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FEASIBILITY STUDY FOR A NATIONAL ORS SUPPLY MANAGEMENT INFORMATION SYSTEM IN INDONESIA

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TABLE OF CONTENTS

EXECUTIVE SUMMARY

One of the gaps in ORS supply management in Indonesia is that there is not a routine method of assessing the total picture of ORS supply, at either the national or provincial levels. The purpose of this feasibility study was to locate the sources of ORS supply management data, identify the types of qualitative and quantitative data available in each source, and determine the feasibility of routinely collecting and analyzing the data.

MAJOR FINDINGS

1. Currently, we have identified ten sources of ORS data located in eight different offices in Jakarta. Similar fractionation of data appears to be present at the provincial level.

2. There are overlapping information systems that probably have redundancy (double counting) of some data. No office is attempting to construct a complete profile of the national picture but this was unanimously viewed as something that should be done. All Ministry staff were unfailingly cooperative and indicated they would be willing to participate with data collection efforts in the future.

3. No single procurement program or information system can supply all the data required for monitoring the complete range of ORS supply management topics. In general we found:

* Procurement sources can provide:
  - Needs estimations
  - Procurement data
  - Distribution of ORS to province level

* Information Systems can provide:
  - Morbidity/Mortality data
  - Some ORS issue/use data
  - Some stock monitoring data, but of questionable value

* Commercial Production data available from POM:
  - Some question if accurately reported

4. Data varies greatly in quality, completeness and time of availability. Special assessments are needed of the accuracy of diarrhea morbidity data. The Sentinel System provides quality data, but includes a sample of PusKesMas which might not be representative of the entire country.

5. There is a need to standardize ORS supply and use indicators.

MAJOR RECOMMENDATIONS

The existing data on ORS supply should be gathered and analyzed retrospectively. The results of this study should be presented to all participating parties, along with an action plan describing a routine methodology to gather, process and distribute a national ORS status summary report(s).

Since the magnitude of this task is probably beyond the normal day-to-day workload of the ministry staff, we recommend a team of consultants consisting of at least one local and one international member, to work with a ministry counterpart. Ideally, this study would be completed before the end of the national fiscal year, June 1989.

ACKNOWLEDGMENTS

This study was initiated by the General Directorate of Communicable Diseases (P2M) and its Sub Directorate for Diarrhoeal Disease Control Program (CDD) as part of efforts to assure a continued supply of ORS for the treatment of dehydration from diarrhea. Because ORS supply and information is located in many government offices, this concern involves a number of other branches of the Government including the Nutrition (GIZI), Community Health (BINKESMAS), the National Health Scheme for Civil Servants (ASKES), the Directorate of Food and Drugs (POM) and the United Nations Children's Fund (UNICEF).

The study team is grateful to the representatives from all the above offices for their willingness to share ORS management information, so that a national picture can be more readily available for all concerned.

ABBREVIATIONS

ADD	Average Daily Dose
APBD I	Provincial Routine and Development Budget
APBD II	District Routine and Development Budget
APBN	Central Routine and Development Budget
ASKES	Civil Servant Health Insurance Program
BINKESMAS	Community Health
BKKBN	National Family Planning Coordinating Board
CSP	Child Survival Pharmaceuticals
DDC/CDD	Diarrhoeal Disease Control
DDD	Defined Daily Dose
DEPKES	Department of Health
DIK	Routine Budget
EPI	Expanded Program in Immunization
GIZI	Directorate of Nutrition
INPRES	Special Presidential Program
KABUPATEN	District/Regency Level
KADER	Village Health Worker
KAN WIL	Provincial Administrative Office
MLE	Mixed Liter Equivalent
ORS	Oral Rehydration Salts
ORT	Oral Rehydration Therapy
P2DIARE	CDC Information System
P2M	Sub Directorate CDC responsible for CDD Program
POM	Directorate of Food and Drugs
PUSAT	National Level
SP2TP	Integrated Information System under BinKesMas
UPGK	Family Nutrition Improvement Program
YAN MEDIK	Hospital Services

SECTION 1

INTRODUCTION AND BACKGROUND

1. INTRODUCTION

1.1. BACKGROUND

The Sub Directorate CDD is the Ministry of Health office with responsibility for determining policies and strategies for the National Control of Diarrhoeal Diseases Program. In this capacity, it provides guidance to other branches of the Ministry on a number of key issues including;

* Case Enactment of Diarrhoeal Disease with Emphasis on Oral Rehydration Therapy
* Epidemiological Surveillance
* Training of Clinic and Community Based Health Care Providers

In support of the National Program's strategies for promoting and sustaining ORT services, the Sub Directorate CDD is also responsible for providing guidance on management of supplies of Oral Rehydration Salts. ORS is the pharmaceutical product of choice for treating dehydration induced by diarrhoea. As such, its sustained availability in appropriate quantities is a precondition to achieving goals for ORT coverage. In fact, among the operational targets in its current Five Year Plan, the Sub Directorate has included estimates of the amounts of ORS required to meet specified levels of ORT coverage for each year. (See "Penyakit Diare," pages 6 and 28.)

Originally set up as a cholera control unit, the Sub Directorate CDD became responsible for ORT activities. Although cognizance of the importance of ORS has existed from the very beginning, it was as recently as 1986 that the Sub Directorate began organizing an active program for ORS supply management. In March of that year, three months before the launch of a major ORT intensification campaign in West Java, the Sub Directorate delegated responsibility for ORS logistics arrangements to one of its most experienced section chiefs.

Under this very able leadership, the Sub Directorate has since implemented a program of operations research and training activities aimed at developing practical approaches for managing ORS supplies at province, kabupaten, PusKesMs and community levels. A survey carried out in West Java in April 1987 showed that availability of ORS at all of these levels was very high as a result of management and training interventions. Using experience gained in West Java, the Sub Directorate is now implementing comparable programs in South Sumatra and South Sulawesi with far greater deliberation and efficiency than was possible in the past. This represents notable improvement in the Sub Directorates capacity to assist provinces in implementing National CDD Program policy.

1.2. PROBLEM STATEMENT

Despite the progress noted above, there is an important and lingering gap in the overall program for ORS management. This may be described as a continuing inability to provide current information of ORS supplies at either National, provincial or sub provincial levels. By way of

illustration, it may be noted that approximately every two years there are major evaluations of the EPI and CDD programs carried out by teams composed of Ministry, WHO, UNICEF and USAID staff. In order to provide evaluators with information on ORS management, Sub Directorate staff visit other ministry program offices such as GIZI and POM and gather retrospective information on amounts of ORS procured and distributed in both the public and private sectors. Between evaluations, however, there are no routines for collecting and tabulating this information. This means that, on a month to month basis, the Sub Directorate is generally in the dark concerning how ORS is being managed in Indonesia. This is a significant constraint on its ability to assist the other branches of the Ministry with the progressive implementation of policy concerning ORT.

1.3. PURPOSE AND APPROACH

As a first step towards making up for the deficiency described above, USAID consultants and Sub Directorate staff have gathered information on the types of data concerning ORS that are available in the Ministry. We have identified at least ten sources of information on various topics of supply management plus reported incidence of diarrhoea. Our overall purpose is to identify the best means for periodically collecting and tabulating the minimum set of information necessary for monitoring management of ORS supplies. We have determined that the management topics to be monitored are:

- Production
- Demand Estimation
- Product Selection
- Procurement
- Distribution
- Product Use

The basic approach is a three step one, that is:

- First, specify the "indicators" or types of data to be monitored for each management topic.
- Second, review the types and quality of data available from each source for each topic.
- Third, propose alternatives for collecting and tabulating the data that is available.

Once these steps have been taken, it will be possible through discussion with all parties concerned to propose specific plans for ORS information management.

1.4. ORGANIZATIONAL CONTEXT

1.4.1. Central Level

At the central level, the Ministry of Health is organized into four Directorates General including Communicable Disease control (P2M), Community Health (BINKESMAS), Food and Drug Administration (POM), and Hospital Services (YAN MEDIK). The Sub Directorate CDD is located in the General Directorate CDC. As already noted, this study was able to identify at least ten sources of information relevant to management of ORS supplies. These sources are located across all four Directorates General plus the Government Employees Insurance Agency (ASKES). The different information sources are summarized in detail in section four below. Basically, the sources of information are of two types, that is:

- Programs that procure and distribute ORS, such as;
  - + INPRES
  - + ASKES
  - + P2M
  - + GIZI
  - + Local Budget Funds (provincial and sub provincial levels only)
- MIS that provide epidemiological data or data on Ministry services and operations, such as;
  - + SP2TP
  - + P2-Diare
  - + Hospital Services Reporting System
  - + Sentinel Reporting System
  - + Outbreak Reporting System

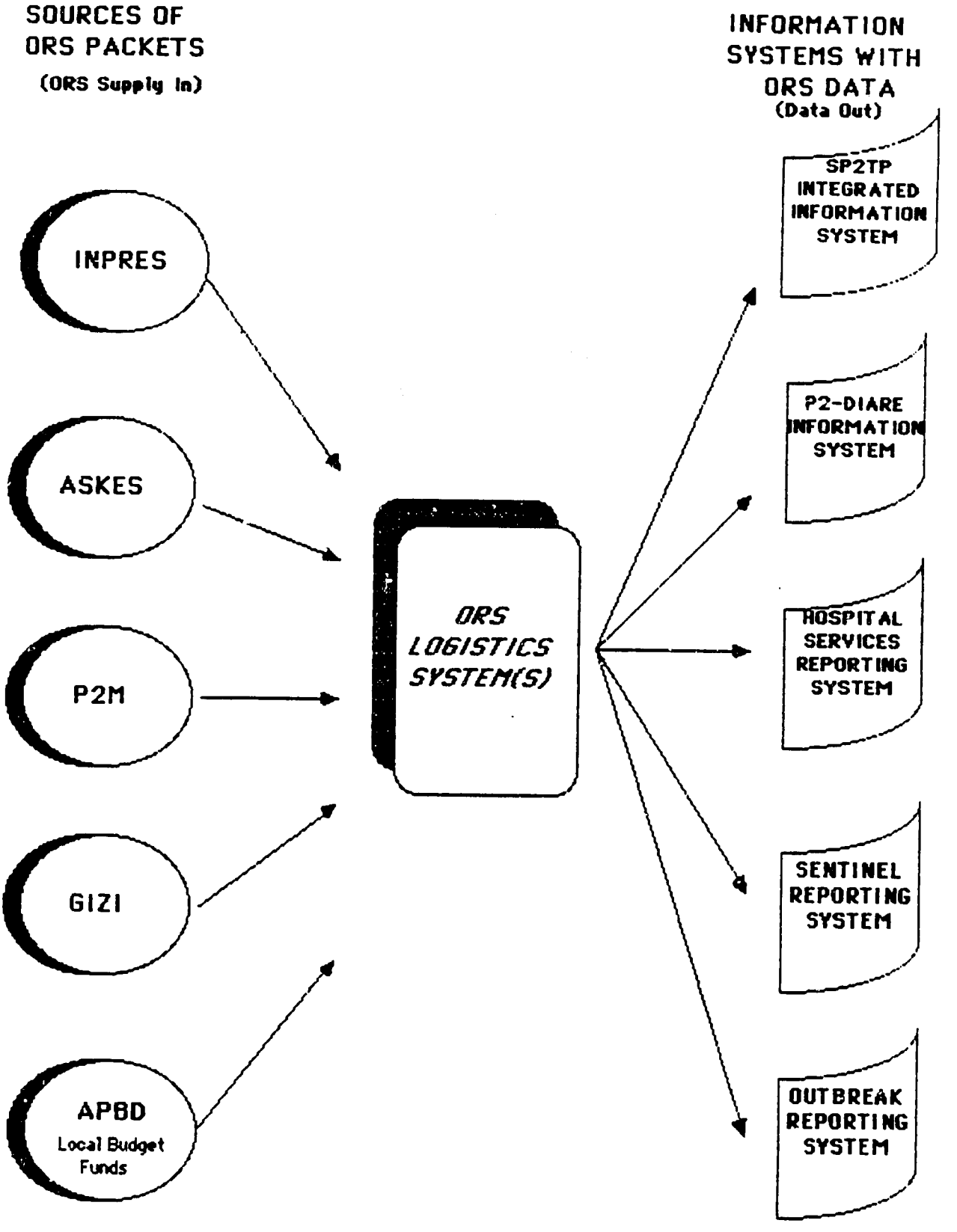
Figure 1 shows this graphically. These different sources provide information on a varying range of supply management or epidemiological topics. There is at present no single source for all of the information relevant to ORS management. This means that in order for the Sub Directorate CDD to prepare profiles of ORS management it will be necessary to periodically interact with other offices in all four of the General Directorates named above plus ASKES. When data are actually collected from any source, the Sub Directorate will be confronted with two challenges, which are:

- Piecing together data on different management topics from different sources to form pictures that are both complete and consistent.
- Dealing with the fact that in many cases data sets will be incomplete. Incomplete data sets will be a lesser problem for management topics like needs estimation and procurement; it will be a greater problem for topics like distribution and product use.

