing intravenous therapy; and finally,

h. the ultimate potential of coverage offered through training mothers to treat their own children under specified conditions.

In terms of the current emphasis on equitable coverage by health services and participation of the community in its own care, the use of oral fluid therapy in the home offers one of the most concrete and potentially effective means to attain these goals.

Oral fluid therapy cannot be used initially in the small proportion of cases who are in shock and require rapid intravenous rehydration. In addition, a small number of children, often severely malnourished, do not tolerate the glucose or sucrose in the oral fluid because of specific

enzyme deficiencies.[18] Vomiting generally is not a contraindication for oral fluids if given slowly, but a few children may be vomiting so severely that nothing can be given by mouth.[19] In children too weak to drink adequate amounts, fluids can be given by a naso-gastric tube as an alternative to intravenous therapy.[18] Use of the naso-gastric tube, however, must be monitored carefully to prevent aspiration. Much more important limitations to use of oral fluids have been cultural practices that dictate withholding fluids during diarrhea, or similar advice from traditional healers or modern physicians whose training until recently has not included the concepts of oral fluid therapy. Major changes in the teaching of the treatment of diarrhea and dehydration to physicians and other health workers plus specific education of the public is needed in most areas before the potential benefits of oral fluid therapy can be realized.[10]

Important Issues

1. Early Use of Oral Fluids in the Home

There is general agreement that oral fluid therapy using well-tested formulae and given by trained health personnel in health facilities to mildly or moderately dehydrated children is rapidly effective in correcting their water and electrolyte deficit and subsequently maintaining adequate hydration. The use of oral fluids in the home, initiated by the mother in all cases of diarrhea, is more controversial. The different positions taken on this topic have usually been based on an individual's field or clinical experience or theoretical possibilities, but there have been few well documented studies to date that can resolve the controversy. The major positions held include:

a. Early use of oral fluids that depends on the mother for preparation and administration is potentially one of the more important applications of oral fluid therapy because of the coverage of all children it can provide, the prevention of progression to dehydration it offers and the involvement of mothers directly in the health care process. Proponents feel that moderate variations in the content of the fluid produced by the inaccuracy of methods used to measure the components of the solution are better tolerated and will not materially change the effectiveness of this intervention early in the course of diarrhea.

b. Early use, although relatively free of potential negative effects has not been adequately demonstrated to change the course of diarrhea. Most cases of diarrhea are self-limited and anything given in the way of fluids is reasonable but will not necessarily prevent the one percent or less of cases that will progress to dehydration. These cases will need rigorous oral fluid therapy once their severity is recognized. Some feel that this therapy needs to be initiated by a well trained and responsive health system in identifiable facilities, but with the mother being involved in continuation of the oral fluid therapy later at home. (11)

c. Early use of home prepared oral fluids may be potentially dangerous. First, by having families attempt to treat all children initially with oral fluids there may be a delay in seeking of medical care by mothers of children with rapidly progressive diarrhea and dehydration. Second, there is the concern that inappropriately prepared solutions with high levels of salt may in fact produce severe electrolyte disturbances (hypernatremia) or in the case of excess sugar, worsen the fluid losses of the diarrhea. (26)

No matter which of these positions is taken, teaching the recognition of severe diarrhea and early signs of dehydration to mothers is considered an essential component of diarrhea control programs, along with increasing the accessibility and acceptability of services to handle these more severe cases by trained health workers in the home or in facilities.

Without extensive data on the efficacy or safety of early home treatment of diarrhea, decision makers must still come to some conclusion whether to include it in their control programs, balancing the possibility of its benefits, especially in situations where adequately trained health workers are not always accessible, against the possibilities of its negative effects and the resources required to implement it. The latter includes having knowledgeable individuals who can teach families at the village level how to make and use oral fluids appropriately. At present, results of the few available village level studies tend to support the conclusion that there are definite benefits of this approach.(5,27,28) Therefore, unless comparable coverage by health services can be provided, or the risks under actual field conditions can be shown to be significant, implementation of early home oral therapy by family members should be recommended as one of the components of diarrhea control programs.

2. Composition of Oral Fluids

A number of issues surface when considering the appropriate composition of oral fluids for use in diarrhea and dehydration. These include:

a. the amounts of the basic components to be used (glucose, sodium, potassium, chloride and bicarbonate) including

whether more than one concentration is needed for differing situations;

b. whether there are more readily available or more stable substitutes for some of the components (glucose and bicarbonate); and

c. whether using only sugar and table salt is adequate (at least in early home use).

Concentration of Components

Extensive research has led to the general agreement that the ideal oral fluids for diarrhea should contain sodium and potassium chloride, sodium bicarbonate and glucose. Most proponents of this so-called "complete" formulation recommend that the oral fluid contain 3.5 grams of sodium chloride (table salt), 2.5 grams of sodium bicarbonate (baking soda), 1.5 grams of potassium chloride, and 20 grams of glucose, dissolved in one liter of water.[22] Some investigators feel that this amount of sodium (90 millimoles per liter) may be too high for common diarrhea in infants.[11,12] They recommend two variations. The first is to have a solution similar in all respects except for a lower sodium content (50-60 millimoles per liter) for infants and young children, to be used initially or at least after the child is rehydrated with the higher sodium content solution. The second approach would have only one strength of the solution (90 millimoles), but in young children and infants the giving of two measures (e.g., cups) of the solution would be followed by giving one measure of plain water, continuing this alternating pattern throughout the use of the oral fluid therapy. In practice, to simplify the development

of prepackaged supplies, the one standard formula is preferable. In addition, instruction of peripheral health workers and use by mothers in the home would be complicated by having several formulations. However, large institutions or capable rehydration centers may be able to develop several types of formulae for their own use with appropriate standing orders. Alternating plain water with the solution is a much better approach for use in less sophisticated facilities or in the home, but still makes instructions a little more complicated. Current studies indicate that either the complete formula alone or alternating it with water appears to work without significant problems.[18,22,23,29] Under these circumstances a decision in large scale programs about which approach to use should hinge on ease of implementing and assuring understanding of the rationale of the approach by mothers and health workers.

Substitutes for Components

Studies have documented that common sugar (sucrose) for all practical purposes can be used in place of glucose in oral fluid therapy (40 grams in place of 20 grams of glucose).[24,30,31] Glucose is preferred if available at a comparable cost since it has been shown to be slightly more effective. However, cost and availability in most countries make sucrose the best choice for locally packaged complete formulae or home prepared sugar and salt mixtures. In one study crude sugar with a high content of molasses has shown added advantages.[21] Such sugar may often be the only sugar available in rural homes and sometimes has significant quantities of potassium and bicarbonate in it (two components missing from mixtures made only with refined sugar and table salt). Suggestions

have also been made to substitute lactate, citrate or acetate compounds for bicarbonate because of their greater stability.[8,11] However, except for potential use in large scale packet manufacturing, bicarbonate is still the component of choice because of cost and availability.

Sugar and Salt as the Only Components

Probably the single most important controversy at present is that involving the use of oral fluids containing only sugar and table salt in contrast to the complete formula. This issue is complicated by the fact that the sugar and salt solution is generally advocated for use by the mother on her own initiative in the home, thus also involving the arguments presented earlier for and against such home use of oral fluids. Careful studies have documented the less adequate biochemical response of dehydrated children to sugar and salt solutions.[7,10,21] However, few if any adverse clinical signs have been noted with its use in these cases. No studies have been reported to date in which use of sugar and salt before the onset of dehydration have been followed biochemically. At present, because of the definite biochemical advantage shown in children with dehydration, it is probably advisable to use the complete formula whenever possible. However, in many situations widespread implementation of oral fluid therapy using the complete formula would either exhaust supplies of prepackaged ingredients, not be possible because of lack of appropriate ingredients locally, or be blocked by inadequate logistic systems to ensure supplies in the periphery. In such cases complete formula therapy could be reserved for administration or distribution by the health system (as far peripherally as supply permits but especially in

centers set up specifically to treat dehydration), while the remainder of the health system and mothers in their homes could be taught to use the less complete sugar and salt mixture.

Sugar and salt mixtures can be made to contain the various levels of sodium mentioned earlier. Because of potential errors of measurement the amounts of table salt now recommended are in the range to produce approximately 50-70 millimoles of sodium per liter or between ½ to 1 teaspoon of salt per liter. (The appropriate quantity of sucrose to achieve optimal absorption of this amount of sugar would be 30 grams or about 4 heaping teaspoons or 7 level teaspoons.)[32,33] This combination preserves a fairly wide margin of safety to protect against the likelihood of excessive sodium in the fluid. When sugar and salt solutions are used it has been recommended that foods high in potassium (e.g., bananas or green coconut water), when available, be started as soon as feasible along with the oral fluid.[21] Many innovative ideas have been developed to improve the measuring of sugar and salt for home mixtures since considerable variation has been documented when using available spoons and containers in the home.[10,34] These involve special plastic spoons and liter containers delivered to all potential users. An alternative is the marking of containers already present in the home by health workers using a standard measuring device, showing the mother the amount of sugar or salt that is in a "teaspoon" and what a liter of water should be.[27,35] Supplying special spoons and containers has the same logistics problems as supplying prepackaged formula; in addition, they can be misplaced. In either case, careful instruction and repeated reinforcement need to be provided users on a regular basis. Because of variability of measuring devices,

perceptions of need for accuracy, and courseness and water content of the ingredients,[10] all approaches advocating home sugar and salt solutions need to be consciously adapted and standardized to local areas. Evaluations of such programs should include sampling of home prepared solutions to measure their sodium and sugar content.

3. Feeding During Diarrhea

One of the most widespread practices associated with diarrhea is the withholding of food during the episode. This practice is supported by folk beliefs, traditional healers, and modern health practitioners. There is an obvious rationale involved--both empirical as well as quantitative observations document the increase in volume and frequency of stools when individuals with diarrhea are fed. However, one balance study has shown a net positive retention of nutrients when children with diarrhea received food.[36] Weight gain was also better in children who were fed during a diarrhea episode.[37] Other studies have demonstrated that adverse changes in the absorptive capacity of the intestines associated with fasting and diarrhea may be prevented by continued feeding.[22] On the other hand, there is evidence that continued feeding of foods containing lactose, especially cow's milk, may aggravate the diarrhea and induce prolonged lactose intolerance leading to malnutrition.[44]

Since withholding of fluids often goes along with the stopping of feeding, probably the most important benefit of changing feeding practices during diarrhea includes the more ready acceptance of oral fluid therapy. However, there is concern that continued feeding, although nutritionally advisable, may increase net water and electrolyte loss. Although the latter has not been documented, the standard provision of oral fluid therapy as outlined earlier, while continuing feeding in children with diarrhea could protect against such a possible effect. In fact, one study in the Philippines indicated that oral fluid therapy combined with continued

feeding produced short-term and long-term better weight gain than continued feeding practiced without the home use of oral fluids.[38] The results may be due to the protection the oral fluids provide against the possible negative effects of continued feeding (in terms of increased water and electrolyte loss). On the other hand, their use may encourage mothers to give the child food once it is seen that the child improves when taking fluids by mouth. There is general agreement that rehydrating a child, and possibly replacing lost potassium, increases the well being and appetite of the child, thus stimulating increased food intake.

In children with severe dehydration, the overwhelming importance of rapidly restoring water and electrolytes initially outweighs nutritional concerns. In these cases, rehydration usually can be completed within six to eight hours, concentrating on getting the oral fluid into the child.[14,18,22,23] Thereafter, feeding the child should start and continue along with maintenance levels of oral fluids. As mentioned earlier, an additional reason for feeding children (at least selected foods) when using only sugar and table salt solutions is the concern to provide them a source of potassium. In young infants, breast milk, giving of plain water or other low solute liquids are seen by a number of investigators as useful adjuncts along with the provision of the complete oral fluid formula, effectively reducing the overall concentration of sodium in the ingested fluids.[12] With the nutritional consequences of diarrhea becoming more clearly delineated, the consensus currently is to recommend continuing breast feeding in all children with diarrhea who are still on the breast, except in the few cases of severe vomiting or for a few hours

during rapid rehydration of a dehydrated child.[14] In these cases when the child is not put to the breast for a period of time, mothers must be instructed to express their milk to maintain its production. Similar advice is less clear for non-breast fed children. Half strength milk* (not skim milk), if tolerated, and an otherwise normal diet (some would exclude high residue and spicy foods and legumes) have been advised in combination with oral fluid therapy in non-dehydrated children.[14] In dehydrated children these foods need to be withheld only during the time of rapid replacement of lost fluids and then re-introduced carefully.

4. The Use of Antibiotics and Other Medicines

The treatment of diarrhea with antibiotics is indicated only in the case of cholera, shigella dysentery and possibly enterotoxigenic E. coli related disease.[6,8,13,26] The majority of childhood diarrheas are caused by viral or unknown agents and do not respond to antibiotics.[6,17] The drug of choice for cholera is tetracycline and for shigella is ampicillin or trimethoprim/sulfamethoxazole.[39] The widespread use of antibiotics for a large proportion of cases of diarrhea is not only a waste of scarce supplies but has potential hazards in itself. One such example is the frequent use of chloramphenicol, a particularly hazardous antibiotic. One of the important components of the training of physicians in the use of oral fluid therapy is to teach the limited indications for antibiotics and the contrasting over-riding importance of oral fluids as the major treatment intervention.

It has repeatedly been demonstrated that other medications such as kaolin, paragoric mixtures, or "Lomotil" type drugs do not change the

*This recommendation is made primarily to reduce the intake of lactose since there often is decreased lastase (enzyme) activity in the small intestines associated with diarrhea as mentioned earlier.

course of the diarrhea and have basically only symptomatic effects. In infants that are severely ill, dehydrated and in shock, the latter two drugs are quite hazardous since they may depress respiration and worsen the cardio-vascular state of the infant.(7,13) There is, therefore, no place for these agents in the treatment of diarrhea in children under five.

Studies are currently being made using some specific "anti-secretory" drugs, but at present they are experimental.(7,8) The use of vaccines to prevent diarrhea has been limited primarily to cholera where it has only moderate effectiveness.(6) Work on rotavirus vaccines has been considered promising. Recent evidence from Bangladesh indicates that although only about 10 percent of diarrheas in infants may be rotavirus related with even smaller percentages at older ages, nearly 50 percent of children under two years of age coming to a treatment center have rotavirus associated diarrhea, probably indicating its greater severity in this age group.(17,20) The development of an effective rotavirus vaccine, therefore, should make a significant impact on early childhood diarrhea morbidity and mortality.

5. <u>The Use of Boiled Water and Baby Bottles</u>

Concern about the potability of the water for making oral fluids has led to recommendations that water be boiled and cooled before adding the sugar and salt or packaged ingredients. Although non-contaminated water is certainly desirable, if available, the obstacles imposed by having to boil and cool water before its use would severely limit the use of oral fluids in diarrhea if rigidly required. Families have too little

fuel or are seldom willing to take the time to boil water just to prepare the oral fluid. Because of the overriding importance to get water and electrolytes into a sick or dehydrated child, the cleanest water immediately available should be recommended in diarrhea control programs. Boiling is not essential, but can be advised in those situations when it is feasible and mothers are willing to prepare it and cool it in advance of mixing in the sugar and electrolytes. Studies have demonstrated that bacteria multiply rapidly in oral therapy solutions after 24 hours.[39] Since even fluids made with boiled water cannot be kept uncontaminated, the preparation of fresh fluid daily is recommended. Any unused fluid should be discarded after 24 hours.

The use of bottles and nipples for feeding the oral fluid to infants should be strongly discouraged in homes not already using them. For much the same reasons for not boiling water, most homes would not have the time or fuel to keep the bottles clean. In addition, the introduction of bottles into a breast feeding environment has far reaching and serious repercussions. Fortunately, infants can be easily given oral fluids with a "cup and spoon" and older children will drink right from the cup.

6. The Role of Intravenous Therapy

It has been found that between 5 to 20 percent of diarrhea cases that become dehydrated do not respond adequately to oral fluid therapy, at least initially.[23,26] The proportion requiring intravenous fluids at some point in their treatment will depend on the type of diarrhea, the extent of dehydration, the rapidity of water and electrolyte loss through the stools, the presence of glucose intolerance, and whether there is

associated severe vomiting. With only about one percent of all diarrhea episodes progressing to dehydration (21) it can be seen that intravenous therapy is required in about one to two episodes out of a thousand. When planning diarrhea control programs, therefore, as resources permit, the siting of facilities with intravenous capability and supplies and the development of referral patterns can be based on this estimate of need. An important assumption, however, is that maximum effectiveness be achieved with the oral rehydration program in treating dehydration in its earlier stages. Thus, the priority will generally lie with the oral component of the program in situations where resources are limited.

7. Production of Packets, Spoons and Bottles

The use of the complete oral rehydration formula depends on widespread availability of the ingredients. The mechanisms for achieving this range from sophisticated processes producing ingredients packaged in foil which are mixed with a fixed quantity of water, to solutions or packages prepared by local health services. The former offer advantages of standardization and long shelf life, but may be more costly (about $0.05-0.10 per packet), (40) and currently can supply only a fraction of overall need. (For example, worldwide production of UNICEF packets in 1980 will be about 24 million, (41) yet the need for such packets in just one country, Egypt, has been estimated to be as high as 50-60 million annually assuming complete coverage of the population. Production of packets in Egypt is projected to reach only 5 million in 1980.) (33,42) Packets prepared using simple equipment and sealed in plastic bags can often be done at the health center or regional level but still depend on

an adequate supply of ingredients. They may or may not be less expensive than mass manufactured packets, but they do not require much technology, are labor intensive and their quantities can be varied depending on the most common local standard measuring device for water.(11) One example of such local production is the filling of plastic bags with the various ingredients using an old glass syringe as the measuring device. The "complete" formula would consist of measuring 3cc of table salt, 3cc of baking soda, 1.5cc of potassium chloride, and 30cc of glucose (or 60cc sucrose) into a packet which would be diluted with one liter of water when used.(43)

Multiple types of spoons also have been developed for home use when making sugar and salt mixtures. These offer distinct advantages over poorly standardized use of home spoons or the finger "pinch and scoop" methods.(34) However, adequate production and supply of such spoons to every home, their cost and problems of loss and resupply are currently serious obstacles to their wider use. The same can be said for the manufacture and distribution of standard (usually one liter) plastic bottles. Their usefulness is unquestioned, but the associated logistics and costs again are limiting factors. Multiple substitute approaches have been developed with the most common being to have the health workers who teach the mothers how to prepare the solutions measure and mark home utensils indelibly using measuring devices (spoon and bottle) they carry with them as the standard. Care needs to be exercised in developing these approaches so that they are as accurate and replicable as possible under the conditions of the area in which they are being used.

8. Evaluation Criteria

As mentioned earlier, although oral therapy is being extensively spread throughout health care systems, it is important to monitor and evaluate its effectiveness in these large scale situations. Even more important, when innovations, modifications, or less well documented approaches are tried, careful assessment of efficacy and safety as well as cost, acceptance, and ease of application are required. The following measurement parameters should be considered when planning evaluation procedures:

a. Production and consumption of supplies (packets, spoons, bottles);

b. Utilization data--coverage of population, use and amount per episode of diarrhea, proportion of use that is spontaneous, stage at which started, source of supply, etc.;

c. Diarrhea morbidity (incidence and prevalence), percent of cases with dehydration (mild, moderate, severe), case fatality rates, and overall diarrhea mortality by age;

d. Attendance rates at fixed facilities, referral rates to rehydration centers, hospitalizations, need for intravenous fluid;

e. Knowledge about correct use and preparation, actual preparation procedures and amount given;

f. Evaluation of worker knowledge, skills and performance;

g. Measurement of fluid composition (sample check of chemical content);

h. Weight gain (nutrition measures

i. Diet provided, if any;

j. Complications of treatment.

All of these measures cannot be used for routine service evaluations, but selected indicators can be built into ongoing information systems. Depending on resources available for evaluation, priority should usually be given first to input data (supply, consumption, cost) and output data (knowledge and utilization), with outcome data (decrease in cases with dehydration, case fatality rates, and total diarrhea mortality) being measured only if inputs and outputs approach levels at which an impact can be anticipated. In actual practice baseline outcome data will need to be gathered prior to knowing whether inputs or use are adequate. However, in order to conserve resources, evaluation procedures should be flexible enough to permit cancellation of follow-up outcome measures when inputs and utilization are clearly inadequate. If such flexibility is explicitly built into evaluations, administrators might be more willing to fund a larger variety of measures, increasing the value of assessment efforts substantially.

Summary and Conclusions

One of the significant challenges to health services around the world is the need to reduce the high rates of morbidity and mortality associated with diarrhea and dehydration in children. Few interventions offer more promise to rapidly meet this need than well designed oral fluid therapy programs. Although some controversy still persists in relation to oral fluid therapy, there has been enough experience with it's use to yield

a reasonable consensus on which to build recommendations for large scale programs. In the meantime, continuing research should provide information that will guide future modifications. In summary oral fluid therapy programs should include the following:

1. The use of a standard complete mixture, packaged appropriately for the specific requirements of the service area. The final solution should yield 90 millimoles of sodium per liter of fluid. When possible, additional free water can be recommended for infants receiving this mixture.

2. The teaching of families how to prepare and use simple sugar and salt mixtures at home immediately with the onset of diarrhea and continued until a more complete mixture can be obtained, or the diarrhea ceases. The methods for preparation should be clearly standardized for each different area to consistently yield about 60 millimoles of sodium per liter of fluid.

3. Except in cases of dehydration, children, and especially infants on the breast, should continue to be fed throughout the diarrhea episode as they concurrently receive oral fluid therapy. Dehydrated children should be rehydrated rapidly first and then started back on food.

4. There is little place for any other type of treatment for diarrhea in children. Antibiotics should be reserved for cholera and shigella cases. Other medicines such as paragoric may actually be harmful to children with dehydration.

5. Although preferable when available, boiled water for the preparation of oral fluids is not essential.

6. Finally, a multi-tiered system should be organized to treat diarrhea. In this system as much of the prevention and treatment of

dehydration as possible should be done using the complete oral fluid mixture. Intravenous therapy should be saved for severe cases which do not respond to oral therapy.

Simple salt and sugar preparations should be used in the periphery of the system and especially in the home where it may not be possible to cover the population with supplies of the complete mixture. The tiers of the system should include at least four levels.

1. The Home--Sugar and salt mixtures, or when readily available packets of complete mixtures, should be used in each home. Families should know how to prepare these fluids appropriately and how much to give. In this setting oral fluids should be started immediately at the onset of the episode of diarrhea and continued until the child improves. Families should know when to take their children for care to the health system.

2. The Peripheral Health Workers--These workers should be supplied with the more complete mixture which they could give to children brought to them or seen in the home. These workers are essential for teaching families how to use oral fluids and for continually monitoring its appropriate use. They also need to know how to prepare and use sugar and salt mixtures in cases when supplies of the complete mixture are not available or are temporarily interrupted.

3. The Peripheral Fixed Facility or Rehydration Center--These facilities need to be equipped to at least handle most cases of dehydration, relying primarily on the use of complete oral fluids, but having the capability to insert naso-gastric tubes to provide fluids for children too weak to drink, or to give intravenous fluids. These centers should also be able to reinforce the teaching capabilities of peripheral workers.

4. Referral Centers or Hospitals--Adequate back-up to the other levels is needed for the more serious cases that do not respond to the various treatments available in the periphery. Oral fluids can still be used at this level, and should be to save on costs. However, intravenous therapy will probably be used in a greater proportion of cases at this level. An important function of the referral or regional center will be the overall supervision and monitoring of the performance of the other levels including the assurance of a smooth flow of supplies. In order to make the whole system work, flexibility will need to be built in permitting the use of different approaches depending upon the availability of supplies and the ability of staff to maintain the necessary knowledge and skills in the system and in the homes.

None of the approaches can be dropped into place and then be expected to continue to be effective without repeated reinforcement. At best, oral fluid therapy should be an integral part of a primary care program with continued support for its appropriate use coming from ongoing home and clinic contacts and repeated inservice training of health workers.