FIGURE 1

SOURCES OF ORS SUPPLY MANAGEMENT DATA

INDONESIA 1988



1.4.2. Provincial Level

In many ways, the organizational context at the provincial level is parallel to the central level. The General Directorate P2M has provincial level offices, and within that office there are staff assigned to manage CDD activities. Within various offices they gain access to all of the sources of information already identified at the central level. CDD province staff, too, are confronted with the challenges of locating data on several ORS management topics scattered among various offices as well as the inevitability of incomplete data sets.

Despite these similarities, there are also important differences between the provincial and central levels. The Sub Directorate CDD in Jakarta is mainly concerned with communicating with both other central level offices and provincial level offices about policy and how to implement it. At the provincial level, CDC staff responsible for CDD directly supervise and monitor kabupaten staff as they attempt to carry out policy. On some management topics, such as distribution of ORS to kabupatens and stock levels at PusKesMas, there is more data available to province CDC staff than to central Sub Directorate CDD staff. In any case, details on the ins and outs of data management at both levels will be presented in section four below.

SECTION 2

INDICATORS OF ORS SUPPLY MANAGEMENT

2. INDICATORS OF ORS SUPPLY MANAGEMENT

2.1. ROLE OF INDICATORS IN ORS SUPPLY MANAGEMENT

Indicators are summary statistics used to measure and compare various topics of management performance.

For ORS supply management there are specific data that can be collected and processed to give managers and policy makers an indication of system performance, including insights about provider behavior and consumer beliefs in the areas of:

* ORS Demand and Use by Health Care Providers and Consumers
* Procurement Policies and Practices
* ORS Availability (Distribution/Stock Status)

In many respects, the development and use of ORS supply management indicators is in its pioneer stages. To date, there are no international ORS supply standards or measurement guidelines that have been established by such international organizations as the World Health Organization (WHO), or the United National Fund for Children (UNICEF). The concept of using ORS supply system data as a way to provide indicators on a wide variety of provider and consumer behavior is somewhat a novel concept. For the purposes of ORS management we can monitor the status of the following management topics:

* Production
* Demand Estimation
* Product Selection
* Procurement
* Distribution
* Product Use

2.2. ORS INDICATOR DATA REQUIREMENTS

There are certain basic data that are essential for ORS supply system analysis. These data are:

* Number of Packets going into the supply system
* Morbidity/mortality statistics on diarrnea episodes
* Total Population or service area coverage
* ORS packet cost

Because supply is a holistic system, the same indicators can be combined in various wars to quantify performance on the topics listed above. In this way, redundancy becomes an asset because comparable statistics can be traced throughout the entire national supply system. Hence a more congruent picture can be obtained of the entire system as a process.

2.3. ORS SUPPLY INDICATORS

There are three basic indicators which could be used by the Sub Directorate. Each of these indicators can have variations on a theme by calculating percentages, and by using different denominators, for example,

population, disease episodes, provider type and time. Using the above basic data, we have determined that two basic indicators are required; these are:

* Defined Daily Dose (see table 1)
* Incidence of diarrheal disease (morbidity/mortality)

The primary statistics are:

1. Defined Daily Dose (DDD)

2. Mixed Litre Equivalent (MLE) or 200cc Packet Equivalent

3. Number of ORS packets, procured, issued and in stock

All of the indicators can provide qualitative and quantitative results, which can be graphically presented.

No single indicator can provide all the answers; each has advantages and disadvantages. Below is a discussion of each of the indicators listed above including comments about their relative merits, strengths and weaknesses.

2.3.1. Defined Daily Dose

The Defined Daily Dose (DDD) is an indicator used initially by drug manufacturers to measure drug sales or market penetration between and among products. More recently it has been used by public health institutions to measure and compare drug use.

One of the constraints in analyzing drug consumption data can be the sometimes misleading conclusions obtained from comparing only package size or basic units (# tablets, vials, tubes, etc). Confusion arises because these figures give little information about therapeutic equivalency, or value among the different drug products. This is also true when estimating ORS use of 200cc vs 1000cc packets.

Once established, the DDD becomes a "gold standard" against which all other drug supply and use can be measured.

The Nordic Council on Medicines, and the World Health Organization Drug Utilization Research Group (DURG) have recommended using the DDD as a unit of measure for comparative international drug consumption statistics. They have defined the DDD as:

> "The defined daily dose for a drug is established on the basis of the assumed average dose per day (24 hours) for the drug used on its main indication in adults"(1).

The DDD was the main drug use indicator in the Child Survival Pharmaceutical Studies (CSP I and II). In those studies, the DDD was established as 1 packet for both 200cc and 1000cc. For the purposes of ORS supply, discussions are needed among MOH personnel to determine the most appropriate ORS DDD for use in Indonesia as a national standard against which change can be measured.

TABLE 1

ORS SUPPLY MANAGEMENT AND USE INDICATORS
December 1988

INDICATORS	HOW OBTAINED	HOW USED	COMMENTS
DEMAND/USE			
cases/1000 pop (morbidity)	LB4		
% cases receiving ORS	Sentenil/LBS prescription audit	Best idea of ORS use	can be difficult to obtain definition of diarrhea/dehydration multiple drug use, etc.
% cases receiving ORS	Assessment Package		
avg dose/case by product size	#packets used/#cases assumes COT therapy	idea of how many mls given to each episode	
by MLE	(#200cc @5)+# of 1000c packs	Give idea of volume use by pop Sometimes had to obtain b/c # packets not recorded with morbidity data	Does not have true common denominator error factor of 5 for 200cc
Defined Daily Dose (DDD)	Establish DDD for each size		Used in CSPI & II
DDD/1000/day or month		Est. # days TX available at any one point in system.	Only way to get common denominator between therapeutic amts
AVG Daily Dose/CASE	tot # packs/case/DDD	Compare usual vs std DDD	Can compare DDD among regions & with avg dose/case or /day (like std tx vs usual tx)
SELECTION & PROCUREMENT			
TOTAL PROCURED BY SOURCE 200 ml 1000ml	requisition/delivery voucher	give indicated of total supply in by pac size	
DDD procured by source by 200ml by 1000ml % each pack size	total order/DDD = total DDDs of order Calc for each size then add	idea of how much therapy being provided. Used in CPS I & II.	No calculations necessary
MLE procured by source by 200ml by 1000ml % MLE each pack size	(total 200cc@5)+total #1000c	Idea of volume ORS available Misleading b/c volume not accounted by Therapeutic Value and physical # packs available	Used by CDD in previous study. sister indicator #200cc eqivalent also used.
Cost/product by source			could do cost effectiveness comparisons or cost/case etc.
DISTRIBUTION			
ORS in stock by product	From depot records	Est min/max stock level	Stock levels easily quantified.
by DDD	#packs by size/DDD=Tot DDD	give # days treatment available	idea of days supply in stock or by month
by MLE	(total 200cc@5)+total #1000c	Give vol of ORS available	idea of volume in stock but no idea of how many pts could rec d packs
ORS ordered ORS received	Requisition/needs est forms shipping/receiving forms	see if ordered what received & vice versa	does not give stockout info
% or ratio difference		Compare ord & Rec'd with other needs est.	

TABLE 1 (CONTINUED)

ORS SUPPLY MANAGEMENT AND USE INDICATORS

INDICATORS	AVAILABLE BY SOURCE					
	SP2TP BINKESMAS	IMPRES	ASKES	GIZI	SENT'L SYSTEM	CDD P2DIARE
DEMAND/USE						
cases/1000 pop (morbidity)	YES	YES	YES	YES	YES	YES
# cases receiving ORS	NO	NO	NO	NO	YES	YES
% cases receiving ORS	NO	NO	NO	NO	YES	YES
avg dose/case	NO	NO	NO	NO	YES	YES
by product size						
by MLE	CALC	YES	YES	YES	YES	YES
Defined Daily Dose (DDD)	CALC	CALC	CALC	CALC	CALC	CALC
DDD/1000/day or month	CALC	CALC	CALC	CALC	CALC	CALC
AVG Daily Dose/CASE		CALC	CALC	CALC	CALC	CALC
SELECTION & PROCUREMENT						
TOTAL PROCURED BY SOURCE	NO	YES	YES	YES	NO	NO
200 ml						
1000ml						
DDD procured by source	NO	CALC	CALC	CALC	NO	NO
by 200ml				STANDARD		
by 1000ml				AMT		
% each pack size						
MLE procured by source	NO	CALC	CALC	CALC	NO	NO
by 200ml				STANDARD		
by 1000ml				AMT		
% MLE each pack size						
Cost/product by source	NO	YES	YES	YES	NO	NO
DISTRIBUTION						
ORS in stock	NO	AT PROV	AT PROV	AT PROV	PUSAT	NO
by product						
by DDD	NO	CALC	CALC	CALC	CALC	NO
by MLE	NO	CALC	CALC	CALC	CALC	NO
ORS ordered	NO	AT PROV	AT PROV	PUSAT	PUSAT	NO
ORS received	NO	AT PROV	AT PROV	PUSAT	PUSAT	NO
% or ratio difference	NO	CALC	CALC	CALC	CALC	NO

For needs estimations, the Sub Directorate is currently using 5 packets of 200cc or 1 packet of 1000cc. Hence, the amount of 1000cc, or 1 litre, could also be established as the DDD.

Establishing the DDD as 1,000cc would also correlate with the Mixed Litre Equivalent (MLE) which has been used as a supply measurement in the ORS Assessment Package currently under development by CDC. The advantage of establishing the DDD as 1000ml is that it would link a therapeutic value to the MLE. This would not be true for any other definition of DDD, such as 600ml.

It should be noted that the DDD is not necessarily the same as the usual treatment, or average daily dose. The DDD is a technical measure of drug consumption which serves as a common denominator or benchmark against which change can be measured. One of the interesting ways to view drug use is to compare the usual (average) daily dose to the DDD.

ESTABLISHING THE DDD.

The DDD is often expressed in terms of weight or basic units (# tablets, tubes, etc). For ORS, we suggest establishing the DDD in terms of milliliters which can then be translated into number of sachets according to size. For purposes of this report, we have establish the DDD as 1000cc. This correlates to 5 packets of 200cc, or 1 packet of 1000cc.

The Sub Directorate, from experience within its program, may decide to establish the DDD as a different amount.

The Defined Daily Dose (DDD) can be expressed in a variety of way such as:

* DDD Procured. This can give an estimate of how many days therapy or treatments that might be provided by the amount procured.

* DDD in stock. Gives an estimate of how many days treatment the stock might provide.

*Cost/DDD. Links cost to providing a days therapy. Useful in calculating budgets and comparing therapies for cost-effectiveness.

* DDD/1000 population or episode. Like morbidity data, the DDD can be expressed in terms of population. This allows comparison between and among, health centers, provinces, countries, etc. The formula for calculating DDD/1000 population is below:

$$\text{DDD/1000 pop} = \frac{(\text{Total number of DDDs})*(1000)}{(\text{Total Population})(365 \text{ days/year})}$$

Additionally, service generated statistics can be used to calculate the average daily dose/episode or per population and compare with the DDD.

2.3.2. Mixed Liter Equivalent (MLE), or 200cc Packet Equivalent

The MLE and 200cc pack equivalent are included in the same discussion because the approach to calculating the statistics is similar. That is, to make the pack sizes into a common volume denominator so that only one figure is used for comparison.

For the MLE: 1 packet of 1000cc = 1 MLE,
5 packets of 200cc = 1 MLE

For the 200cc Equivalent:
1 packet of 1000cc = 5 200cc equivalent
1 packet of 100cc = 1 200cc equivalent

The problem in only expressing by volume leaves a five-fold difference. This is not a problem when expressing therapeutic equivalence in the view of the DDD. But a figure can be confusing or misleading when attempting to interpret it as a measure of packets available. With MLE, the 200cc packets are under-represented by a factor of 5, and with the 200cc equivalent, the 1 liter packets are over-represented by a factor of five.

A detailed discussion of how the MLE is used in the ORS Management Assessment package is in section 4.5. In summary, the MLE can be expressed as:

- Total MLE purchased, procured or in Stock
- Total MLE /1000/month
- % Total MLE procured by pack size
- Average MLE dispensed per episode, per total population
- Average MLE dispensed by provider type

2.3.3. Number of ORS Packets Procured, Issued and in Stock

The physical number of ORS packets available at any one point throughout the supply system tells a lot about who is using how much ORS and where it is being used. It is empirical data that is relatively easily collected and analyzed, and especially when combined with disease data it can give an indication about the adequacy of supply.

The number of packets, as an indicator, is so straightforward and simple that it is often underestimated in ability to express the success or failure of the health system's performance in treating dehydration from diarrhea. It is the basis for calculating the DDD and MLE. The number of packets can be expressed:

- By level (Province, Kabupaten, PusKesMas, Kader)
- By pack size (200cc or 1000cc)
- per case treated
- # packs/1000 population or episodes
- # packets issued by provider type
- # packets manufactured, imported, donated, etc

2.4. Summary

Each of these indicators is presented in a matrix format in Table 1. By taking this approach one can easily view and compare:

1. where in the ORS supply system the indicator could be used: demand/use, procurement, and distribution;

2. how to obtain or calculate the indicator;

3. how the indicator might be used or interpreted; and

4. advantages and disadvantages of each statistic.

As was stated in the beginning, no single indicator can tell the ORS supply manager everything. But indicators are invaluable, when used correctly, in providing insights as to if and how a supply system is working, and clues about provider and consumer behavior.

SECTION 3

DESCRIPTION OF ORS DATA AVAILABLE BY PROCUREMENT SOURCE

3.1. POM

3.1.1. INPRES

3.1.2. Commercial Production

3.2. ASKES

3.3. GIZI

3.4. UNICEF

3.5. P2M

3.6. Summary

3. DESCRIPTION OF DATA AVAILABLE BY PROCUREMENT SOURCE:

APPROACH

As was discussed above, most programs that procure ORS packets possess and operate systems for collecting health related data which is considered vital to program management at all levels. For the purpose of this report, we focused upon the types of information at the national level. We did however, review ORS information management in one province, Sulawesi Selatan (SUSEL) as described the case study in Annex B.

At the national level, personnel from each of the programs listed above were interviewed to gain insights about the following topics in ORS supply management:

1. Approach to Needs Estimation
2. Procurement and Distribution of ORS
3. Stock Level Monitoring
4. Dispensing Data
5. Report formats
6. Data Interpretation/Utilization
7. Data Flow Cycle

The responses to each of the above topics is described below. Table 2 provides contacts, documents and timing of data collection.

3.1. POM (FOOD AND DRUG ADMINISTRATION)
Contact for INPRES and Commercial ORS Production:

Ibu Andayaningsih, MSc.
Director of Drug Control
POM
Phone 414-755

3.1.1. INPRES

POM is the national Food and Drug Administration. Part of the responsibilities of POM is oversight of the INPRES drug procurement program. The INPRES drug supply system serves the entire Indonesian population for all drugs included in the basic list of 178 essential drugs as determined by POM (Food and Drug Administration). The list of drugs is intended to meet both the preventative and curative needs of hospitals and health centers. Each kabupaten is allotted Rp. 450 per person to order INPRES drugs. ORS is one of the drugs on the INPRES drug lists, which are the same lists available to ASKES.

1. Approach to Needs Estimation. ORS needs estimation are not made at the national level, but by each Kapubaten. The national INPRES program allocates Rp 450 per capita annually for purchase of essential drugs. Accordingly, each kabupaten has a total budget based on its population. With this sum, it procures drugs, including ORS from the national drug lists according to local needs.

To assist with the INPRES needs estimation, POM is using the Drug Estimation and Monitoring System (DEM) and, next year plans to have the SWEDIS drug registration and inventory control program installed.

TABLE 2

PUSAT

ORS SUPPLY MANAGEMENT INFORMATION SOURCES

ROADMAP OF CONTACTS, DOCUMENTS & TIMING

ORS SOURCES (NO DISPENSING/ISSUE OR MORBIDITY INFORMATION)

PROGRAM & LEVEL	STATUS	NEEDS EST.	PROCUREMENT	DISTRIBUTION ALLOCATION	STOCK LEVEL MONITORING
INPRES (POM)	Avail. Form	yes to be determined	yes Commercial Production	yes	no
ASKES Husini Noor	Avail. Form	Nov Recap. Rencana Kebuthuan Obat-Obatan Daftar A B1, B2. printout (does not include C daftar)	?	Jan/Feb Alokasi Kebutuhan Obat Daftar A, B1, B2 (printout)	June/Dec Laporan Penerimaan dan Pengeluaran Obat (LPPO) (only 10% comlete)
GIZI Mr. Suparman	Avail. Form	Feb/Mar Hasil Pertemuan Konsultasi Pinpro Perbaikan GIZI Daerah Dan Pusat (Bound report)	?check July/Aug UNICEF contract Jul-Aug	Prov. invoice ? Summary to Pusat??	no
P2M (CDD) Pusat Dr. Sutoto Mr. Adi	Avail. Form	Oct Annual CDD plan	?	Jan Final budget to Prov. to procure locally ???Check if PUSAT recap	no
APBD Province Specific	Avail. Form	Province Specific	?	no	no

2. Procurement and Distribution of ORS. POM receives kabupaten procurement requests from the province. Orders are made by the kabupaten with both public and private sector manufactures. The manufacturers deliver the kabupaten specific orders to the province.

No distribution or consumption data are available apart from the data provided by the SP2TP system.

3. Stock Level Monitoring. In March, the end of the fiscal year, kabupaten stock levels are reported from the province up to the central level for planning purposes.

4. Dispensing Data. See discussion in SP2TP information system description

5. Report Formats. See discussion in SP2TP information system description.

6. Data Interpretation/Utilization - The INPRES staff are using the DEM to estimate drug needs. Currently, POM plans to install the DEM in West Java, East Java and Central Java to test lists utility at provincial levels. No special cognizance is being taken of ORS at this time.

7. INPRES Data Flow Cycle. See discussion in SP2TP information system description.

The time cycle is:

April	-	End of year stock levels are available from each kabupaten.
May	-	DAFTAR A, B1 and B2 drug orders are available.
June	-	C list orders are available.

In summary, ORS packages used in the INPRES program are determined at the kabupaten level. The national INPRES office tenders and contracts for all pharmaceuticals used by the INPRES program, including ORS. The integrated information system (SP2TP) of Binkesmes could be the main source of data on ORS supply management information for INPRES pharmaceutical supplies.

3.1.2. ORS Commercial Production

POM received monthly production figures from drug manufacturers. These figures are summarized on a quarterly basis. ORS production figures can be provided to CDD for each quarter, with June 30th being the end of the first quarter.

3.2. ASKES (NATIONAL)

CONTACT: Husni M. NOOR, Pharmacist
Director of Drug Programs
OFFICE: Perum Husada Bhakti
Jin. Let. Jen. Surapto
Cempaka Putih Jakarta
PHONE: 416063 Pes 46

ASKES is the National Health Scheme for Civil Servants and its drug procurement program is structured very similarly to the INPRES System with a few differences. Drugs are supplied only for civil servants and families at a rate of Rp 700/member/year. ASKES uses POM's standard drug list divided into the A,B and C sublists. The DOKABU (Kabupaten Health Officer) prepares the lists and needs estimates at the kabupaten level, as is the case with INPRES, but the lists are forwarded to the ASKES administrator at the provincial level rather than to the KANWIL. The provincial ASKES office then forwards the lists to the national ASKES office.

1. ASKES Approach to Needs Estimation. The national ASKES office receives the provincial estimates for drugs in Sept./Oct. The national office prepares a summary report called "RENCANA KEBUPATEN OBAT-OBATAN PERCUM HUSADA, BHAKT TAHUN 19_". These estimates include lists A, B1 and B2, but not C (local purchases).

Estimates are available from the national office in November in a printout entitled "RECAPITULASI RENCANA KEBUTUHAN OBAT-OBATAN, DAFTAR A, B1 AND B2", or "Summary of Planned Needs for 19_, Lists A, B1 and B2". Estimates of purchases from the C list are not available.

2. ASKES Procurement and Distribution. Every January/February, a printout summarizing the allocations to each province is available. The printout is entitled: "ALOKASI KEBUTUHAN OBAT DAFTAR A, B1, B2". All products on lists A and B are procured from the two government owned manufacturers: Indofarma and Kimiafarma.

In some cases, manufacturers deliver drugs directly to the kabupaten, in other cases the drugs go first to the ASKES provincial office and are then redistributed to the kabupatens. Suppliers deliver orders every 6 months in October/November and April/May. A report is received back that the drugs arrived in December and June. A summary of what drugs are purchased and delivered is made at the national every six months.

3. Stock Level Monitoring. ASKES drugs are supposed to be stored separately from any other pharmaceuticals, such as those supplied by INPRES, GIZI, etc.

The SP2TP LB4 form contains a column for stock level data for ASKES drugs but ASKES does not rely upon this source. Rather, they have their own form called "LAPORAN PENERIMAAN DAN PENGELUARAN OBAT" or LPPO. This is sent every 3 months from the provinces to pusat. However, only about 10% of the provinces complied last year. Next year ASKES plans to do a stock summary for all drugs.

4. Dispensing Data. In theory, the quantities of ASKES drugs dispensed are reported by the SP2TP form LB4. In practice, this data for ASKES is very incomplete.

5. ASKES Report Forms. The forms used are cited in points 2 and 3 above.

6. Data Interpretation/Utilization. Data are summarized as to estimates and allocation only.

7. Data Flow Cycle Summary.

November	-	Needs estimations finalized
January	-	Final allocation/province available
June & December	-	Summary report on what drugs purchased and delivered.

In Summary, the ASKES ORS supply is determined at the kabupaten level. SP2TP is the information system that contains ORS supply data, but it is viewed as incomplete and not utilized by the ASKES national office. ORS needs estimates are available from the national office in November. Retrospective ORS procurement and distribution data to the kabupaten level is available.

3.3. GIZI

Contact at GIZI:

Dr. Suparman
Family Nutrition Improvement Program (UPGK)
Jl. Percetaleau Nepara 23A
Jakarta
Phone 414693

GIZI provides ORS as part of the UPGK program. All of the packets supplied are the 200cc size. Tendering and Procurement is done by UNICEF. In 1988, GIZI supplied over 12.5 million packets to all 27 provinces.

1. Approach to Needs Estimation. The ORS needs estimation is based upon the standard national formula for the UPGK Project; 50 packets for "old" Pos Yandu participating in the Project and 100 packets for "new" Pos Yandu.

GIZI only provides 200cc ORALITE packets. The estimation and supply for the next Fiscal Year is made once yearly in February/March.

2. Procurement and Distribution of ORS Packets. ORS procurement is arranged by the UPGK Project at the national level, with funding from UNICEF. UNICEF Project managers tender and contract with an Indonesia commercial manufacturer for ORS supplies for all provinces. Manufacturers deliver directly to the provinces. UNICEF procures only what is requested by GIZI.

From June to December deliveries are made directly from manufacturers to all provinces. The national GIZI program has safety stock which is available upon request from the provinces. In 1988 the safety stock was about 200,000 packets. This stock is kept in the Ministry's Foreign Assistance Goods Warehouse.

3. Stock Level Monitoring. Stock level data are not used by the national office

4. ORS Dispensing Data. Data or ORS dispensed is forwarded to pusat but is considered incomplete.

5. Report Formats. A consolidated provincial report is sent to the GIZI office in Jakarta, but it does not contain information considered reliable or useful to ORS supply management.

6. Data Interpretation/Utilization. With the exception of the national Safety stock, ORS supply data is not monitored or analyzed.

7. GIZI Data Time Cycle.

April	-	Needs estimation done by province & pusat
August/September	-	ORS safety stock arrives at GIZI national warehouse
Yearly	-	summary reports sent to national GIZI offices. No useful ORS supply data available.

In summary, the national GIZI office can provide ORS procurement and distribution data to the provincial level. This data can also be obtained from UNICEF, as described below.

3.4. UNICEF

Contact at UNICEF:

H. R. Lerrick
Procurement Assistant
Wisma Metropolitan II, 11th floor
Kav. 29, Jalan Jend. Sudirman
Jakarta
Phone: 578-1366 Ext. 273

The ORS that GIZI distributes are provided by UNICEF. UNICEF's function is limited to procurement of the product and, within the limits of available funding, it makes no adjustment to requests from GIZI. UNICEF uses USAID funds to procure ORS for the Infant Mortality Reduction Project. As a procurement agency, it tenders for companies to bid upon the supplies needed, verifies quality control and delivery of the ORS directly to the provinces.

UNICEF does not estimate ORS needs for the programs it supplies ORS to, but uses the programs estimates as the basis of tendering and contracting. In 1988 there were three manufacturers with UNICEF contracts for ORS.

The time cycle is:

December	Get needs estimates from GIZI and USAID
Jan - March	Tender and adjudication of manufacturers
May/June	Contracts signed
June - December	Delivery of ORS to provinces

In Summary, UNICEF does not make any adjustments to the ORS requested by GIZI, but only makes arrangements to procure that amount. Data on the amounts of ORS supplied to each province is available from the GIZI offices. However, UNICEF should be routinely contacted so that any other

programs that might use UNICEF for procurement and distribution are known and also included in the consolidated national supply figures. For example, in 1988, funded by USAID, UNICEF is procuring about 1 million ORS packets to the PVO managed Infant Mortality Reduction Project.

3.5. P2M (CDC)

Contact:

Daryono Adi
Evaluation Section Chief
CDC Complex
Jalan Percetatan Negara
Telp; 417-608 Pes 42
Sub Directorate/CDD

P2M (or CDC) is the General Directorate responsible for administering the national CDD program. Within P2M, the Sub Directorate CDD is the implementing agent. P2M has a budget for procuring drugs required for its various programs such as CDD, EPI or TB. Within P2M, the Sub Directorate CDD is responsible for administering funds available for procurement of ORS. It does not directly manage procurements.

1. Approach to Needs Estimation. Needs are estimated at the national level by the Sub Directorate. The approach is to take the total budget available for ORS procurement and allocate the funds to provinces proportionally by population.

2. P2M Procurement and Distribution of ORS. The Sub Directorate CDD's budget allows 110 Rp per 200cc product, including shipping costs. The total allowance is allocated to the province and the provincial CDC office arranges procurement with a commercial supplier.