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COST AND COMPARATIVE COSTS FOR ORT PROGRAMS

Table 1. Costs and Cost-Effectiveness of ~~Past and Projected~~ Programs for Control of Diarrheal Disease Using Oral Rehydration Therapy

Country, Year, Source	Approach	Number of Children in Population Analyzed	Cost per Child Covered: Originally Reported, Current $ — Supplies	Cost per Child Covered: Originally Reported, Current $ — Total	Cost per Child Covered: Adjusted, 1985 Dollars[a] — Supplies	Cost per Child Covered: Adjusted, 1985 Dollars[a] — Total	Deaths Averted per 1000 Children	Cost per Death Averted ($)
Bangladesh, 1981[b]	Home mixture	134,000	.08	.48	.12	.70	n.a.	n.a
Honduras, 1981[c]	mass media, packets	110,000	n.a.	1.23	n.a.	1.80	120	$150
Indonesia, 1982[d]	Community workers, packets	1,337	1.31	1.81	1.75	2.41	n.a.	n a.
Egypt, 1980[e]	Oralyte, home distrib.	6,875	.48	.83	1.01	4.19	77	544
"	Salt and sugar, home prepared	7,023	.05	.87	.07	3.64	83	439
"	Salt and sugar, home distrib.	2461	.48	.91	.77	4.57	69	662
Zaire, 1982[f,g]	Packets thru facilities	National	.68	1.20	.90	1.60	50	320
Costa Rica, 1977[f,h]	Packets thru clinics	250,000	.70	.93	1.36	1.82	na	n a
Unspecified, 1981[f,i]	Fixed centers, packets	66,825	.20	2.74	.29	4.01	66	608
"	Outreach, packets	133,650	.18	2.06	.27	3.02	61	495
"	Mobile, packets	178,200	.18	2.78	.27	4.07	61	667
Ghana			.28	.51	.34	.62		
Central African Rep.	"				.30	.96		
Rwanda, 1984[f,j]	Peripheral facilities, packets	318,000	.41	(.98)[k]	.45	(1.08)[k]	n.a	n a
Malawi, 1984[f,j]	"	520,000	.49	(.94)[k]	.54	(1.03)[k]	n.a	n.a.
Average			—	—	.60	2.89	65	445

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Ghana, 1983[fj]	Packets, health facilities	690,000	.28	.51	.34	.62[K]	n.a.	n.a.
Cent. Afr. Rep. 1983[fj]	"	250,000	.25	.79	.30	.96[K]	"	"
Malawi, 1984[fj]	"	520,000	.49	.94	.54	1.03[K]	"	"
Congo, 1983[fj]	"	254,000	.20	.88	.24	1.06[K]	"	"
Rwanda, 1984[fj]	"	318,000	.41	.98	.45	1.08[K]	"	"
Lesotho, 1983[fj]	"	155,000	.39	1.17	.47	1.42[K]	"	"
Liberia, 1983[fj]	"	133,000	.26	1.37	.31	1.66[K]	"	"
Swaziland, 1983[fj]	"	105,000	.44	1.90	.53	2.30[K]	"	"
AVERAGE	—	—	—	—	.5$ (c	2.89	65	$445

ORT - TECHNICAL CAVEATS - LIMITATIONS OF TECHNOLOGY

ORAL REHYDRATION THERAPY: TECHNICAL CAVEATS

Oral Rehydration Therapy (ORT) is a simple, inexpensive health technology which is extremely effective in treating acute cases of diarrhea.

Little is known about the long-term effects of repeated/chronic use of the salts.

- ORT does not prevent diarrhea; it is a treatment for the dehydration that accompanies diarrhea;

- some portion of LDC populations has a high predisposition to diarrhea-related dehydration. This is probably associated with general levels of undernutrition as well as constant exposure to infection and disease;

- As a result, some portion of the population is likely to require repeated treatments with oral rehydration salts.

- Some research must be directed at the question of the etiology of chronic diarrhea. (NB: The new program with the Children's Hospital of Buffalo will concentrate on treatment of chronic childhood diarrheal disease with acute severe episodes of dehydration.)

Diarrhea is often a symptom of other diseases; ORT treats the symptom, but does not treat the underlying disease.

- in perhaps 40 percent of measles cases, diarrhea is an accompanying symptom;

- in perhaps 50 percent of malaria cases in Africa, diarrhea is present.

- Because diarrhea may mask other diseases, it is important that temperatures of patients are monitored following an oral rehydration treatment. If fever is present, other diseases (malaria, measles, pneumonia, etc.) must be considered and after diagnosis appropriate treatment administered.

- the danger in misdiagnosing the cause of the diarrhea--in addition to the obvious danger of disability or death from improper treatment--is that mothers who have been taught that ORT cures diarrhea will become discouraged when the symptoms recur, and will no longer seek treatment.

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IMMUNIZATIONS

BRIEFING BOOKLET ON IMMUNIZATION

BRIEFING BOOKLET ON IMMUNIZATION

PREPARED FOR M. PETER MCPHERSON
ADMINSTRATOR

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

FEBRUARY 1984

MORTALITY FROM DISEASES PREVENTABLE BY IMMUNIZATION

THE WORLD HEALTH ORGANIZATION ESTIMATES THAT 5 MILLION INFANTS AND CHILDREN DIE EACH YEAR OF DISEASES PREVENTABLE BY IMMUNIZATION. OF THE 100 MILLION CHILDREN BORN EACH YEAR IN THE DEVELOPING WORLD 80 MILLION ARE NOT CURRENTLY PROTECTED WITH IMMUNIZATION. AMONG UNPROTECTED INFANTS AND CHILDREN:

3 OF EVERY 100 CHILDREN WILL DIE OF MEASLES AND ITS COMPLICATIONS	2.4 MILLION DEATHS
2 OF EVERY 100 CHILDREN BORN WILL DIE OF PERTUSSIS	1.6 MILLION DEATHS
1 OF EVERY 100 CHILDREN BORN WILL DIE OF NEONATAL TETANUS	0.8 MILLION DEATHS
1/2 OF EVERY 100 CHILDREN BORN WILL BE PARALYZED WITH POLIOMYELITIS	0.4 MILLION PARALYZED CHILDREN

FACTS ON KEY DISEASES

SLES

ECTION AT 6-59 MONTHS
SEVERE AT 6-35 MONTHS
FATALITY 2-10%
LICATIONS:
INDNESS
IARRHEA
NDERNUTRITION
ECONDARY INFECTIONS
PNEUMONIA
DIARRHEA
TB MENINGITIS

PERTUSSIS

INFECTION AT 2-35 MONTHS
MOST SEVERE AT 2-11 MONTHS
CASE FATALITY 2%
COMPLICATIONS:
VOMITING
LOSS OF APPETITE
UNDERNUTRITION

NEONATAL TETANUS

INFECTION IN FIRST FEW DAYS OF LIFE
DEATH WITHIN 3 WEEKS
CASE FATALITY 80%

POLIOMYELITIS

INFECTION AT 2-35 MONTHS
ALL CHILDREN INFECTED
1/100 DEVELOP PARALYSIS
10% DIE
20% RECOVER
70% LEFT WITH PARALYSIS

EFFECTIVE MEASURES EXIST FOR THE PREVENTION OF THE SIX IMMUNIZABLE DISEASES

DISEASE	TARGET FOR IMMUNIZATION	SCHEDULE	EFFECTIVENESS
NEONATAL TETANUS	PREGNANT AND FERTILE AGED WOMEN	TWO DOSES OF TETANUS TOXOID 4 WEEKS APART	99%
CHILDHOOD TUBERCULOSIS	NEWBORNS	BCG AT FIRST CONTACT WITH HEALTH SYSTEM	?
PERTUSSIS	INFANTS 2 - 14 MONTHS	INJECTIONS AT 6, 10, AND 14 WEEKS (3 DOSES)	75%
- DIPHTHERIA			95%
- TETANUS			95%
- POLIOMYELITIS		ORAL VACCINE AT 6, 10, AND 14 WEEKS (3 DOSES)	85%
- MEASLES	INFANT 9-11 MONTHS	ONE INJECTION AT 9 MONTHS	90%

ADVANTAGES OF IMMUNIZATION APPROACH TO IMPROVING CHILD HEALTH

1. PREVENTION THROUGH IMMUNIZATION REQUIRES LIMITED CONTACT (1-3 VISITS) BETWEEN AT-RISK PERSON AND HEALTH SYSTEM.

2. IMMUNIZATION IS EFFECTIVE IN ADVANCE OF EXPOSURE.

3. IMMUNIZATION IS HIGHLY EFFECTIVE (70-99%) IN REDUCING MORBIDITY AND MORTALITY.

4. IMMUNIZATION IS COST EFFECTIVE.

DISEASE	COST PER CASES PREVENTED *	COST PER DEATHS PREVENTED *
NEONATAL TETANUS	$ 221.01	$ 276.02
CHILDHOOD TUBERCULOSIS	?	?
PERTUSSIS	1.09	98.96
DIPHTHERIA	65.49	87.32
TETANUS	?	?
POLIOMYELITIS	655.54	6555.40
MEASLES	2.39	49.78

*DATA ON COST EFFECTIVENESS OF IMMUNIZATION IN THE GAMBIA BY ROBERTSON, R.L., WILLIAMS, P.J., HULL, H.F., AND FOSTER, S.O. (IN PREPARATION)

CONSTRAINTS IN VACCINE DELIVERY

1. IMMUNIZATION REQUIRES DIRECT FACE TO FACE CONTACT BETWEEN HEALTH SYSTEM AND PERSONS AT RISK.

2. PUBLIC DOES NOT ALWAYS RECOGNIZE IMPORTANCE OF OR RATIONALE FOR IMMUNIZATION.

3. MOST VACCINES ARE HEAT-LABILE AND REQUIRE DEVELOPMENT AND MAINTENANCE OF A COLD CHAIN.

4. SHORTAGE OF FUELS (PETROL FOR VEHICLES AND KEROSENE FOR REFRIGERATORS) LIMIT ABILITY TO DISTRIBUTE AND STORE VACCINE.

5. REGULAR RELIABLE TRANSPORTATION IS REQUIRED FOR VACCINE DISTRIBUTION AND SUPERVISION.

6. CONDITIONS OF EMPLOYMENT OF HEALTH STAFF ARE NOT ALWAYS ADEQUATE TO ATTRACT STAFF, MAINTAIN INTEREST, AND PROVIDE MOTIVATION.

CURRENT STATUS IMMUNIZATION

Estimated percentage of children immunized in the first year of life and percentage of pregnant women immunized against tetanus, by WHO Region, based on latest information available as of 30 June 1983

Region	Percentage of population covered by reports	Percentage of children immunized by 12 months of age				Percentage of pregnant women immunized
		BCG	DPT III	Polio III	Measles	Tetanus II
Africa	44%	31%	19%	17%	27%	18%
Americas	56%	39%	35%	36%	57%	7%
South-East Asia	98%	22%	25%	10%	1%	20%
Europe	85%	77%	76%	81%	74%	
Eastern Mediterranean	99%	22%	24%	28%	22%	4%
Western Pacific	19%	74%	61%	70%	15%	

1. SOURCE: WHO REPORT TO OCTOBER 1983 EPI GLOBAL ADVISORY GROUP
2. PERCENTAGES REFER TO POPULATION FOR WHICH DATA ARE AVAILABLE. AREA-WIDE FIGURES, CURRENTLY UNAVAILABLE, WOULD BE LOWER.

RESOURCE NEEDS FOR EFFECTIVE IMMUNIZATION

ESSENTIAL COMPONENTS OF EFFECTIVE IMMUNIZATION	LOCI FOR SHARED RESPONSIBILITY	
	DEVELOPING COUNTRIES	DONOR COMMUNITY
Political Commitment	X	X
Assessment & Planning	X	X
Training	X	X
Vaccines		X
Refrigerators		X
Supplies (Syringes & Needles)		X
Manpower	X	
Field Operations	X	X
Technical Cooperation		X
Supervision	X	
Monitoring & Evaluation	X	X
Research.....Basic .....Operational	X	X

AID'S IMMUNIZATION DATA BASE

TECHNICAL BACKGROUND PAPERS/STRATEGY PAPER ON IMMUNIZATION

(Distributed to participants by Ken Warren)

Estimated Indirect Costs Associated with Differences in Person-Years Lived by Children, (Selected Ages and Countries, 1985 to 2000) Assuming Fixed Fertility and Various Trends in Mortality During the Period.

(in million US dollars)

Types of Indirect Costs	Estimated Indirect Costs				
	Constant Mortality vs. 50% Mortality Decline	Constant Mortality vs. U.N. Medium Variant Mortality Decline	Constant Mortality vs. 50% Decline Over U.N. Medium Variant Mortality	U.N. Medium Variant vs. 50% Mortality Decline	U.N. Medium Variant vs. 50% Decline Over U.N. Medium Variant Mortality
Health	$617	$286	$759	$336	$484
Education	$283	$155	$360	$127	$207
Food	$13,361	$6,676	$16,679	$6,743	$10,192
Total	$14,260	$7,117	$17,798	$7,206	$10,883

Notes:

(1) Selected Countries: India, Pakistan, Bangladesh, Indonesia, Nigeria, Mexico, Ethiopia, Zaire, Philippines and Brazil.

(2) Indirect costs computed on the basis of the following person-year cost estimates:
Health (population 0-4) ..... U.S. $8.00 per person per year.
Education (population 5-14)... U.S. $5.00 per person per year.
Food (population 0-14)....U.S. $100 per person per year.

Dr. Foege's paper cites direct immunization program costs in the billions. What may be less well appreciated is the order of magnitude of indirect costs (health, education, food) that are associated with the additional person-years lived as a result of the reductions in mortality. Similar costs would of course accrue from the same reductions in mortality through ORT, as opposed to immunization (although direct program costs would probably be less). The point though, is that the total bill is massive. And that means either additional resource generation or diversion of existing resources from other sectors -- and that argues for the critical need to look at relative costs and benefits, and complementarities, as you decide on health interventions to be put in place in particular settings.