3. Stock Level Monitoring. Only safety stocks are kept at P2M national warehouse. Provincial stock levels are not forwarded to the national office. If shortages occur, province requests more ORS from the Sub Directorate CDD's national safety stock in Jakarta.

4. Consumption (use) Data. Some issue data are available from the P2Diare information system. Refer to the discussion of the P2Diare for a detailed discussion of its utilities and limitations.

5. Report Formats. There is no special information system for tracking P2M ORS supply status. Data are collected once a year at an annual meeting of the provincial CDD officers. A summary report entitled "Distribusi Penderita & Kematian Diare Menurut Golognan Umur" is prepared by the CDD Sub Directorate. Primarily morbidity and mortality statistics are summarized in the report, ORS issue data while available from the province reports, are not included in the CDD annual summary.

6. Data Interpretation/Utilization. Primarily morbidity/mortality data is used from the P2Diare information system.

7. Data Time Cycle.

March Budget allocations sent from pusat to province

April Beginning of Fiscal Year and funds become available

The rest of the time cycle is province-specific.

In summary, at the national level, the P2M and the Sub Directorate CDD is the administrative body responsible for administering funds available for procurement of ORS, but not for procurement directly. The information system used is the P2Diare and the SP2TP. Both information systems are discussed below.

3.6. SUMMARY OF ORS SUPPLY INFORMATION BY PROCUREMENT SOURCE

Data relevant to ORS procurement are to be found in at least five offices identified thus far. Procurement sources can seemingly provide reliable data on the amount of ORS going into the health system. Data regarding distribution below the province level, stock level monitoring and dispensing data were available in some places but not others; in any case these data do not appear to be reliable.

Data on commercial production of ORS is available from POM, however the POM staff expressed some concern that this data provided by the manufacturers might underestimate actual production.

SECTION 4

DESCRIPTION OF EXISTING INFORMATION SYSTEMS

4. DESCRIPTION OF EXISTING INFORMATION SYSTEMS

There are four information systems which the CDD office might utilize. These are: (1) SP2TP, the BinKesMas (Community Health) System, (2) EPI/CDD Sentinel System, (3) the P2Diare information system, and (4) Outbreak Reporting System. Each of these information systems is discussed below. Table 3 shows the contacts and type of data available by subject.

4.1. SP2TP INTEGRATED HEALTH INFORMATION SYSTEM (Community Health)

Contact: Ny Horry Fangidae, SKM
Kabag. Informasi
Set Ditjen Binkesmas
Jl. Prapatan 10, Jakarta
Telp. 355-158/9

SP2TP is the PusKesMas activities reporting system managed by BINKESMAS or the General Directorate of Community Health. It is often referred to as the "Integrated Reporting System" because it is supposed to provide information on epidemiology and pharmaceutical supplies for all health centers.

In its current incarnation, SP2TP forms report on morbidity, status of drug supplies, health services and status of personnel down to the PusKesMas level.

While this information system is managed by Binkesmas, selected forms are made available to various offices in other Directorates General which need the information they contain. For purposes of this discussion, the relevant forms are those dealing with morbidity (LB1) and drug supplies (LB4).

At the kabpuaten level, information on monthly consumption at all PusKesMas only is consolidated twice a year on the DLB4 form and forwarded to the province and national levels. Thus in June and January, semi-annual records of kabupaten-wide consumption become available.

The LB4 forms have column to provide issue and stock level data from INPRES, ASKES, and "Other" sources. Review of forms at Binkesmes however, shows that information is frequently not included for all sources. It was observed that often only the INPRES columns contained data.

The SP2TP flow of information is as follows:

PusKesMas staff fill out the LB1 morbidity report and send it to the kabupaten level once every three months. There kabupaten staff consolidate this information into the form DLB1 and send it to both the provincial and central levels. Thus for morbidity, this system supplies the province with quarterly kabupaten-wide summaries, but not reports on individual PusKesMas.

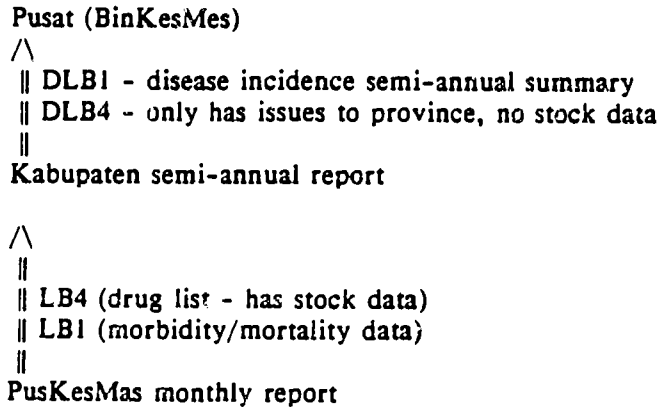
TABLE 3

PUSAT
ORS SUPPLY MANAGEMENT INFORMATION SOURCES
ROADMAP OF CONTACTS, DOCUMENTS & TIMING
INFORMATION SYSTEMS (NO NEEDS ESTIMATION OR PROCUREMENT INFORMATION)

PROGRAM & LEVEL	STATUS	DISPENSING	MORBIDITY	DISTRIBUTION ALLOCATION	STOCK LEVEL MONITORING
SENTINAL SYSTEM					
Pusat	Avail.	YES	YES	NO	yes
Dr. Harraiti	Form	Sentinal System Recap Report monthly/YTD by Province	Recap Report monthly/YTD		Recap Report monthly/YTD
ST2TP (Binkesmes)					
Pusat	Avail.	YES	YES	NO	NO
	Form	LB4	LB1/DLB1		
		MONTHLY/YTD	MONTHLY/YTD		
Province	Avail.	YES	YES	NO	NO
P2D (CDD)					
Pusat	Avail.	YES	YES	NO	NO
	Form	Prov Dia Sum.	Prov Dia Sum. (White sheet)		
Province	Avail.	YES	YES	NO	NO
	Form	Prov + KBP Dia Sum	Prov + KBP Dia Sum pink sheet		
SPECIAL OUTBREAK					
Pusat	Avail.	YES	YES	NO	NO
	Form	OPL	OR		
	When				
Province	Avail.	YES	YES	NO	NO
	Form	OPL	OR		
	When				

For ORS supply purposes, the LB1 (morbidity report) and LB4 (drug report) are the most important sources of data.

Below is a diagram of the LB1 and DLB1 LB4/DL4 form flow.



In summary, the SP2TP integrated information system contains data on morbidity, and ORS stock data. Concern has been expressed by numerous parties that the data is not reliable or complete, and that reports are difficult to obtain from Binkesmas. The potential for SP2TP to provide ORS management information is there, but the information generated by the system should be reviewed to determine its accuracy and utility to CDC.

4.2. SENTINEL SYSTEM

Contact: Dr. Hariati
Sub Directorate Surveillance
CDC Complex
Jalan Percetatan Negara, Jakarta
Tele. 420-1511

This is a pilot reporting system begun in January 1988 by the General Directorate P2M's Sub Directorate of Surveillance in cooperation with CDD and Immunization. The Sentinel System collects and processes data on morbidity/mortality, stock levels, etc. on one PusKesMas/kabupaten -- a total of 302 PusKesMas in all 27 provinces in Indonesia. Personnel at these PusKesMas have been specially trained to participate in the Sentinel System by the P2M Sub Directorates for Surveillance, P2M and Immunization.

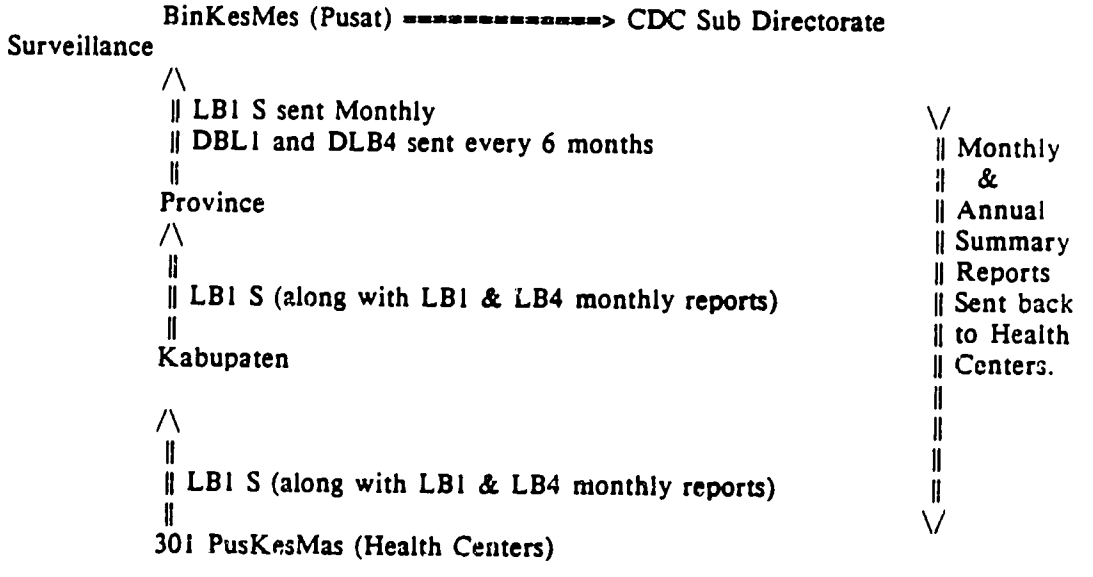
The Sentinel System uses only one form, the LB1 S. This form flows through the Integrated reporting system (SP2TP), but, in addition to the routinely collected data under the SP2TP, the Sentinel System collects data on the status of dehydration and the status of vaccination of EPI cases.

Conceptually, the Sentinel System could be viewed as an amplified data subset of the SP2TP (Binkesmes) integrated system.

Because the Sentinel System was designed to compliment the SP2TP information system the flow of reports is also similar. The LB1 S reports are sent from the participating PuskesMas to the provinces to the Information Section at BinkesMas Central, who in turn forward the reports

to the P2M Sub Directorate Surveiilance for processing. The processing is designed to have a turn around time of less than one month to enter data and generate reports to be sent back down to each participating PusKesMas. There have been delays however, in obtaining the LB1 S forms from Binkesmes in a timely manner.

The system is diagramed below:



The computer program utilized by the Sentinel System is written in dBASE III. This means that any of the primary data are accessible from the database files by using dBASE III, so that special analysis or reports could be generated outside of the routine reports generated monthly.

The reports generated by the Sentinel System are summary statistics, many of which are expressed in percentages. This is true of the stock levels expressed as "average total months when PusKesMas stock was below the minimum level". In order to get the actual stock count, one must either work backwards using the population and percent, or go to the primary data as submitted on form LB1 S, and as entered into the database.

Below is a summary of the statistics generated for diarrheal diseases. A complimentary set of indicators is provided for immunizable diseases, but are not included in this report because our focus is on ORS supply.

MONTHLY STATISTICS:

- Population of the PusKesMas
- Total and % of diarrhea cases by age
- Total cases and % of dehydration by status
- Total and % of cases treated with antibiotics
- % of minimum stock level
- Total and % of ORS distributed by kader
- Total and % of cases seen by kader

YEARLY STATISTICS:

- Total cases of diarrhea and % by age
- Diarrhea cases/100,000pop
- Total average stock of ORS
- Average stock of ORS
- Average # of months stockouts
- Total packets used by size
- Average # packets/person/population by ORS pack size
- Average total 200cc equivalent/case
- % of ORS given by kader

The Sentinel System is the most complete information system available on ORS supply management for prevalence rates and ORS availability. Conclusions on ORS use and supply have potential utility for projecting national estimates.

The question to ask however is: "How representative are the data to the rest of the country?" The statistics generated above can however, provide a benchmark or comparison which can be used by CDD staff and other health providers.

4.3. P2-DIARE

CONTACT: Dr. Widodo
Surveillance Section Chief
CDC Complex
Jalan Percetatan Negara
Jakarta
Tele. 417-608 Pes 42

Within P2M, there is also separate CDD Information System called P2-Diare which provides morbidity data and ORS supply data. In principal, this system is only used for the "so called" CDD PusKesMas, that is PusKesMas for which the staff have received special orientations in the activities of the national CDD Program. In most provinces, all PusKesMas are considered CDD PusKesMas, so that the P2-Diare information system, like SP2TP covers the whole province, however it was uncertain from CDD reports how many and which PusKesMas were included from each province.

All data for the P2Diare system is collected at a meeting held once yearly for the CDD provincial staff. At this meeting the provincial officers bring their data and a recap report is made. The P2M staff did not express a high degree of confidence in the quality of the data summarized at the yearly meeting.

There does not appear to be much utilization of the reports or feedback to the provinces at this time.

All of the forms in the P2-Diare system have a section for PusKesMas based information, and one section for Kader or community based information. Within each of these sections, there are columns for reporting numbers of cases of diarrhoea treated by age group and columns for reporting quantities of ORS dispensed.

The P2-Diare Information system is intended to work as follows:

* KADER fill out the "Laporan Penderita Diare" form and send to PusKesMas.

|| Laporan Penderita Diare Form
||
|| Monthly report to PusKesMas
\/

* PUSKESMAS staff, using their internal records for the PusKesMas section and the Laporan Penderita Diare for the Kader section, fill out the Rekapitulasi Laporan Penyakit Diare (PusKesMas green form). This is submitted to the kabupaten monthly.

|| Rekapitulasi Laporan Penyakit Diare (PusKesMas green form)
||
|| Monthly report to kabupaten
\/

* Kabupaten staff consolidate all data from the PusKesMas into one report from the kabupaten using the Rekapitulasi Laporan Penyakit Diare (kabupaten pink form). Each PusKesMas is listed separately on the form. This is submitted to the province level once each month. This means that province staff have a record of morbidity and ORS consumption for each Puskesmas.

|| Rekapitulasi Laporan Penyakie Diare (kabupaten pink form)
||
|| Monthly report to province.
\/

* Province staff consolidate all data from the kabupaten forms into one report for the province using the Rekapitulasi Laporan Penyakit Diare (Propinsi white form). Each kabupaten is listed separately on the form. In theory, this form is submitted to the pusat level once each month. In reality, summaries are done at annual CDD meetings. After the meeting, P2M staff have profiles of morbidity and ORS consumption for each province.

|| Rekapitulasi Laporan Penyakie Diare (province white form)
||
|| Monthly report to P2M (CDD), in reality,
\/ yearly summaries made at CDD planning meeting

At CDD Sub Directorate Dr. Widodo did not receive the LPD form from 2 of the 27 provinces. The CDD representatives were not at the yearly meeting. He stressed that unless the meeting is held, there would probably not be a P2Diare summary. He expected that the P2Diare system to be eventually phased out once the SP2TP integrated system is considered reliable. However, there is no current timetable for phasing the P2Diare system out.

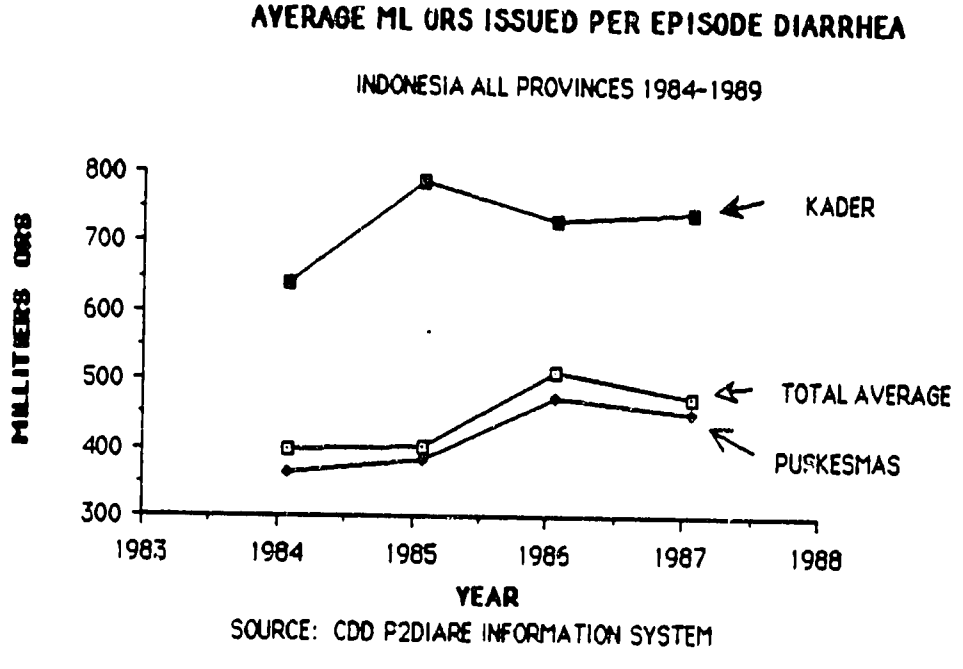
Even though the data from the P2Diare information system is not viewed with high confidence, it has been gathered, assimilated and serves as a basis for comparisons. Whereas morbidity data from the P2Diare system has been summarized, the ORS issue data from was not.

Using provincial reports from the P2Diare system for 1984 - 1987. ORS issue data from the four years were analyzed. When combined with population estimates, some interesting use indicators were generated regarding:

- the average milliliter issued/episode issued by health center, and by Kader,
- the defined daily dose/1000 population by each province, and as a national average

Over the four year period there was a definite trend of increasing the number of milliliters issued per diarrhea case by kader and health centers. The total average milliliters of ORS increased from 382ml in 1984 to 459ml in 1987. Interestingly, kaders issued significantly more ORS volume/case than did the PusKesMas. Figure 2 below shows the trend and range among the 27 provinces.

Figure 2



Annex D contains summary sheet printouts and results. This type of issue analysis could be routinely done by the CDD staff using morbidity data and ORS issue statistics obtained from the Sentinel System, SP2TP or the special survey.

In summary, the P2Diare information system is working, but there is concern about the accuracy and completeness of the data. The P2Diare information has the advantages of providing:

- data are available on morbidity/mortality by age group and provider type (Kader and PusKesMas).
- issue data reported by package size for provider type. This can give some indication of usual dosages issued.
- once yearly data summarized at the provincial CDD officer's meeting. Results of the provincial P2Diare could be summarized and discussed at the yearly meeting. With implications for each provinces program performance.

Additionally, the P2Diare system has the potential advantage of data quality control within the CDD Sub Directorate.

The disadvantages of the P2Diare system are that:

- Data is not verified or qualified. Some doubt its accuracy and completeness.
- The same data could be obtained from the SP2TP system, however the CDD does not view the integrated system as reliable or accessible.
- The P2Diare will be discontinued once confidence is gained on the SP2TP integrated system.

4.4. OUTBREAK REPORTING SYSTEM.

CONTACT: Dr. Hariati
Surveillance Section Chief
Sub Directorate Surveillance
CDC Complex
Jalan Percetatan Negara, Jakarta

Overall, this information system is managed by the P2M's Sub Directorate of Surveillance. Whenever an outbreak of infectious disease occurs, the nearest PusKesMas is supposed to prepare Laporan Kejadian Luar Biasa/Wabah (Outbreak Report Form), which identifies the type of outbreak and the number of people affected by it. This report is supposed to be forwarded up through kabupaten to province to pusat as quickly as possible, ideally within 24 hours.

Where diarrhoeal disease is concerned, province levels usually maintain the drugs received from P2M as part of a safety stock for outbreaks. This stock also contains ORS as well as tetracycline and ringers lactate. If P2M province staff determine that a reported outbreak requires additional stocks of any of these products, they are sent to the PusKesMas in question, PusKesMas staff fill out an Outbreak Patient list which has a column for the number of packets of ORS dispensed to each patient. PusKesMas send this form back up the line to the province.

What all this means is that when outbreaks occur, the Outbreak Reporting system provides data on morbidity and ORS dispensing (but not stock levels) and this information is available at the PusKesMas, kabupaten and province levels. While Outbreak Reporting System was not designed to monitor the use of P2M ORS supplies, the fact that P2M ORS comprises an outbreak safety stock means that the this system provides certain types of information concerning the use of that stock in the form of packets issued to patients.

We were told at the province and pusat levels, that this system generally does not work and is not used for any qualitative or quantitative program analysis.

4.5. ORS MANAGEMENT ASSESSMENT PACKAGE

CONTACT: Daryono Adi
Evaluation Section Chief
CDC Complex
Jalan Percetatan Negara
Telp. 417-608 Ext. 42

The Sub Directorate CDD is in the process of developing an automated survey package that can be used to make base line assessments and post intervention assessments of ORS management within a given province. At present, this survey package consists of

* data collection instruments, and

* check lists explaining how to tabulate and analyze the data collected using published software programs such as dBase M+, Lotus and HPG.

This set of materials has been used to produce baseline surveys in South Sumatra and South Sulawesi. The reason the package was developed is that there is no way to construct a complete profile of ORS management within a province using the data that data that are routinely collected at the central or provincial levels.

The package uses two basic indicators, that is

* Reported incidence of diarrhoeal disease per 1000 persons and by population per month, and

* Mixed liter equivalents of ORS.

These indicators are used alone and in combination to produce simple graphic reports to illustrates quantitative findings concerning five topics of
ORS management. The topics and reports produced are summarized below.

Management Topic	Concept Reported
* Estimated Demand	+ MLE ORS Dispensed/1000/month
* Procurement	+ MLE ORS Procured/1000/month
	+ % Total MLE ORS Procured in 200cc and 1000cc packet sizes
* Distribution	+ Months of ORS in stock at all levels of the distribution system, based on reported incidence, % cases receiving ORS, and average MLE ORS dispensed.
* Product Use	+ Average MLE ORS dispensed per case broken down by both packet size and age group
	+ Profile of types of drugs prescribed for diarrhoeal disease
	+ Profile of costs for all drugs prescribed for diarrhoeal disease

To produce these outputs, the survey package carries out two separate sub studies. One is a "Management Study" using reported incidence of diarrhoea plus ORS procurement and distribution data collected at the province, kabupaten, PusKesMas and Community levels. The other is a "Prescribing Study" using data on drugs prescribed which is all collected at the PusKesMas level. The results of the two sub studies are then combined to produce graphic reports of the concepts described above.

In its current form, the Assessment Package is considered a prototype. As noted has been successfully used to support CDD Program activities in South Sumatra and South Sulawesi. It is, however, only semi automated and this limits the sample sizes and raises the costs of collecting and analyzing data. Plans call for greatly increasing the degree of automation so that in the future province specific ORS management profiles may be constructed with relative economy and efficiency. In general, it envisioned that use of this package will be combined with analysis of routinely collected data from all of the information sources already discussed in sections 3 & 4 into an overall ORS management information strategy.

4.6. SUMMARY

From closely categorizing the ORS supply data available from each of the programs and supply sources it is clearly evident that no one system currently can provide complete supply management information. Rather a patchwork approach could be taken in the short term to obtain data that will give a the most complete picture possible of the national ORS supply status.

Programmatic implications of further comparing qualitatively and quantitatively the data from various sources needs further attention. Some potential CDD program uses might be to conduct an analysis and trends from data in each system to compare results generated by the SP2TP, Sentinel System, and P2 Diarrhea information systems. This could be viewed as a cross check of information system as well as program performance. Some comparisons might include:

1. How data analyzed from the four information systems agree or differ.

2. The insights each information system might provide on training in diarrheal case management (from Sentinel System and special survey)

3. Rational or irrational use of ORS by age group and dehydration status (from Sentinel System only)

4. Use of antibiotics and antidiarrheal drugs in treating diarrhea (from Sentinel System, or Special survey)

5. Health Center Trends as to the decrease of serious diarrhea cases seen, implying that ORS is being used in the home and available as a preventative measure. (Sentinel System, P2-Diare and Special Survey).

6. Trends of Kader (community Health Workers) treating ORS outside the health center; also implying acceptance of ORS as a cost-effective, accessible treatment. (Available from Sentinel System and P2Diare).

7. Availability of adequate supplies of ORS at PusKesMas and to Kader. (Sentinel System, and SP2TP for stock data).

At the national level, it is clear that no one single office or information currently contains a complete set of supply system data (selection, procurement, distribution and use) required for informed management of all the steps of the supply cycle, including needs estimation, procurement, distribution and product use. The ST2TP Reporting System comes the closest in that it contains forms for morbidity trends, stock levels and consumption, but it is considered to contain incomplete data, and summary results are difficult to obtain from Binkesmas.

For most of the systems there is reasonable doubt about the completeness of the information available.

In general, the types of supply information are located in:

PROCUREMENT SOURCES	INFORMATION SYSTEMS
Needs Estimation Documentation	Stock Levels
Quantities Procured	Quantities Dispensed
Quantified Distributed	Cases of Diarrhea Reported

Additionally, because multiple systems are in place, there is a high probability that double counting of ORS stocks from multiple sources is unavoidable. The result is duplication, and a lack of an integrated set of information for ORS supply managers.

The reliable data available at the national level are on estimations, allocations, procurement, and distribution to the province. In other words: what ORS supplies are going into the distribution system.

Data at the other end of the supply system are less available; that is distribution and use data below the province level. This gap is partly addressed by the Sentinel System and the special survey.

SECTION 5

FINDINGS AND IMPLICATIONS

5. SUMMARY OF FINDINGS

In Sections One and Two of this report, we propose using mixed liter equivalents and defined daily doses of ORS plus reported incidence of diarrhoea as indicators for monitoring and comparing performance on a range of ORS management topics including;

* Production
* Demand Estimation
* Product Selection
* Procurement
* Distribution
* Product Use

Sections Three and Four, went on to describe the data for producing these indicators that are currently available from two categories of sources, that is, the programs that procure ORS and existing MIS within the Ministry of Health. Based on all of the foregoing, we may summarize the key findings as follows: (Table 4 shows these results in matrix form.)

1. Data relevant to ORS supply management are to be found in at least ten different sources located in eight different offices in Jakarta.

2. No single procurement program or MIS currently supplies all of the information required for monitoring the whole range of ORS management topics.