(=$11 billion, conservatively)

**Estimated Person-Years Lived by Children,
(Selected Ages and Countries, 1985 to 2000)
Assuming Fixed Fertility and Various Trends
in Mortality.**

(in thousands)

Childhood Age Groups	Person Years Lived Under Various Mortality Assumptions			
	Constant 1985 Level Mortality	50% Decline in Mortality 1985-2000	U.N. Medium Variant Mortality Decline	50% Decline Over U.N. Medium Variant Mortality Decline
0-4	3,622,280	3,701,758	3,659,798	3,720,350
5-9	3,336,140	3,379,956	3,360,329	3,391,952
10-14	3,106,389	3,121,173	3,115,237	3,124,977
0-14	10,064,809	10,202,787	10,135,364	10,237,279

Notes:
(1) Selected Countries: India, Pakistan, Bangladesh. Indonesia, Nigeria, Mexico, Ethiopia, Zaire, Philippines and Brazil.
(2) Fertility levels as projected for 1985-2000 in U.N. Medium Variant Projections.

Source: Information prepared by staff of the Demographic Data for Development Project, Westinghouse. Estimates based on data in ESDS files for health, education and food costs. Methodology supplied on request.

Estimated Differences in Person-Years Lived by Children,
(Selected Ages and Countries, 1985 to 2000)
Assuming Fixed Fertility and Various Trends
in Mortality.

(in thousands)

Differences in Person Years Lived Under Various Mortality Assumptions

Childhood Age Groups	Constant Mortality vs. 50% Mortality Decline	Constant Mortality vs. U.N. Medium Variant Mortality Decline	Constant Mortality vs. 50% Decline Over U.N. Medium Variant Mortality	U.N. Medium Variant vs. 50% Mortality Decline	U.N. Medium Variant vs. 50% Decline Over U.N. Medium Variant Mortality
0-4	77,082	35,774	94,845	41,960	60,552
5-9	42,742	23,134	54,359	19,528	31,625
10-14	13,783	7,846	17,588	5,939	9,744
0-14	133,607	66,754	166,792	67,427	101,921

Notes:
(1) Selected Countries: India, Pakistan, Bangladesh, Indonesia, Nigeria, Mexico, Ethiopia, Zaire, Philippines and Brazil.
(2) Fertility levels as projected for 1985-2000 in U.N. Medium Variant Projections.

S&T/H/CD COMMENTS ON IMMUNIZATION/MALARIA PAPERS

February 27, 1984

MEMORANDUM

TO: S&T/HP, Franz Herder

FROM: PPC/PDPR/EP, Maureen Lewis

SUBJECT: Comments on "Protecting the World's Children: Strategies for attaining the Goal"

In response to your request, I have reviewed the subject paper and have summarized my reactions to it here. I think it is worth further discussion, however.

The paper prepared for the March 1984 Bellagio Conference by W.F. Foege makes a case for establishing a broad program for establishing and expanding worldwide immunization networks to reduce childhood morbidity and mortality. While both a noble goal and highly needed, the practical issues pose serious impediments.

There is no question that existing technologies are not being applied to alleviate pain and suffering, but is is unclear from the paper ,or for that matter other evidence, that the answer is immunizations. There is no clear cut case that immunizations are the best, cheapest or most efficient place to start. On economic grounds it can be argued that immunizations are a logical investment because they are public or merit goods -- they affect the society as much or more than the individual. On epidemiological grounds they are a proven means of saving lives. However the costs are high in developing countries, which siphons off resources from other worthy investments.

The proposed plan is flawed in a number of respects, including: (1) the cost effectiveness of immunizations hinges on the ability to piggyback existing PHC networks; (2) the management and absorbtive capacity is already reached in most LDCs, particularly those in greatest need of immunization programs; (3) the estimated costs are unrealistically low; (4) the fundamental problems are not addressed by the proposed program; and (5) the long term viability of the programs is not considered. Each of these is discussed here.

1. The success of WHO's smallpox eradication program was an aberration, as it was a disease that lent itself to swarming teams of innoculators. Few other diseases can be addressed as readily and many of them leave no extermal marks but require

more than one vaccination to be effective. Existing studies indicate that vertical immunization programs are costly undertakings because of the cold chain requirements and the need to locate population settlements on a somewhat random basis.

Building on a PHC system is critical in ensuring both effectiveness of delivery and reasonable costs; however the approach raises the overall cost to the government while lowering the per immunization costs of the immunization effort. It also should be kept in mind that PHC programs are least effective and most geographically restricted in the poorest countries where the mortaltiy among infants and childldren is highest and the immunization campaign most appropriate.

In addition to the lack of PHC systems, the costs associated with establishing such networks are exceedingly high both in terms of investment and recurrent costs. As LDC government budgets shrink, less will be allocated to health, suggesting that additional commitments and/or planned PHC expansion may have to be curtailed. Moreover, for every dollar invested in PHC, something else will have to be given up; this fact applies to immunizations as well. What health investments are of lesser importance that can be terminated so that human and financial resources can be allocated to establishing/strengthening PHC and building immunization system?

2. Currently there are immunization efforts underway in every developing country under various auspices. It is unclear whether the managers, administrators and service delivery mechanisms can absorb any additional resources. It has been difficult to introduce fiscal discipline and minimal management in existing systems. Expanding these or establishing new vehicles may strain ministries further, reducing the overall effectiveness of donor and LDC government investments. In Africa, for instance, little additional funds can be absorbed without additional management and delivery resources and expertise. And, again, it is in Africa where the needs are greatest.

3. The cost estimates provided are exceedingly low due to a number of factors, some indicated and some not. The underestimates are due to the following:

- costs are based on controlled trials where technical assistance minimizes wastage and procedures are undertaken with particular care. Moreover, in most cases technical advisors implement the trial and the salaries of their replacements are ignored; salaries constitute anywhere between 50 and 80 percent of total costs;

- costs of reaching and immunizing children and pregnant women do not decrease as a program develops since more remote and more costly populations are reached as the program matures; economies of scale (where the per capita cost falls as the scale of the program grows) are therefore unlikely;

- the most costly and intractable problem facing ministries of health is the establishment of a viable PHC networks. To be operational, the proposed immunization effort would have to build on that existing structure. The investment and recurrent costs of PHC systems are astronomical and suggest a high opportunity cost for any country;

- costs vary by the terrain, infrastructure, population density and competency of immunization teams. The reported cost ranges are based on relatively more accessible, and therefore less expensive areas, assume no wastage in storage or delivery and therefore severely underestimate actual costs;

- the wastage of vaccines in transport to the country, storage in-country, and distribution within country is also exceedingly costly and an area where simple logistics and management skills need to be developed and firmly established before an all out immunization effort can be undertaken with any justification.

4. As already mentioned, the fundamental issues of an oeprational PHC system are not addressed by the paper. Although there is some indication that a PHC network is desirable, there is also reference to the fact that the immunization program will help to establish a PHC system. Before launching a program to immunize all children, some basic management, training and technical problems need to be resolved within the PHC systems including: importing, storing and distributing vaccines; establishing an operational cold chain; training and hiring competent personnel to handle the storage, distribution and innoculation of the vaccines; and, allocating

sufficient resources to sustain the program. These investments must precede the immunization program proposed and it is unlikely that such infrastructure will be available in the short run.

The proposed system would respond to well defined and argued country plans, further biasing the effort toward further the well-staffed, better off countries who have the technical expertise and existing PHC capacity to absorb and apply the resources. Because this is a second stage issue, it is not useful to dwell on it, but it is worth noting.

5. Because even the estimated costs are high, some means of financing the program needs careful consideration before the significant investments suggested are made. The opportunity cost to the government in terms of financial and human resources, the alternatives for recovering some costs (this is difficult where little or no demand exists for immunizations and/or shots are seen as a curative measure unnecessary for a health individual), and the cost of gearing up for a program that only lasts a short time with minimal expectations for future external resources to continue the program, together suggest that continued financing will be difficult to obtain and sustain, on both political and economic grounds. Needless to say, the PHC costs will not be borne by donors either.

These are all difficult issues that cannot be ignored if donors are to encourage the health investments suggested in the Foege paper. Indeed, discussion of an expanded immunization effort only makes sense if the issues raised can be realistically assessed/resolved beforehand. The paper obviously does not attempt this.

It is unclear whether the proposed investment would have any long term impact on host country institutions or even build a capacity to efficiently deliver immunizations. Based on the proposals in the paper, the most rational proposals were those suggesting investments in improved cold chain methods and materials, and development of more stable and appropriate vaccines. In the long run they probably would have the highest payoffs, and they are far more amenable to short term infusions of funds.

February 27, 1984

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TO: S&T/HP, Franz Herder

FROM: PPC/PDPR/EP, Maureen Lewis

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- costs are based on controlled trials where technical assistance minimizes wastage and procedures are undertaken with particular care. Moreover, in most cases technical advisors implement the trial and the salaries of their replacements are ignored; salaries constitute anywhere between 50 and 80 percent of total costs;

- costs of reaching and immunizing children and pregnant women do not decrease as a program develops since more remote and more costly populations are reached as the program matures; economies of scale (where the per capita cost falls as the scale of the program grows) are therefore unlikely;

- the most costly and intractable problem facing ministries of health is the establishment of a viable PHC networks. To be operational, the proposed immunization effort would have to build on that existing structure. The investment and recurrent costs of PHC systems are astronomical and suggest a high opportunity cost for any country;

- costs vary by the terrain, infrastructure, population density and competency of immunization teams. The reported cost ranges are based on relatively more accessible, and therefore less expensive areas, assume no wastage in storage or delivery and therefore severely underestimate actual costs;

- the wastage of vaccines in transport to the country, storage in-country, and distribution within country is also exceedingly costly and an area where simple logistics and management skills need to be developed and firmly established before an all out immunization effort can be undertaken with any justification.

4. As already mentioned, the fundamental issues of an oeprational PHC system are not addressed by the paper. Although there is some indication that a PHC network is desirable, there is also reference to the fact that the immunization program will help to establish a PHC system. Before launching a program to immunize all children, some basic management, training and technical problems need to be resolved within the PHC systems including: importing, storing and distributing vaccines; establishing an operational cold chain; training and hiring competent personnel to handle the storage, distribution and innoculation of the vaccines; and, allocating

sufficient resources to sustain the program. These investments must precede the immunization program proposed and it is unlikely that such infrastructure will be available in the short run.

The proposed system would respond to well defined and argued country plans, further biasing the effort toward further the well-staffed, better off countries who have the technical expertise and existing PHC capacity to absorb and apply the resources. Because this is a second stage issue, it is not useful to dwell on it, but it is worth noting.

5. Because even the estimated costs are high, some means of financing the program needs careful consideration before the significant investments suggested are made. The opportunity cost to the government in terms of financial and human resources, the alternatives for recovering some costs (this is difficult where little or no demand exists for immunizations and/or shots are seen as a curative measure unnecessary for a health individual), and the cost of gearing up for a program that only lasts a short time with minimal expectations for future external resources to continue the program, together suggest that continued financing will be difficult to obtain and sustain, on both political and economic grounds. Needless to say, the PHC costs will not be borne by donors either.

These are all difficult issues that cannot be ignored if donors are to encourage the health investments suggested in the Foege paper. Indeed, discussion of an expanded immunization effort only makes sense if the issues raised can be realistically assessed/resolved beforehand. The paper obviously does not attempt this.

It is unclear whether the proposed investment would have any long term impact on host country institutions or even build a capacity to efficiently deliver immunizations. Based on the proposals in the paper, the most rational proposals were those suggesting investments in improved cold chain methods and materials, and development of more stable and appropriate vaccines. In the long run they probably would have the highest payoffs, and they are far more amenable to short term infusions of funds.

FAMILY PLANNING

POPULATION PROGRAM - OVERVIEW

OVERVIEW
Population Assistance Program

The objective of the A.I.D. population assistance program is twofold: 1) to enhance the freedom of individuals in LDCs to voluntarily choose the number and spacing of their children; and 2) to encourage population growth consistent with the growth of economic resources and productivity. A.I.D. support for family planning service programs is based on two fundamental principles: voluntarism and informed choice.

We give preference in funding to programs which provide a wide range of choices in family planning methods, excluding abortion. The largest share of U.S. population assistance has been directed to countries where there is:

- a strong commitment by the host government;
- an infrastructure with the capacity to deliver services throughout the country; and
- social and cultural acceptance of the concept of family planning.

Countries with these three conditions, notably in Asia, have experienced declines in birth rates and have also increasingly accepted greater responsibility for funding their own programs, often shifting from all grant funds to a combination of loan and grant funds. Some countries, e.g., Indonesia and Thailand, are now assuming full or major responsibility for financing contraceptive supplies.

The major priority emphases of the Agency include: 1) an expanded role for government-to-government discussions on country policies; 2) more direct involvement of the private sector in development efforts; 3) institutional development and strengthening; and 4) technology development and transfer.