3. The apparent quality and completeness of the data sets in different locations varies greatly. In general, data from the procurement programs on the topics of needs estimation, procurement and distribution to the province level appeared to be accessible, consistent and reliable. The only constraint with these data sets is that information on the different topics becomes available from different programs during different months of the year.

4. The data sets available for monitoring stock levels, dispensing of ORS and reported incidence of diarrhoeal disease are in many important respects incomplete and there is in general much doubt about their reliability

   An apparent exception to this rule is the Sentinel System which provides consistent data sets on stock levels, ORS dispensing, reported incidence of diarrhoea, and degrees of dehydration. This data is only available, however, for one PusKesMas in each kabupaten in the country.

TABLE 4

ORS SUPPLY MANAGEMENT INFORMATION SOURCES

PROGRAM & LEVEL	NEEDS EST.	PROCUREMENT	DISTRIBUTION	STOCK LEVEL MONITORING	DISPENSING	MORBIDITY
GIZI	yes	yes	?	?	no	no
P2M (CDD)	yes	yes	no	no	no	yes
APBD	no	no	no	no	no	no
INPRES	yes	yes	yes	no	yes	no
ASKES	yes	yes	yes	no	yes	no
INFORMATION SYSTEMS						
SENTINAL SYSTEM	no	no	no	yes	yes	yes
ST2TP (Binkesmes)	no	no	no	no	yes	yes
P2D (CDD)	no	no	no	no	yes	yes
SPECIAL OUTBREAK	no	no	no	no	yes	yes

5. Data on commercial production of ORS is available from POM on a quarterly basis. POM staff feel, however, that this data as provided to them by manufacturers may underestimate actual production.

6. Ministry staff in every location visited were unfailingly cooperative in arranging appointments and informing us about the types of ORS management data available. All parties indicated that they would be willing to cooperate in data collection efforts in the future.

   At this time however, it appears that no one associated with an ORS procurement program or MIS is analyzing available data for purposes of monitoring or evaluating management of the product.

   It also appears that no party is engaged in gathering data from outside the information source with which he or she is affiliated. Thus GIZI has unanalyzed data on some topics of ORS management but is unaware of information that might be available from P2M. No office has or is attempting to construct a complete profile of the whole situation.

7. All of these findings are for the central level. Comparable information was collected for South Sulawesi. In general, the situation there was very similar to the central level. For example, the pattern of reasonably complete data for needs estimation and procurement, but doubtful data for stock levels, dispensing and reported incidence of diarrhoea also prevailed for South Sulawesi.

   We feel, however, that findings for South Sulawesi alone are not sufficient to generalize about province level ORS information management for the whole country. Accordingly, it is best to defer a presentation of findings for provincial/sub provincial levels until situations have been reviewed in other provinces. In the meantime, the information gathered in South Sulawesi has been compiled into a case study which is appended to this report.

SECTION 6

NEXT STEPS

6. NEXT STEPS

The findings of this study suggest that it is feasible to formulate a strategy for routinely collecting and analyzing data on ORS management in the public sector. While it may be difficult to collect complete and consistent information on every topic, it is easily possible to make much, much greater use of the various data sets that are available. Reaching the point at which the Sub Directorate CDD can routinely collect, analyze and feed back available information on the complete range of ORS management topics should not be difficult. But there are many things to do and decide. Accordingly, it will be useful to define the tasks that lay ahead and prioritize them into sets of those activities which need attention in the near future and those which may be done at a later date.

1. TO DO SOONER

1. Standard Indicators

Specify the indicators to be used for monitoring the status of the six topics of ORS amendment already identified. There are a bunch of picky little questions to be answered and this requires dialogue with a number of parties located in different offices. To give an example, the current iteration of the "ORS Management Assessment Package" use mixed liter equivalents as an indicator for quantifying estimated demand, procurement and doses of ORS dispensed. The Sentinel system uses 200cc equivalents for quantifying stock level and dispensing. We need to settle on one of these. Which is best, considering the advantages and disadvantages of each? Another example is whether to use the "defined daily dose" concept. If it is to be used, what should that dose be? This report has illustratively suggested one liter, is there a more appropriate figure?

2. Assess Quality of Data Sets

Our assessment is that some of the data available at this time, particularly those relating to needs estimation and procurement, are reasonably reliable and should be used. Other data available on such topics as stock levels and dispensing are so dubious as to not be worth tabulating and analyzing. As specialists in supply management, we feel comfortable making those generalizations. Less clear to us at this time is the utility of morbidity data available through the SP2TP and Sentinel Systems. What are the strengths and limitations of these data sets? How may they be profitably used to produce indicators of reported incidence of diarrhoeal disease? These must be clarified.

3. Retrospective Analysis

Once indicators have been fixed for each ORS management topic, data should be gathered retrospectively from all relevant sources and annual profiles of ORS management for the last five years should be prepared. Annual profiles may then be compared in terms of different management topics to identify trends. An

outside consultant should be brought in to assist the Sub Directorate in (1) designing data collection forms, (2) collecting data retroactiverly for four to five years, (3) analyzing data, and (4) making recommendations based upon trend analysis.

Within the General Directorate CDC, there are two data sets which bear working with. These are the information accumulating from the Sentinel System and the data available from the P2-Diare system. As part of the "retrospective stage," these data sets should receive special attention and be tabulated and analyzed in terms of the indicators and management topics that are applicable for the type of information they contain.

4. Special Survey ORS Management Assessment Package (MAP)

It is clear that some ORS management topics cannot be reliably quantified from the data currently accumulating at the central level. One example is actual prescribing practices for diarrhoea including doses of ORS dispensed. This information is essential for producing estimates of current demand. Another example is stock levels at warehouses and clinical facilities. Such information is necessary for estimating the months of ORS in the pipeline. This information can best be assembled at this time through surveys rather than routine data collection. As already noted, the Sub Directorate CDD has been developing the ORS Management Assessment Package (MAP) to provide current profiles of ORS management within provinces. The MAP can be used to fill in gaps in information supplied through the routine sources. It is important, therefore, to formulate a plan for systematically using the MAP in a coordinated fashion with analyses of routinely collected data. Within the context of the HTRD/CDD Project there are implications here for funding and allocation of Sub Directorate staff time.

2. TO DO LATER

Provincial Processing

After an approach for managing ORS information available at the central level has been developed and tested it will be time to pay attention to the province level. The case study on South Sulawesi shows that available information on ORS at this key operational level is not being systematically used to plan and evaluate the implementation of CDD Program activities.

In other areas such as case management, establishment of diarrhoea training units, and training of community based workers and distribution of ORS, the Sub Directorate has developed packages of materials that provide detailed guidance on how to proceed. This could also be done for ORS information management. Before making that decision, however, it would be best to define a complete package of province level MIS for CDD materials for all aspects of program management. Thus the ORS management information materials would be included as a sub set of the larger package. This activity should take place after the National Retrospective ORS Supply Management Analysis.

ANNEX A

DIRECTORY OF PERSONNEL

HAVING ORS SUPPLY MANAGEMENT INFORMATION

DIRECTORY OF PERSONNEL
HAVING ORS SUPPLY MANAGEMENT INFORMATION

CONTACT & ADDRESS	WHEN VISIT	DATA TO COLLECT	DOCUMENT(S) CONTAINING DATA
INPRES & PRODUCTION			
Ibu Andayanginsih, MSc Director of Drug Control POM Jl. Percatakan Negara Telp. 414-755	May/June April Quarterly June	Procurement EOY Stock National ORS Manufacture	Figures available To be supplied Figures available
ASKES			
Drs. Husni M. Noor, M.Chem Ka. Bid Pelayanan Obat & Alat Kesehatan Office Address Perum Husada Bhakti Jln. Let. Jen. Suprapto P.O. Box 391 Jkt. Cempaka Putih Jakarta Telp. 416-063 Pes 46	Nov Feb Jun & Dec	Needs Est. Allocation Stock Mon.	Recap Rencana Kebuthuan Obat-Obatan Daftar A, B1,B2 - Printout Alokasi Kebutuhan Obat Daftar A,B1,B2. Printout Laporan Penerisaan Dan Pengeluaran Obat (LPPO) (only about 10% complete)
GIZI			
Drs. Suparman Head of Family Nutrition Improvement Program (UPTC) Tim Percetaleau Negara 23A Jakarta Telp. 414-693	ab/Mar	Needs Est.	Hasi Perteuan Konsultasi Pindro Perbaiken GIZI Daerah dan Pusat (Bound Report)
UNICEF			
H.R. Lerrick UNICEF Contracts Officer Wisma Metropolitan 11 11th Floor, Kav 29, Jalan Jwero, Sudirman Telp. 578-1366 Pes 273	Dec	Procurement	UNICEF Contracts Lists province procurement

DIRECTORY OF PERSONNEL
HAVING ORS SUPPLY MANAGEMENT INFORMATION

CONTACT & ADDRESS	WHEN VISIT	DATA TO COLLECT	DOCUMENT(S) CONTAINING DATA
P2M (CDD)			
Daryono Adi, BSc. Evaluation Section Chief Sub-Directorate CDD, P2M Jl. Percetatan Negara Telp. 417-608 Pes 42	Oct Jan	Needs Est. Procurement	Annual CDD Plan (Bound report) Final Budget to Provinces
APBD			
Provincial Contact Address by province	?	Procurement	Province Specific
SENTINAL SYSTEM & SPECIAL OUTBREAK			
Dr. Hariati Sub Dir. Surveillence Surveillence Section Chief P2M Jl. Percetatan Negara Telp. 420-1511	Monthly	Use, Morbidity, Stock	LB1 S (primary data) Printouts of statistics
SP2TP			
Ny Horry Fangidae, SKM Kabag. Informasi Set Ditjen Binkesmas Jl. Prapatan 10, Jakarta Telp. 355-158/9	Aug & July	ORS Issued Morbidity	Recap DLB1 & DLB4
P2Diare (CDD)			
Dr. Widodo Surveillence Section Chief P2M Jl. Percetatan Negara Telp. 417-608 Pes 42	Sept?	Morbidity	Distribusi Penderita & Kematian Diare. Menurut golongan Umur umur dan pengguuaan Oralit di Puskesmas. Also for
YAH MEDIK			
Ny Mardiah Mawardi Director of Information Set Ditjen Binkesmas Jl. Prapatan 10, Jakarta Telp. 354-434		Morbidity same as Sentinal System	Refer to Sentinal System Reports Sub Dir Surveillence

FILE:ROADMAP.WK1

ANNEX B

LIST OF PERSONS CONTACTED

SUMMARY OF ACTIVITIES AND MEETINGS
DURING ORS SUPPLY MANAGEMENT INFORMATION SYSTEM STUDY

Week One - Jakarta

Dr. Sutoto	Sub Directorate/CDD
Daryono Adi	Sub Directorate/CDD
Ibu Horry	Binkesmas Information System
Dr. Suparman	GIZI, Head of Family Nutrution Project
Joy Riggs-Perla	USAID
Dr. Hariati	Sub Directorate/Surveillence
Dr. Djumhana S.	Sub Directorate/Surveillence

Week Two - SUSEL

Moh. Anoari Saleh	Provincial Health Officer
Dr. Darmin Tangsa	INPRES
Dr. Nadia H.	GIZI
Dr. Yenny	ASKES (PHB)
Dr. Musaka R.	P2M (APBN)
Dr. Wijayanto & Staff	P2M SUSEL

Week Three - Jakarta

Dr. Rob Northrop	PRITECH Project
Daryono Adi	CDD - P2M System
Dr. Widodo	P2Diare Information System
Husni M. Noor	ASKES
Dr. Surandurri	ASKES
Dr. Benson Hausman	Sentinel System
Dr. Pong Tengko	Bureau of Plan

Review Meeting of Preliminary Findings - Attendees

Dr. Hariati	Dr. Widodo
Bill Emmett	Dr. Benson Hausman
James Bates	Patricia Foreman

Eschlon One Meeting, CSP Studies Presentation

AID Briefing on Preliminary Findings - Attendees

John Rogosh	Ann Peniston
Joy Riggs-Perla	James Bates
Patricia Foreman	

Briefing for CDD Dr. Sutoto, Daryono Adi

Week Four - Jakarta

Rodney Hatfield	UNICEF Project Officer, Health (EPI)
H.R. Lerrick	UNICEF Contracts Officer
Ibu Andayanginsih	POM, Director of Drug Control
Husni M. Noor	ASKES
Dr. Surandurri	ASKES
Ibu Mardiah Mawardi	Directorate Gen. for Hospital Services

Briefing for USAID

ANNEX C

PROVINCE CASE STUDY

OF

ORS SUPPLY MANAGEMENT INFORMATION

CASE STUDY

ORS INFORMATION MANAGEMENT IN BANGDANG

WORKING DRAFT
8 December 1988

NOTE: The names of personnel and places have been changed in this case study. However, the results of the interviews, and all the data are based upon real figures.

I. BACKGROUND

Dr. Oralit is the chief of the CDD program for Bangdang. In this capacity, he is responsible for planning the province's ORS needs and monitoring the status of supplies throughout the year. The purpose of this case study is to review the types of information available to him to use in carrying out these tasks.