Voluntary family planning service delivery and related supplies form the heart of the program and consistently absorb the greatest proportion of population funds. Accompanying the provision of services is dissemination of information and education on family planning and population, both for individual users and government policy makers; and analysis of the impact of rapid population growth on other development sectors, such as food, health and energy. A.I.D. has maintained an increased level of support for biomedical research on the development of promising new contraceptives, improvement of existing methods, and research on the safety and effectiveness of contraceptives under actual conditions in developing countries.

Almost half of the A.I.D. population account is allocated directly to regional and national population programs. Although these funds are allocated bilaterally or through regional projects, a significant share goes to support the work of non-governmental agencies.

Attached is a summary table of the population assistance program for fiscal years 1980 through 1985.

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Bilateral/Regional (Total)	60,177	61,166	88,039	92,616	98,600	119,602
Africa	3,041	4,502	7,342	11,714	15,642	14,342
Asia	45,262	44,281	68,139	65,000	57,345	73,100
LAC	7,339	8,021	10,812	14,202	18,488	26,260
N.E.	4,535	4,362	1,746	1,700	7,125	5,900
Central (Total)	92,799	93,739	89,251	88,501	108,500	104,400
S&T Bureau	92,403	93,319	88,853	88,221	108,275	100,100
PPC Bureau	396	420	398	280	125	300
PE Bureau	-	-	-	-	-	4,000
Multilateral (Total)	32,000	35,000	33,760	33,760	38,000	26,000
UNFPA	32,000	35,000	33,760	33,760	38,000	26,000

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POPULATION PROGRAM - KEY PROGRAM ELEMENTS

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A.I.D.'S POPULATION ASSISTANCE PROGRAM - ELEMENTS

Since 1966 the United States, through A.I.D., has provided population assistance to developing countries. The achievements over the last two decades confirm the soundness of A.I.D.'s basic strategy, which is to provide individual couples with the information and means to freely and voluntarily decide their desired family size.

A.I.D.'s population assistance program has a well-balanced portfolio of projects in six major areas. In all instances, the program is based on the principle of voluntarism and the receptivity of the host country's people and government. The program is a dynamic one which is responsive to the changing needs of the developing world and to the development of new technologies.

- Policy - Provision of information to host government leaders to enable them to understand the impact of population growth on the development of their countries. A major success in this area is the Resources for Awareness of Population Impact on Development (RAPID) project which uses specially designed computer technology in presentations to high government officials.

- Research - Contraceptive research develops the most effective, safe and culturally acceptable means of fertility regulation for use in LDCs, including natural family planning. Operations research focuses on the cost-effectiveness of family planning and health delivery systems.

- Services - More than other parts of the Office's program, service projects support the private sector in both the U.S. and the developing world. Through these programs, A.I.D. purchases high quality, U.S.-manufactured family planning commodities and uses private organizations to transfer resources and know-how to developing world counterparts. The Contraceptive Social Marketing project utilizes commercial infrastructures in the developing world for the delivery of family planning information and services.

- Information - Activities emphasize technical assistance to develop information and educational programs designed to make populations aware of the range of family planning services available and to give them the information requisite for informed decisions about fertility and use of family planning.

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POPULATION - SOCIAL MARKETING

SOCIAL MARKETING IN FAMILY PLANNING PROGRAMS

Social marketing projects are a combination of public health/social action programs and commercial distribution/marketing systems. The primary goal of social marketing programs is to create a mass market for a product sold at the lowest possible price.

While the concept of contraceptive social marketing may seem simple, its implementation is complex. These programs have not been easy to start or to maintain. Yet over half of all programs started continue to operate successfully. And they have proven to be more effective and cost efficient than other methods of contraceptive delivery.

Social marketing projects in family planning promote, distribute and sell a contraceptive product through existing sales outlets at a subsidized price to achieve the social goal of expanding contraceptive use.

Experience in more than twenty countries indicates that social marketing can be an effective method of delivering contraceptives. This approach utilizes existing indigenous distribution systems, thereby reducing program costs and helping to assure project continuation once reasonable sales levels have been attained. The small income which accrues to the country programs can be used to defray advertising, packaging and management costs.

- In Bangladesh, social marketing programs now provide more than 50 percent of all oral contraceptives and condoms being used at a cost to the consumer of less than one percent of average annual per capita income. Total sales to date comprise sufficient contraceptives to protect over one million couples per year, at a program cost of about $6.39 per couple per year, including contraceptives.

- In Mexico, more than 11,000 retail outlets are carrying the subsidized, low-priced contraceptives.

- In Egypt, A.I.D. assists a social marketing project which started in Cairo and expanded to other areas of Egypt.

- In Nepal, after seven years of resident assistance, the social marketing program is now managed by a private firm. The program currently sells 43% of Nepal's condoms and 16% of the country's pills. In addition, they have begun sales of oral rehydration salts which are packaged in attractive foil to catch the consumer's eye. The packages sell for 7¢ US.

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FAMILY PLANNING AND HEALTH STATUS

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THE IMPACT OF FAMILY PLANNING ON THE HEALTH OF WOMEN AND CHILDREN

Among the most robust relationships in the public health literature are those between the timing and number of births in a family and the health of the mother and children. In brief, numerous studies, spanning continents and decades, have consistently shown the following:

INFANT HEALTH

Birth Interval: When the interval between births is short (less than two years) both the younger and the older sibling are more likely than other children to die before their 5th birthday.

Birth Order: Children of high birth order (fourth or later) are much more likely than other children to die in infancy. If they survive, such children have poorer intellectual development, on average, than do low birth order children.

Maternal Age: Children born to women at the extremes of their reproductive years (younger than 20 or older than 35) are less likely to survive infancy than are children born to women in their 20s or early 30s.

MATERNAL HEALTH

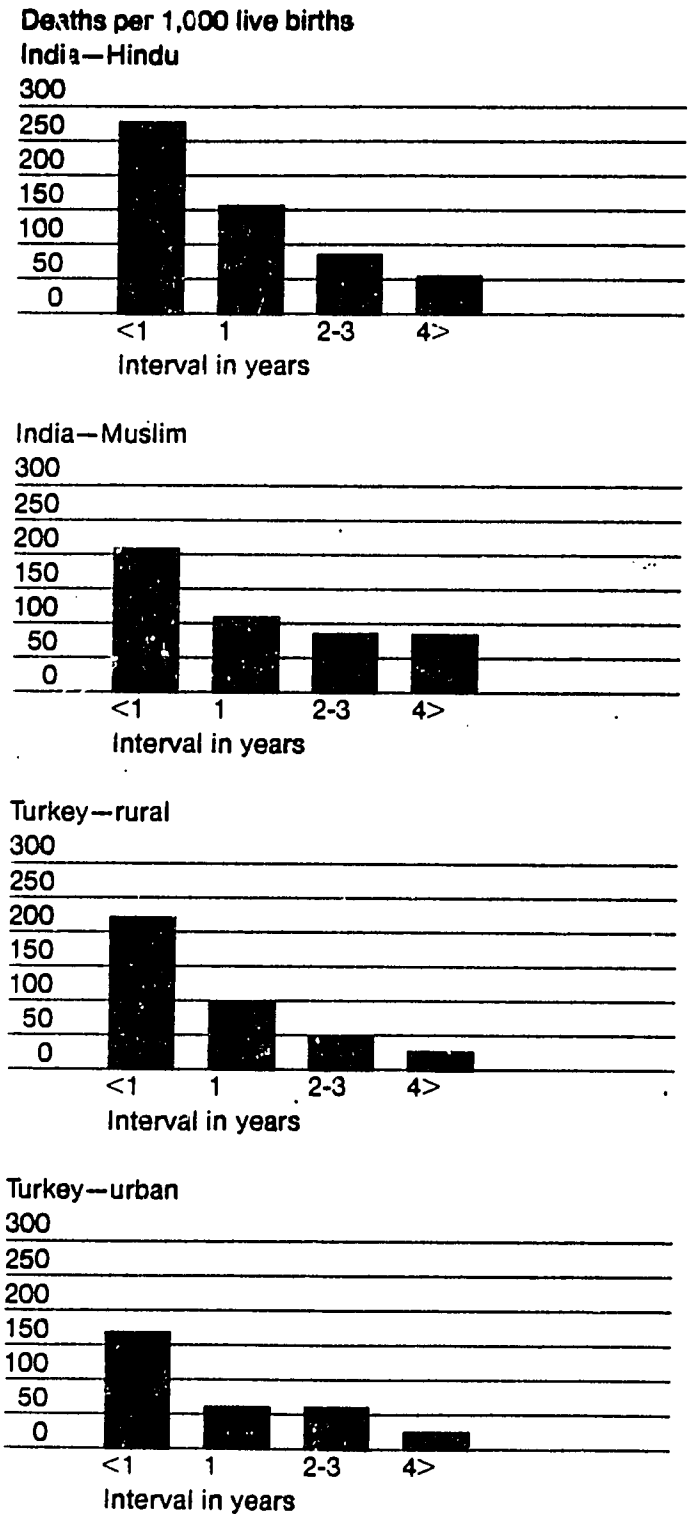
Family Size: Women who already have three or more children are more likely to die during pregnancy or delivery than are women with fewer children.

Maternal Age: Mortality rates are also increased among women who give birth before they are 20 or after they are 30.

Poor women are more likely than wealthy women to have closely-spaced births, large families and births at unfavorable ages. Poor children are especially likely to die during infancy or childhood, and their mothers are at high risk of complications of pregnancy and delivery. Consequently, confounding of cause and effect must be considered. Careful examination has shown that the findings listed above do not simply reflect the effects of socioeconomic status. For example:

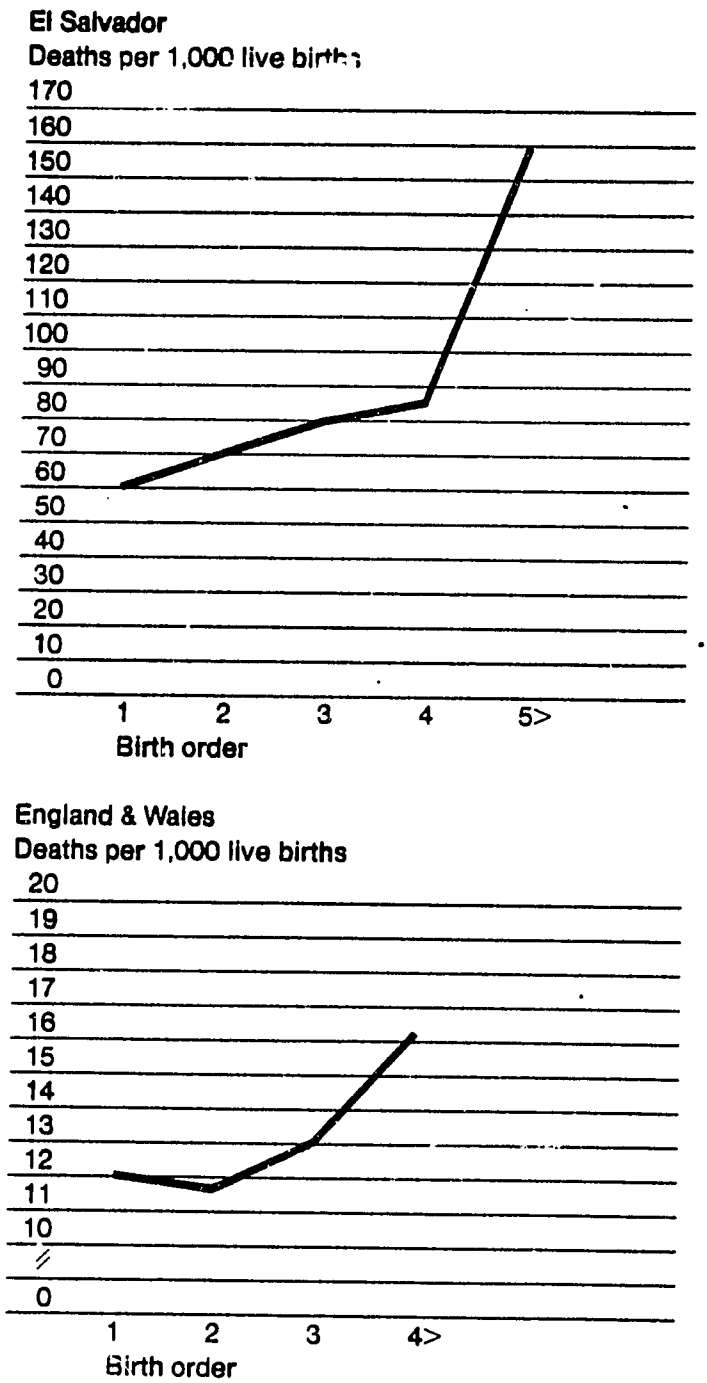
- o In Britain the relationships of birth order and maternal age to infant mortality have not only persisted over decades when the infant mortality rate has dropped sharply, but hold true within social classes.
- o More recently, data from the World Fertility Survey have shown that short birth intervals are associated with increases in infant mortality (usually of 50-100 %) in all 26 countries studied. Most importantly, this finding did not disappear when maternal education (a common measure of socioeconomic status) was taken into account. In addition, the WFS showed that at least 15% of all births followed a short interval in all 26 countries studied -- in most at least 30% of births followed short intervals.

Infant deaths, by number of years between births, India and Turkey, 1971-1975



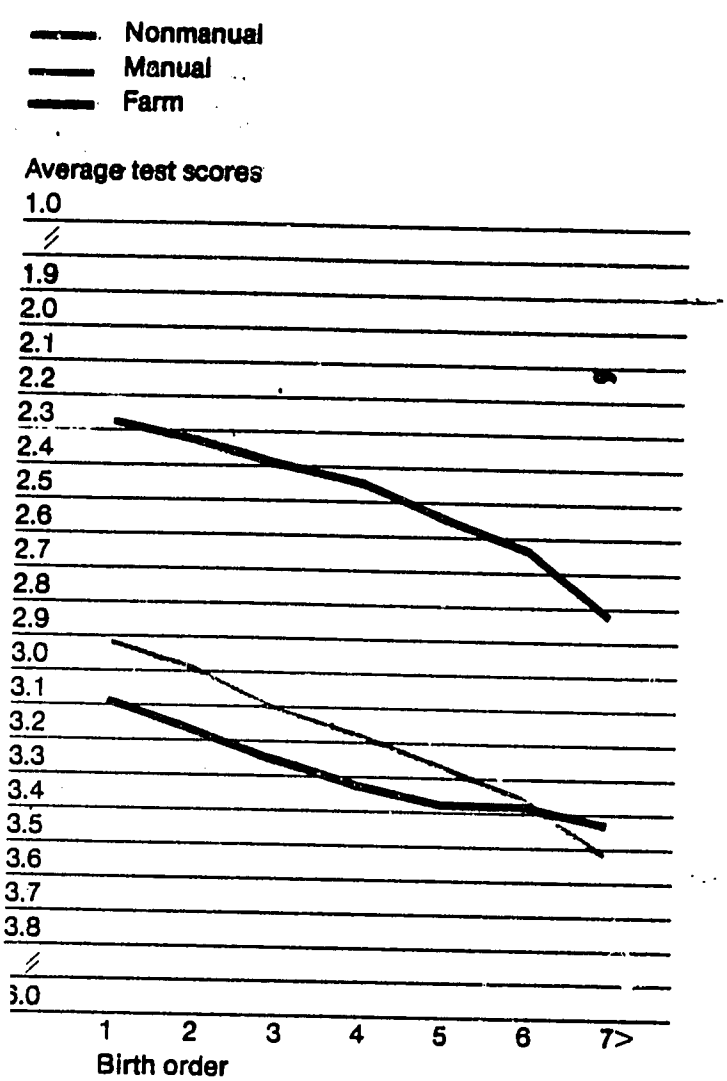
Source: ref. 7

Infant deaths, by birth order, El Salvador and Chile, 1968-1970, and England and Wales, 1977



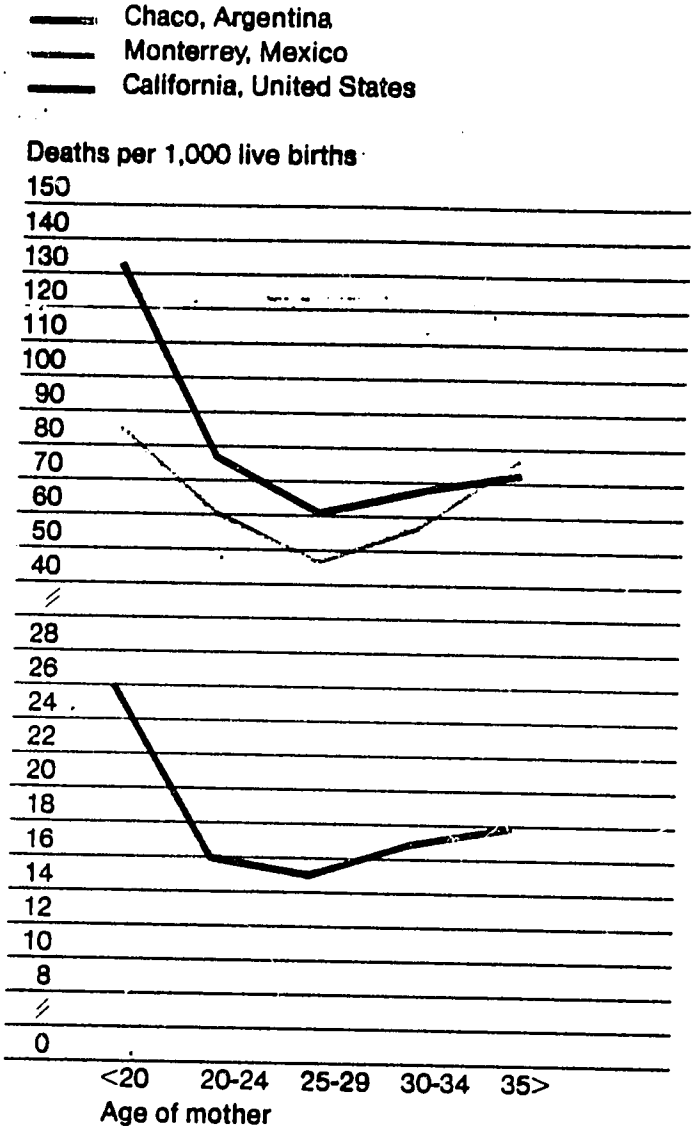
Source: refs. 14, 23

Intelligence test scores among 19-year-old men, by birth order and socioeconomic group, the Netherlands, 1953-1956



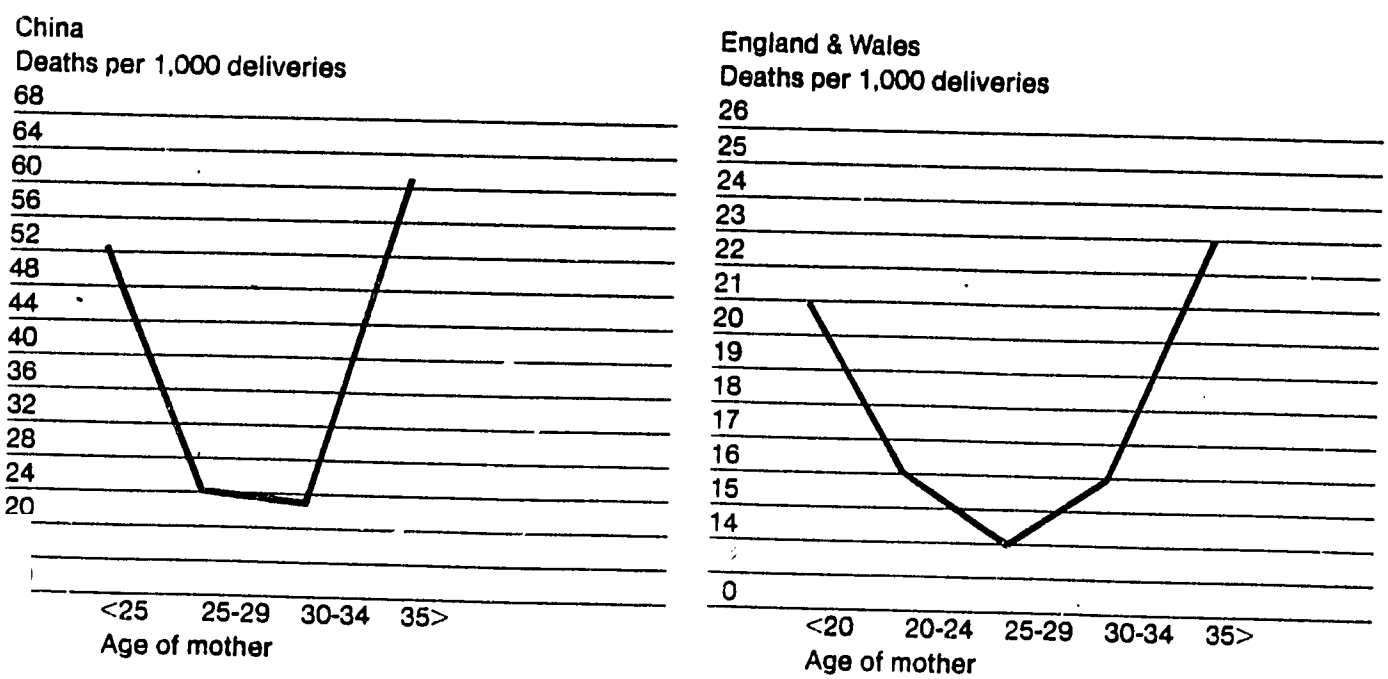
Source: ref. 30

Infant deaths, by age of mother, Argentina, Mexico, and the United States, 1968-1970



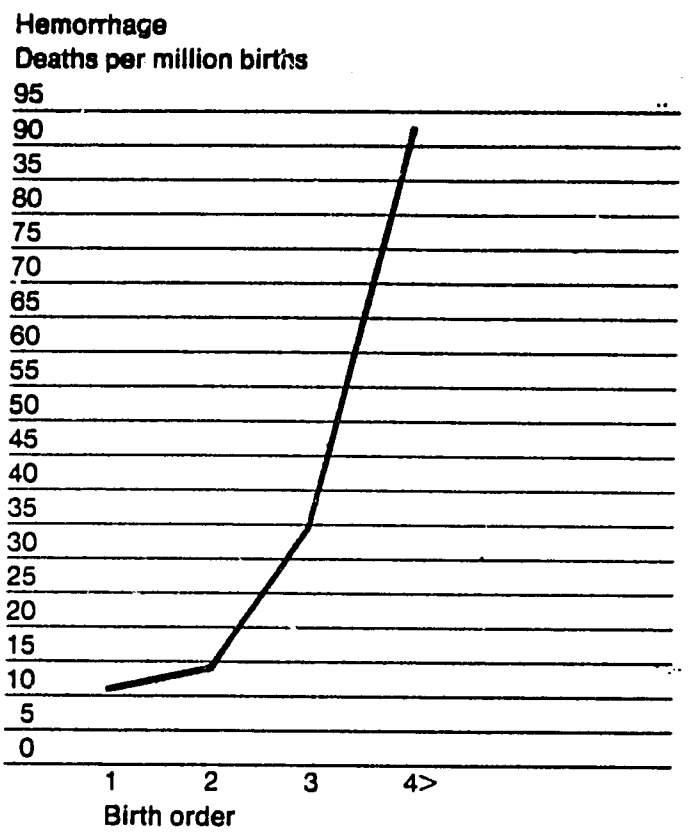
Source: ref. 14

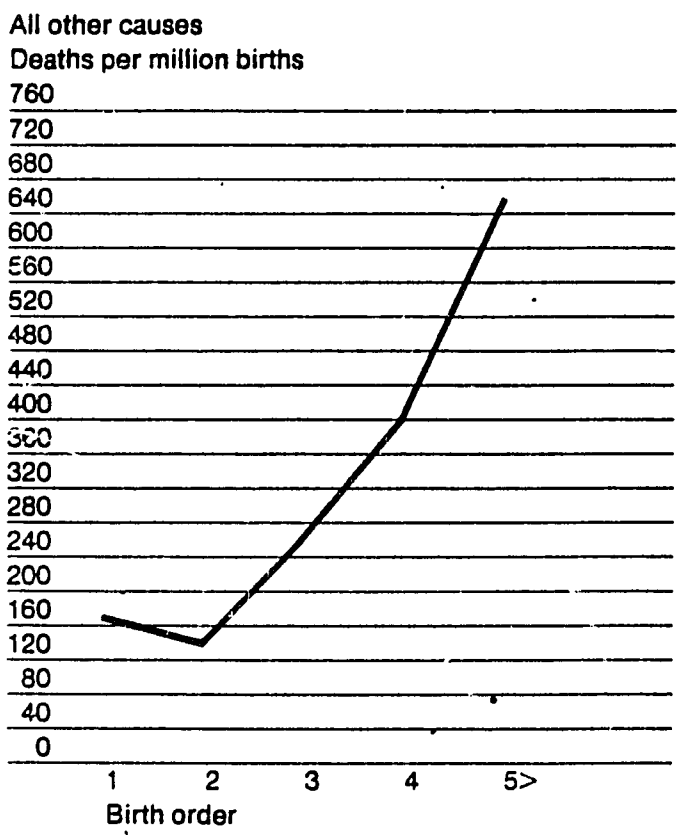
Figure 8.
Fetal deaths during the last two months of pregnancy and deaths during the first week of life, by age of mother, Tientsin, China, 1978, and England and Wales, 1977