The ORS Management Baseline Study, conducted by the Sub Directorate CDD showed that for FY87/88 ORS was supplied to Bangdang by the following sources:

ORS SUPPLY TO BANGDANG (FY87/88)

PROGRAM	200cc PACKETS	% 200cc SUPPLIED	1000cc PACKETS	%1000cc PACKETS
GIZI	471,000	78%	0	0
P2M (CDC)	71,000	12%	0	0
APBD	55,000	9.2%	0	0
INPRES	1,734	0.3%	238	100%
TRANSMIGRASI	200	0.03%	0	0
TOTAL	598,934	100%	238	100%

Our review showed that data concerning the ORS supply was available in:

* information systems located in the administrative offices respective to each of these procurement sources, and
* the CDD program office.

Section Two of this report summarizes the nature and source of the information available in all locations by (A.) procurement programs and (B.) within the CDD program.

Section Three of this study provides an analysis of constraints and opportunities for using available data.

2A. SOURCES OF INFORMATION - PROCUREMENT PROGRAMS

In Bangdang each of the programs listed above were visited to inquire about the information they had regarding ORS supplies. The topics reviewed included:

1. Approach to Needs Estimation
2. Procurement and Distribution of ORS
3. Stock Level Monitoring
4. Dispensing Data
5. Report Formats
6. Data Interpretation/Utilization
7. Data Flow Cycle

A summary of each program's approach to ORS data management follows.

GIZI (Nutrition)

By far most of the packets supplied (over 99%) were of the 200cc size and of these, over 78% were supplied by GIZI. This makes the nutrition program the biggest supplier of ORS to Bangdang.

1. Approach to Needs Estimation. The ORS needs estimation is based upon the standard national formula for the UPGK Project; 50 packets for "old" Pos Yandu participating in the Project and 100 packets for "new" Pos Yandu.

GIZI only provides 200cc ORALITE packets. The estimation and supply for the next Fiscal Year is made once yearly in February/March.

2. Procurement and Distribution of ORS Packets. ORS procurement is arranged by the UPGK Project at the national level, with funding from UNICEF. UNICEF Project managers tender and contract with an Indonesia commercial manufacturer for ORS supplies for all provinces.

Usually in September, the order for an entire year's ORS stock arrives at the provincial warehouse. The ORS is held there until all supplies for the UPGK Program are received (Vitamin A, scales, etc.) so as to deliver the required materials at the same time. Distribution must be made before the end of the fiscal year or funds available for transportation expire.

3. Stock Level Monitoring. PusKesMas Stock levels are reported monthly to the province as the end-of-month stock balance. This is done on the GIZI monitoring form which is forwarded to the kabupaten and province levels.

4. ORS Dispensing Data. Not monitored.

5. Report Formats. Monthly reports containing end-of-month stock balances are sent from the health post to the provincial office. There the data is summarized into a consolidated provincial report and sent to the GIZI office in Jakarta. Data from each individual health post, therefore are available at the province and kabupaten levels, but not at pusat.

6. Data Interpretation/Utilization. ORS supply management data does not appear to be analyzed or utilized by decision managers. We were also told by province staff that they do not have a high degree of confidence in the primary data. When the province staff went to verify the reported

PusKesMas stock records against actual stock levels, they found that there were differences, and are not highly confident in the reported stock statistics.

7. GIZI Data Time Cycle.

April	-	Needs estimation done by province & pusat
August/September	-	ORS arrives at GIZI province warehouse
October	-	distribution to health posts(when all supplies arrive)
Monthly	-	reports sent to province
Yearly	-	summary report sent to pusat

P2M (CDC)

P2M/PLP (or CDC) is the General Directorate responsible for administering the National CDD program. Within P2M, the Sub Directorate CDD is the implementing agent. P2M has a budget for procuring drugs required for its various programs such as CDD, EPI or TB. Within P2M, the Sub Directorate CDD is responsible for administering funds available for procurement of ORS.

In FY87/88 the P2M supplied approximately 12%, or 71,000 packets of the ORS in Bangdang.

1. Approach to Needs Estimation. Needs are estimated at the National level by the Sub Directorate. The approach is to take the total budget available for ORS procurement and allocate the funds to provinces proportionally by population.

For FY1988/1989 Bangdang allocation was 500 packets of 200cc ORS for each of the 225 PusKesMas or 112,500 total packets.

2. P2M Procurement and Distribution of ORS. The Sub Directorate CDD's budget allows 110 Rp. per 200cc product. The total allowance is allocated to the province and the provincial CDC office arranges procurement with a commercial supplier. The province negotiates the price with the supplier and may attempt to get a lower unit price than the 110 rupees allocated.

The ORS is stored in the P2M warehouse. The ORS is not normally distributed to the kabupatens but kept in reserve for outbreaks of diarrheal disease.

3. Stock Level Monitoring. Stock records show the quantities on hand in the P2M warehouse. This information is not regularly reported to the national level (pusat).

If shortages occur, province requests more ORS from the Sub Directorate CDD's national safety stock in Jakarta.

4. Consumption (use) Data. When an outbreak of diarrheal disease occurs, clinical facilities provide the P2M ORS to kabupatens for operating stock according to need. There is no special formula for calculating buffer stocks. The Laporan Penderita Diare (LPD) form has a column to report the amount of ORS given to each patient seen. This is then totaled on an outbreak patient list. Thus, no stock data is fed back to the province, only ORS issue data.

5. Report Formats. There is no special information system for tracking P2M ORS. Since this stock is held in reserve for outbreaks, the information system most relevant to it is the outbreak Reporting System. This is discussed in point B below.

6. Data Interpretation/Utilization.

7. Data Time Cycle.

March	Needs estimation form received at province
April	Beginning of Fiscal Year and funds become available
June/July	Plan of action is ready.
August	Contract signed and ORS purchase is made
September	ORS delivered to province

APBD (Local Budget Funds)

APBD is not a program but rather a line-item in the provincial budget for the purchase of supplies, including ORS, on a contingency basis. Not every province uses APBD funds to buy ORS. However, in Bangdang the FY87/88 APBD funds were used to purchase 55,000 packets of 200cc ORS. They represented over 9% of the total packets supplied to Bangdang. For this reason we have included APBD in the study as a source of ORS supply.

Conceptually, the APBD funds could be viewed as a safety valve to compensate for shortfalls in ORS supply from other sources.

1. Approach to Needs Estimation. In Bangdang, the ORS supplies coming from other sources (ASKES, INPRES and GIZI) are totaled. and based upon this total, and an average packs/case an estimate is made as to the total demand. The total estimated need is compared with the total supply to calculate any shortfall. If there is a shortfall, then APBD funds are requested from the Governor's office to purchase ORS. Last year 600 packets per PusKesMas were provided by APBD funds.

2. Procurement and Distribution of ORS. Procurement is done locally by tender and negotiation with local suppliers. The suppliers ship the ORS directly to the province depot which then delivers the ORS to the kabupaten. Supply to the PusKesMas and consequently to the basic health worker is done on an as needed basis.

3. Stock Level Monitoring. There is no special approach to monitoring APBD supplies as a category distinct from other supplies.

4. Consumption (use) Data. Morbidity/dispensing data used to estimate need.

5. Report Formats. Invoice vouchers.

6. Data Interpretation/Utilization.

7. Data Time Cycle. The time cycle is outlined below:

April	Budget is obtained for the province
May/June	ORS estimation and planning completed
July	Tender and purchase ORS from local supplier
August	ORS supplies delivered to kabupaten. Further distribution done on an "as needed" basis.

INPRES

The INPRES drug supply system serves the entire Indonesian population for all drugs included in the basic list of 178 essential drugs as determined by POM (Food and Drug Administration). The list of drugs is intended to meet both the preventative and curative needs of hospitals and health centers. Each kabupaten is allotted Rp. 450 per person to order INPRES drugs.

1. Approach to Needs Estimation. The National INPRES program allocates Rp 450 per capita for purchase of essential drugs. Accordingly, each kabupaten has a total budget based on its population. With this sum, it procures drugs according to local need.

Decisions on types and quantities of drugs to procure are made by the kabupaten health office. Work done in the CHIPPS Project shows that the actual approach to needs estimation and drug use can vary greatly among kabupatens which have similar morbidity patterns.

2. Procurement and Distribution of ORS. All kabupaten drug orders are processed at the province and forwarded to the National level. The National Program places orders with both public and private sector manufactures. The manufacturers deliver the kabupaten specific orders to the province. These orders remain in the KanWil's warehouse for transit only and are quickly sent on to the kabupaten. ORS is sent every 3 months from the province warehouse to the PusKesMas.

3. Stock Level Monitoring. The provincial INPRES program uses the STZTP information system. In its current form, this system supplies PusKesMas data for drug use including ORS and stock levels to the kabupaten on the LB4 form. At the kabupaten level, information on monthly consumption only is consolidated twice a year on the DLB4 form and passed on to the province and national levels. Thus, in June and January, six-month records of kabupaten-wide consumption become available.

The LB4 forms have a column to provide consumption and stock level data from INPRES, ASKES and "other" sources. Review of forms at the national Level, however, shows that information is frequently not supplied for all sources.

4. Dispensing Data. See discussion under point 3 above

5. Report Formats. See discussion under point 3 above.

6. Data Interpretation/Utilization - There was no indication that the INPRES staff utilize ORS consumption data.

7. INPRES Data Flow Cycle. Monthly copies of the LB4 and LB1 reports are sent from the PusKesMas to province. Semi-annual DLB4 reports are sent to BinKesMas at pusat.

The time cycle is:

April	-	Order request from kabupaten
June	-	Summary of all kabupaten stock levels (DLB4) and monthly (DLB1) goes from province to pusat
Varies	-	Daftar A/P drugs comes to province. Delivery depends upon the Interior Ministry

TMIGRASI.

Trans Migrasi is a program to relocate people from Java to other provinces. The program supplies ORS but in minute quantities. In FY87/88 it supplied 200 packets to Bangdang, which was approximately 0.03% of the total. Because of the tiny amounts of ORS supplied, a detailed description of its information system is not included in this study.

While in the provincial capital, we tried to visit the program office, but were unsuccessful in obtaining any supply information.

2B. SOURCES OF INFORMATION AVAILABLE WITHIN THE CDD PROGRAM

There are three sources of data that flow through the CDD office. These are: (1) Sentinel System, (2) SP2TP, the BinKesMes (Community Health) System, and (3) the P2D information system of the CDD.

Each of these information systems is discussed below.

1. Sentinel System. This is a pilot reporting system begun in January 1988 by the General Directorate P2M's Sub Directorate of Surveillance. The Sentinel System collects and processes data on morbidity/mortality, stock levels etc on 1 PusKesMas/kabupaten, a total of 302 PusKesMas in all 27 provinces in Indonesia. Personnel at these PusKesMas have been specially trained by the CDC Sub Directorate to participate in the Sentinel System.

Below is a summary of the statistics that are generated by the system by monthly and yearly summaries.

MONTHLY STATISTICS:

- Population of the PusKesMas
- Total and % of diarrhea cases by age
- Total cases and % of dehydration by status
- Total and % of cases treated with antibiotics
- % of minimum stock level
- Total and % of ORS distributed by kader
- Total and % of cases seen by kader

62'

YEARLY STATISTICS:

- Total cases of diarrhea and % by age
- Diarrhea cases/100,000pop
- Total average stock of ORS
- Average stock of ORS
- Average # of months stockouts
- Total packets used by size
- Average # packets/person/population by ORS pack size
- Average total 200cc equivalent/case
- % of ORS given by kader

The Sentinel System is the most complete information system available on ORS supply management. It is a well conceived system that generates extremely useful indicators which can be used by managers for decision making, especially needs estimations based upon both consumption and morbidity data. The question that must be asked is; "How representative are the data to the rest of the country?" The statistics generated above can, however, provide a benchmark or comparison which can be used by CDD staff and other health providers.

For Bangdang, Dr. Oralit plans to expand the Sentinel Reporting system to include all PusKesMas in the province.

SP2TP

SP2TP is the PusKesMas activities reporting system managed by BINKESMAS or the General Directorate of Community Health. In its current edition, SP2TP forms report on morbidity, status of drug supplies, health services and status of personnel. While this information system is managed by BINKES, selected forms are made available to various offices in other Directorates General which need the information they contain. For purposes of this discussion, the relevant forms are those dealing with morbidity (LB1) and drug supplies (LB4).

We have already seen that the forms relevant to drug supplies are made available to kabupaten and province staff responsible for managing the INPRES Drug Procurement Program. These were the LB4 and DLB4 forms; see the discussion under INPRES above.

In Bangdang, the provincial PSM office receives the forms for reporting morbidity. The flow of information is as follows:

PusKesMas staff fill out the LB1 morbidity report and send it to the kabupaten level once every three months. There kabupaten staff consolidate this information into the form DLB4 once every three months and send it to both the provincial and central levels. Thus for morbidity, this system supplies the province with quarterly kabupaten-wide summaries, but not reports on individual PusKesMas.

It is noteworthy that while province staff responsible for INPRES receive kabupaten-wide consolidations of drug consumption and stock level data (DLB4), they do NOT receive morbidity data. And while the P2M province staff responsible for the CDD Program receive morbidity data (DLB1) they do not receive the drug supply data, or more specifically the ORS data.