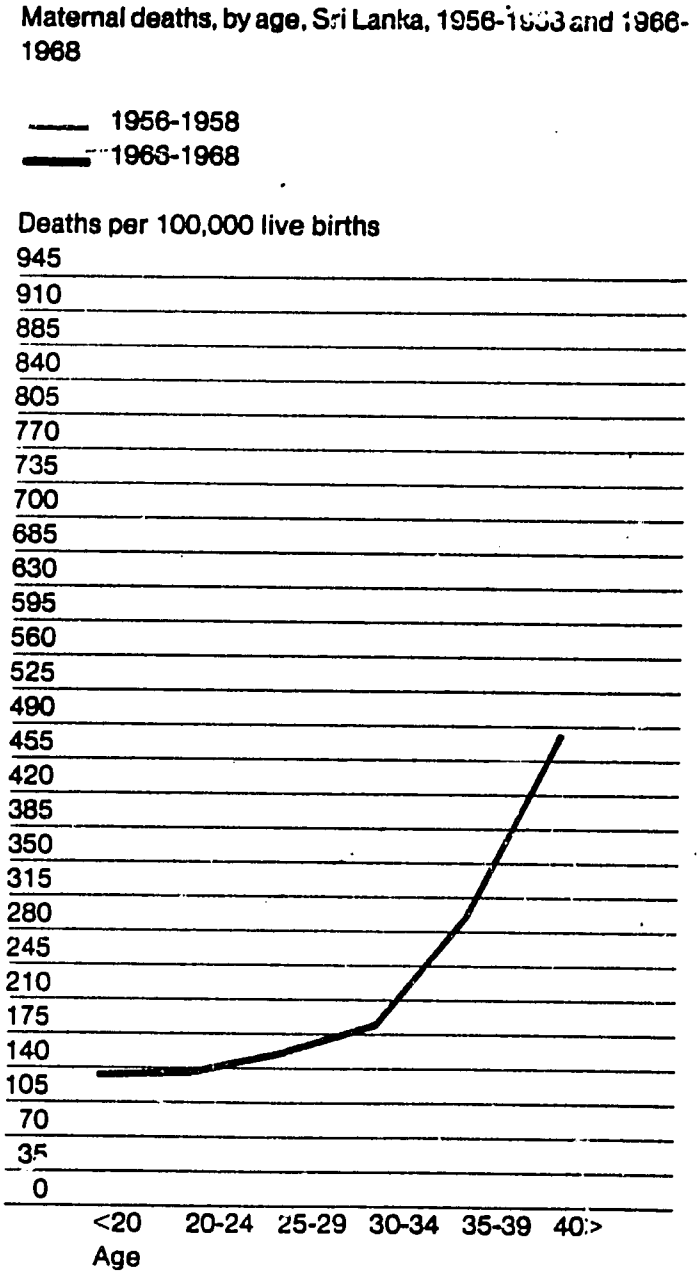
Source: refs. 21, 23

Maternal deaths, by cause and birth order, England and Wales, 1973-1975





Maternal deaths, by age, Sri Lanka, 1956-1958 and 1966-1968



Source: ref. 52

THE IMPACT OF FAMILY PLANNING ON THE HEALTH OF WOMEN AND CHILDREN

Among the most robust relationships in the public health literature are those between the timing and number of births in a family and the health of the mother and children. In brief, numerous studies, spanning continents and decades, have consistently shown the following:

INFANT HEALTH

Birth Interval: When the interval between births is short (less than two years) both the younger and the older sibling are more likely than other children to die before their 5th birthday.

Birth Order: Children of high birth order (fourth or later) are much more likely than other children to die in infancy. If they survive, such children have poorer intellectual development, on average, than do low birth order children.

Maternal Age: Children born to women at the extremes of their reproductive years (younger than 20 or older than 35) are less likely to survive infancy than are children born to women in their 20s or early 30s.

MATERNAL HEALTH

Family Size: Women who already have three or more children are more likely to die during pregnancy or delivery than are women with fewer children.

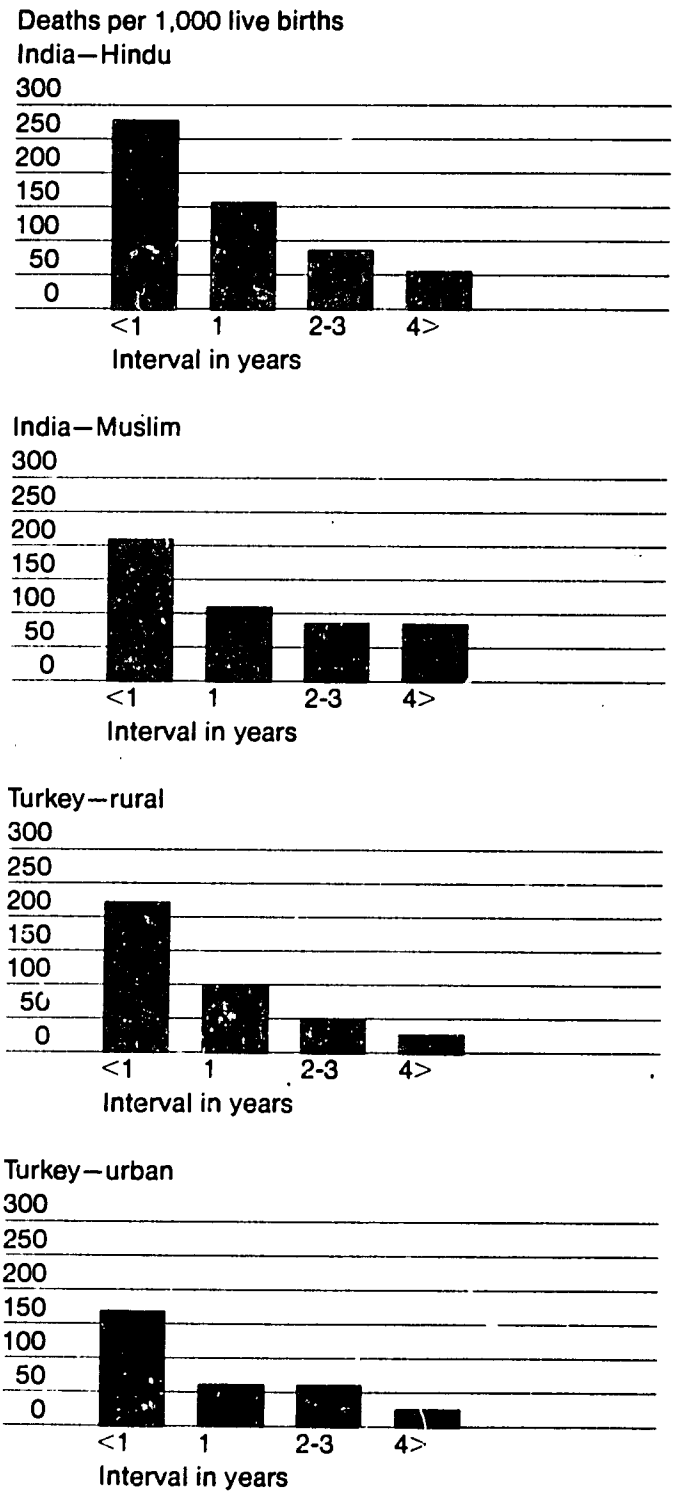
Maternal Age: Mortality rates are also increased among women who give birth before they are 20 or after they are 30.

Poor women are more likely than wealthy women to have closely-spaced births, large families and births at unfavorable ages. Poor children are especially likely to die during infancy or childhood, and their mothers are at high risk of complications of pregnancy and delivery. Consequently, confounding of cause and effect must be considered. Careful examination has shown that the findings listed above do not simply reflect the effects of socioeconomic status. For example:

- o In Britain the relationships of birth order and maternal age to infant mortality have not only persisted over decades when the infant mortality rate has dropped sharply, but hold true within social classes.
- o More recently, data from the World Fertility Survey have shown that short birth intervals are associated with increases in infant mortality (usually of 50-100 %) in all 26 countries studied. Most importantly, this finding did not disappear when maternal education (a common measure of socioeconomic status) was taken into account. In addition, the WFS showed that at least 15% of all births followed a short interval in all 26 countries studied -- in most at least 30% of births followed short intervals.

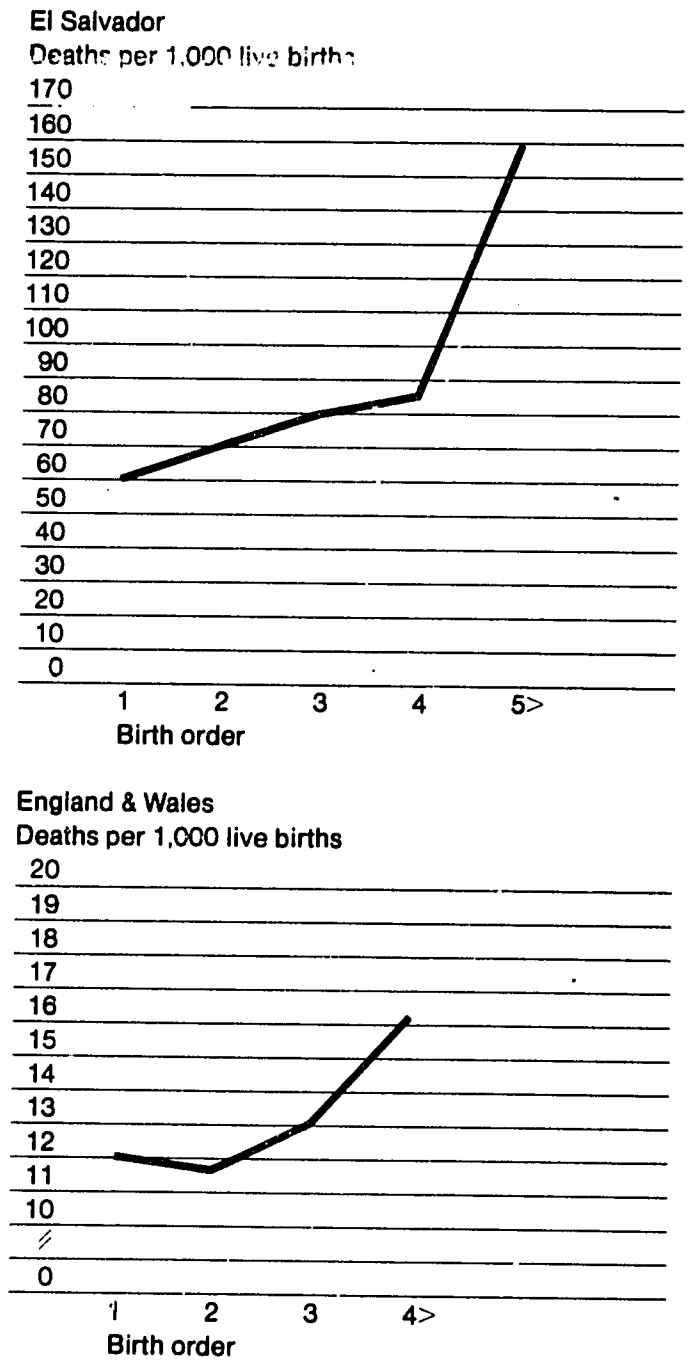
Child Health and Family Planning

Infant deaths, by number of years between births, India and Turkey, 1971-1975



Source: ref. 7

Infant deaths, by birth order, El Salvador and Chile, 1968-1970, and England and Wales, 1977



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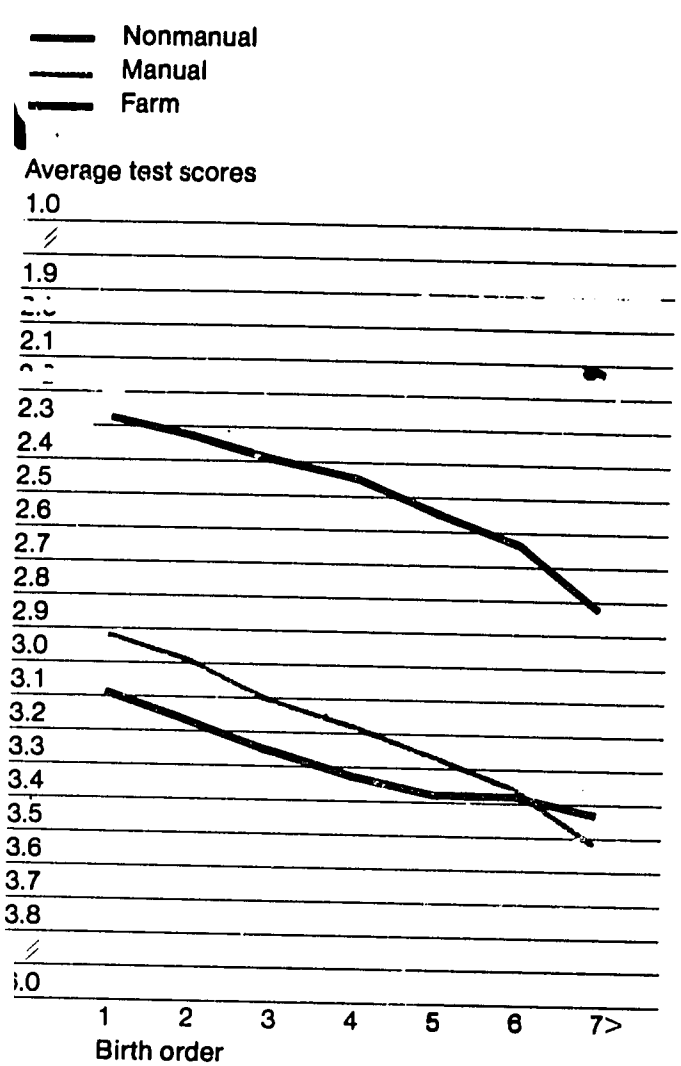
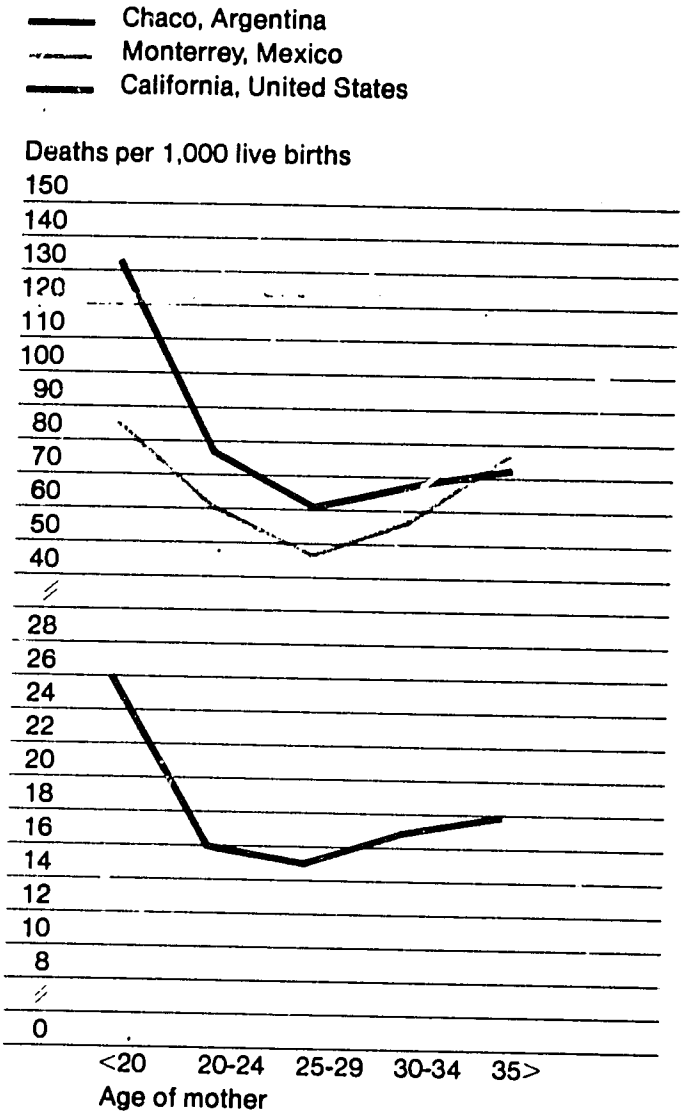
Intelligence test scores among 19-year-old men, by birth order and socioeconomic group, the Netherlands, 1953-1956



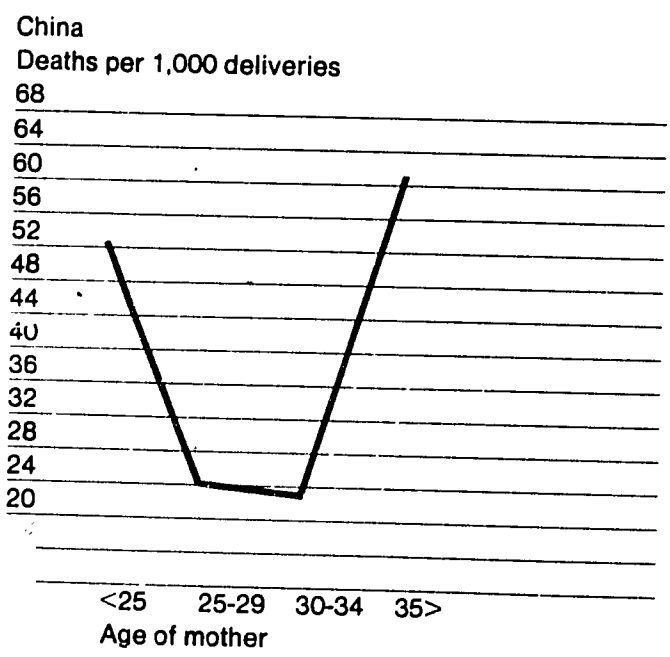
Source: ref. 30

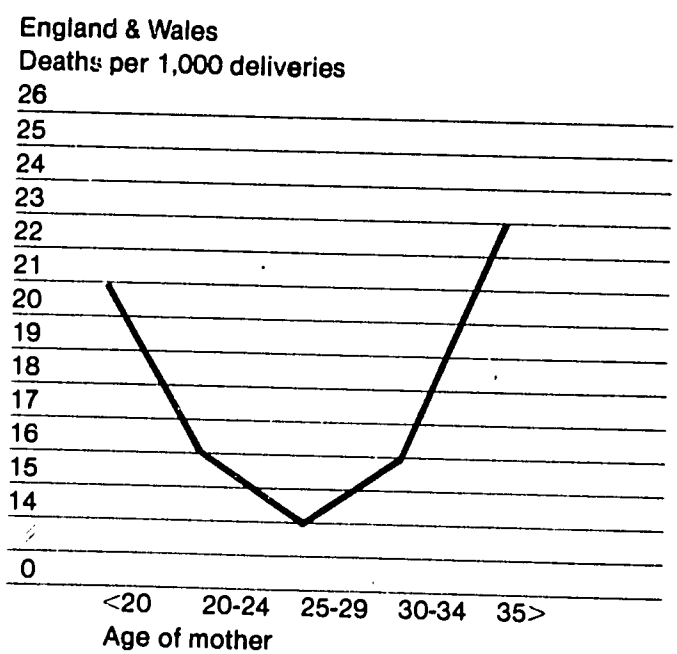
Infant deaths, by age of mother, Argentina, Mexico, and the United States, 1968-1970



Source: ref. 14

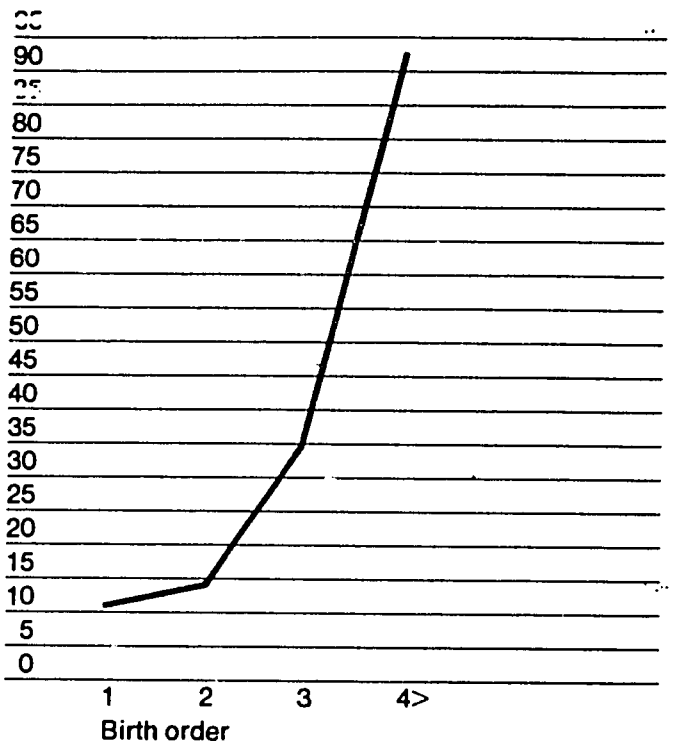
Figure 8.
Fetal deaths during the last two months of pregnancy and deaths during the first week of life, by age of mother, Tientsin, China, 1978, and England and Wales, 1977

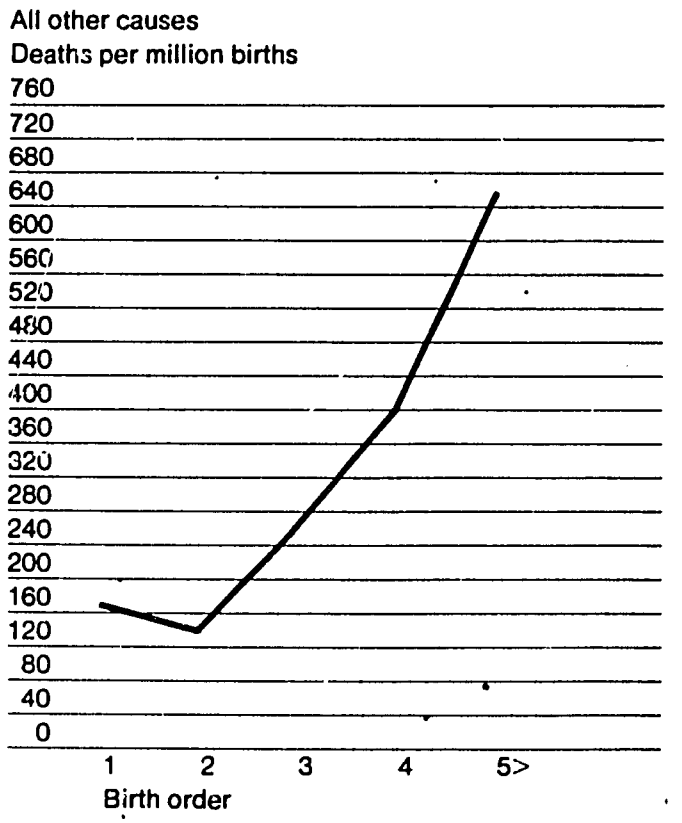




Source: refs. 21, 23

Maternal deaths, by cause and birth order, England and Wales, 1973-1975





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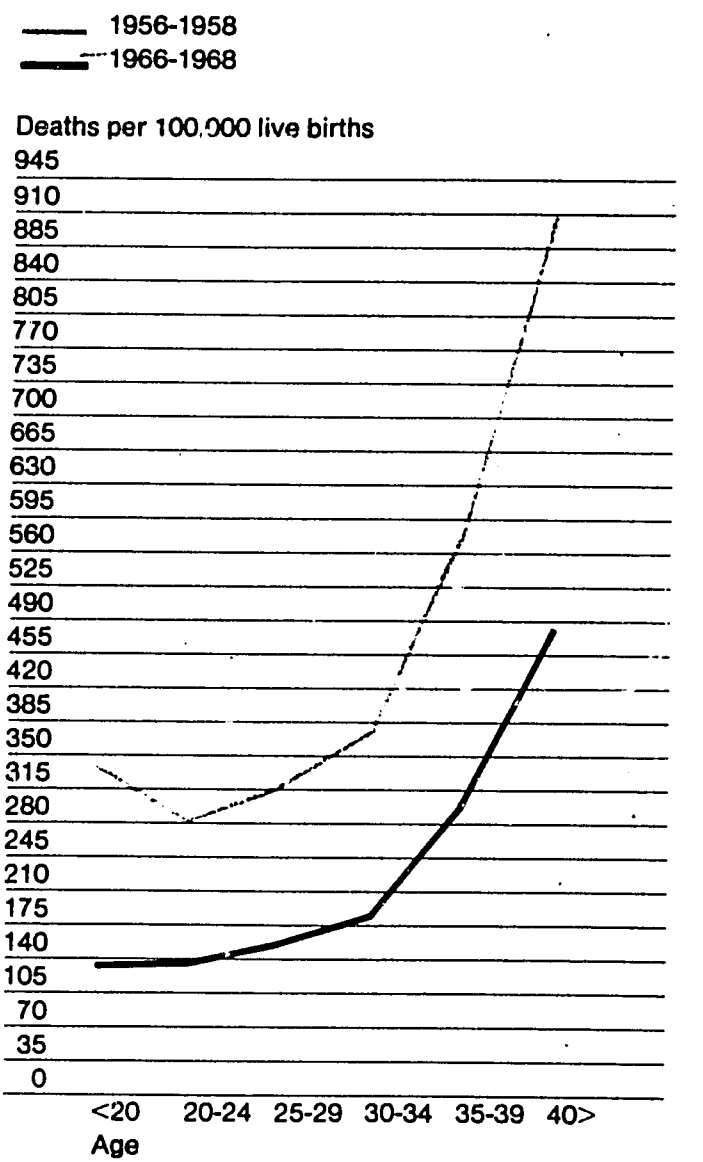

Source: ref. 52