P2-DIARE

Within P2M, there is also separate CDD Information System called P2-Diare which provides morbidity data and ORS supply data. In principal, this system is only used for the "so called" CDD PusKesMas, that is PusKesMas for which the staff have received special orientations in the activities of the National CDD Program. In Bangdang, all PusKesMas are considered CDD PusKesMas, so that the P2-Diare information system, like SP2TP covers the whole province.

All of the forms in the P2-Diare system have a section for PusKesMas based information and one section for Kader or community based information. Within each of these sections, there are columns for reporting numbers of cases of diarrhoea treated by age group and columns for reporting quantities of ORS dispensed.

The P2-Diare Information system is intended to work as follows:

- Kaders fill out the Laporan Penderita Diare form and give it to the to PusKesMas once a month.
- PusKesMas staff fill out the Rekapitulasi Laporan Penyakit Diare (PusKesMas green form), using there internal records for the PusKesMas section and the Laporan Penderita Diare for the Kader section. This is submitted to the kabupaten monthly.
- Kabupaten staff consolidate all data from the PusKesMas into one report from the kabupaten using the Rekapitulasi Laporan Penyakit Diare (kabupaten pink form). Each PusKesMas is listed separately on the form. This is submitted to the province level once each month. This means that province staff have a record of morbidity and ORS consumption for each Puskesmas.
- Province staff consolidate all data from the kabupaten forms into one report for the province using the Rekapitulasi Laporan Penyakit Diare (Propinsi white form). Each kabupaten is listed separately on the form. This is submitted to the pusat level once each month. This means that pusat staff have a record of morbidity and ORS consumption for each province.

OUTBREAK REPORTING SYSTEM.

Overall, this information system is managed by the P2M's Sub Directorate of Surveillance. Whenever an outbreak of infectious disease occurs, the nearest PusKesMas is supposed to prepare Laporan Kejadian Luar Biasa/Wabah (Outbreak Report Form), which identifies the type of outbreak and the number of people affected by it. This report is supposed to be forwarded up through kabupaten to province to pusat as quickly as possible, ideally within 24 hours.

Where diarrhoeal disease is concerned, we have already noted that the province maintains the ORS received from P2M as a safety stock for outbreaks. This stock also contains tetracycline and ringers lactate. If P2M province staff determine that a reported outbreak requires additional stocks of any of these products, they are sent to the PusKesMas in

question. PusKesMas staff fill out an Outbreak Patient list which has a column for the number of packets of ORS dispensed to each patient. PusKesMas send this form back up the line to the province.

What all this means is that when outbreaks occur, the Outbreak Reporting system provides data on morbidity and ORS dispensing (but not stock levels) and this information is available at the PusKesMas, kabupaten and province levels. While Outbreak Reporting System was not designed to monitor the use of P2M ORS supplies, the fact that P2M ORS comprises an outbreak safety stock means that the this system provides certain types of information concerning the use of that stock.

3. ANALYSIS OF CONSTRAINTS AND OPPORTUNITIES

The review of ORS information available in Bangdang found data relevant to management of this product in several locations and/or information systems. The sources of information include:

Procurement Programs	P2M Information Systems
* INPRES	* ST2TP
* Nutrition	* Sentinel Reporting System
* P2M	* P2-Diare Reporting System
* APBD	* Outbreak Reporting System

The types of information available include:

* Needs Estimation Documentation
* Procurement Documentation
* Stock Levels in Storage and Clinical Facilities
* Quantities Dispensed
* Cases of Diarrhoea Reported

The attached tables summarize the types of information provided by each source. Table 1 provides a quick overview of the types of information available in the provincial capital and may be used for a quick overview. Table 2 provide more detail on types of information available by level of the system plus the names of the forms used.

These categories of information are, in fact, exactly what is needed for effective management of ORS supplies, but there are some major constraints that make it difficult to use what is available. Among these are:

* None of the information sources contains all of the information required for informed management of all the steps of the supply cycle, including needs estimation, procurement distribution and product use. The ST2TP or PusKesMas Activities Reporting System

comes the closest in that is contains forms for morbidity trends, stock levels and consumption. At the province level, however, no one office receives all of the forms. Staff responsible for the INPRES Drug Procurement Program receive forms based on LB4 summarizing stock levels and consumption. P2M's Surveillance Section receives forms based on LB1 summarizing morbidity patterns.

For most of the systems there is reasonable doubt about the completeness of the information available. Again, taking the ST2TP information available at INPRES as an example, the LB4 form filled out by PusKesMas staff has separate columns for stock levels and consumption for INPRES drugs, ASKES drugs and drugs from "Other" sources. Many, perhaps most PusKesMas fill in the columns only for INPRES. In Bangdang, INPRES provides 100% of the 1000cc ORS supply which was 238 packets and 0.3% of the 200cc packets. The two biggest suppliers are Nutrition and P2M, accounting for 90% of the supply and would fall in the normally empty "Other" column and thus not be reported on at all through SP2TP.

Gizi's UPGK Activities Monitoring form has a section for reporting end of the month stock levels for ORS provided project. Staff reported, however, that site checks at many PusKesMas revealed large differences between what was reported and what was actually on hand.

* The information available is scattered among several offices working for different branches of the health system.

A discussion was held with Dr. Oralit and his staff to try and understand how they used the information available from all sources to plan ORS needs and coordinate subsequent distribution of ORS supplies. It came out that the provincial XXX group which is composed of YYY personnel meet in August to prepare an annual workplan for the ensuing fiscal year which begins in April of the following year. P2M, which is placed in the provincial DINAS is not directly involved in the deliberations of this group which is composed entirely of KanWil staff. P2M does, however, provide them with information on ORT service targets and estimates of ORS needs. Dr. Oralit's staff say that they take into account existing ORS stocks and likely procurement from all sources when supplying information to the group. In particular they have supplied analysis of doses of ORS prescribed per case over a 4 year period. Never the less, they currently produce no document which systematically distills and analyzes data from all sources, the use of this information appears to be ad hoc. In making this remark, we intend no criticism of the people involved. For one thing they are generally aware of the types of information available for each source, and in their approach to using this information they are not less systematic than other provinces or DEPKES pusat.

Table 1

ORS MANAGEMENT INFORMATION SOURCES BY SUPPLY AREA

PROGRAM & LEVEL	NEEDS EST.	PROCUREMENT	DISTRIBUTION	STOCK LEVEL MONITORING	DISPENSING	MORBIDITY
GIZI						
Pusat	yes	yes	yes	yes	no	no
Province	yes	no	yes	yes	no	no
Kabupaten	yes	no	yes	yes	no	no
PusKesMes	yes	no	?	yes	no	no
P2M (CDD)						
Pusat	yes	?	no	no	no	yes
Province	yes	yes	yes	yes	yes	yes
Kabupaten	no	no	yes	no	yes	yes
PusKesMes	no	no	yes	no	yes	yes
APBD						
Pusat	no	no	no	no	no	no
Province	yes	yes	yes	no	no	no
Kabupaten	no	no	yes	no	no	no
PusKesMes			as requested			
INPRES						
Pusat	yes	yes	yes	no	yes	no
Province	yes	yes	yes	no	yes	yes
Kabupaten	yes	?	?	yes	yes	yes
PusKesMes	?			yes	yes	yes

Table 1 (continued)

ORS MANAGEMENT INFORMATION SOURCES BY SUPPLY AREA

PROGRAM & LEVEL	NEEDS EST.	PROCUREMENT	DISTRIBUTION	STOCK LEVEL MONITORING	DISPENSING	MORBIDITY
INFORMATION SYSTEMS						
SENTINAL SYSTEM						
Pusat	NO	NO	NO	yes	YES	YES
Province	NO	NO	NO	yes	YES	YES
Kabupaten	NO	NO	NO	yes	YES	YES
PusKesMes	NO	NO	NO	yes	YES	YES
ST2TP (Binkesmes)						
Pusat	NO	NO	NO	NO	YES	YES
Province	NO	NO	NO	NO	YES	YES
Kabupaten	NO	NO	NO	YES	YES	YES
PusKesMes	NO	NO	NO	YES	YES	YES
P2D (CDD)						
Pusat	NO	NO	NO	NO	YES	YES
Province	NO	NO	NO	NO	YES	YES
Kabupaten	NO	NO	NO	NO	YES	YES
PusKesMes	NO	NO	NO	NO	YES	YES
SPECIAL OUTBREAK						
Pusat	NO	NO	NO	NO	YES	YES
Province	NO	NO	NO	NO	YES	YES
Kabupaten	NO	NO	NO	NO	YES	YES
PusKesMes	NO	NO	NO	NO	YES	YES

FILE:INFOMTX.WK1

Table 2

ORS SUPPLY MANAGEMENT INFORMATION SOURCES

PROGRAM & LEVEL	STATUS	NEEDS EST.	PROCUREMENT	DISTRIBUTION	STOCK LEVEL MONITORING	DISPENSING	MORBIDITY
GIZI							
Pusat	Avail. Form When	yes formula April	yes UNICEF contract Jul-Aug	yes, if delivered Prov. invoice	yes Monitoring form monthly	no	no
Province	Avail. Form When	yes formula April	no	yes receipt/issue for Oct	Monitoring form monthly	no	no
Kabupaten	Avail. Form When	yes formula Feb/Mar	no	Mar latest	Monitoring form monthly	no	no
PusKesMes	Avail. Form When	yes formula Feb/Mar	no		monthly EOM balance	no	no
P2M (CDD)							
Pusat	Avail. Form When	yes Annual CDD Mar/April	?	no	no	no	yes
Province	Avail. Form When	yes begin FY March	yes local tender Aug	yes stock records Sept	yes	yes OPL monthly	yes OPL monthly
Kabupaten	Avail. Form When	no	no	yes requisition	no	yes OPL monthly	yes OPL monthly
PusKesMes	Avail. Form When	no	no	yes requisition # packets/pt	no	yes OPL monthly	yes OPL monthly

Table 2 (continued)

ORS SUPPLY MANAGEMENT INFORMATION SOURCES

PROGRAM & LEVEL	STATUS	NEEDS EST.	PROCUREMENT	DISTRIBUTION	STOCK LEVEL MONITORING	DISPENSING	MORBIDITY
APBD							
Pusat	Avail. Form When	no	no	no	no	no	no
Province	Avail. Form When	yes Work Plan May/June	yes local tender July	yes requisition August	no	no	no
Kabupaten	Avail. Form When	no	no	yes requisition as needed	no	no	no
PusKesMes	Avail. Form When			as needed			
INPRES							
Pusat	Avail. Form When	yes drug orders annual	yes ?	yes invoice	no	yes LB4/DLB4 monthly & 6mo.	no
Province	Avail. Form When	yes APO	yes ?	yes ?	no	yes LB4/DLB4 Monthly/6month	yes LB1/DLB1
Kabupaten	Avail. Form When	yes APO	?	?	yes LB4 monthly	yes LB4/DLB4 monthly	yes LB1/DLB4 monthly
PusKesMes	Avail. Form When	?			yes LB4 monthly	yes LB4 monthly	yes LB1 monthly

Table 2 (continued)
ORS SUPPLY MANAGEMENT INFORMATION SOURCES

PROGRAM & LEVEL	STATUS	NEEDS EST.	PROCUREMENT	DISTRIBUTION	STOCK LEVEL MONITORING	DISPENSING	MORBIDITY
INFORMATION SYSTEMS							
SENTINEL SYSTEM							
Pusat	Avail. Form When	NO	NO	NO	yes Recap Report monthly/YTD	YES Recap Report monthly/YTD	YES Recap Repor monthly/YTD
Province	Avail. Form When	NO	NO	NO	yes PKM Report monthly	YES Report monthly/YTD	YES PKM Report monthly
Kabupaten	Avail. Form When	NO	NO	NO	yes LB1 S for PKM monthly	YES LB1 S for PKM monthly	YES LB1 S for P monthly
PusKesMes	Avail. Form When	NO	NO	NO	yes LB1 S monthly	YES LB1 S monthly	YES LB1 S monthly
ST2TP (Binkesmas)							
Pusat	Avail. Form When	NO	NO	NO	NO	YES LB4 MONTHLY/YTD	YES LB1/DLB1 MONTHLY/YTD
Province	Avail. Form When	NO	NO	NO	NO	YES LB4/DLB4 MONTHLY/YTD	YES LB1/DLB1 MONTHLY/YTD
Kabupaten	Avail. Form When	NO	NO	NO	YES LB4/DLB4 MONTHLY	YES LB4/DLB4 MONTHLY	YES LB1 MONTHLY
PusKesMes	Avail. Form When	NO	NO	NO	YES LB4 MONTHLY	YES LB4 MONTHLY	YES LB1 MONTHLY

Table 2 (continued)

ORS SUPPLY MANAGEMENT INFORMATION SOURCES

PROGRAM & LEVEL	STATUS	NEEDS EST.	PROCUREMENT	DISTRIBUTION	STOCK LEVEL MONITORING	DISPENSING	MORBIDITY
P2D (CDD)							
Pusat	Avail. Form When	NO	NO	NO	NO	YES Prov Dia Sum.	YES Prov Dia Su (White shee
Province	Avail. Form When	NO	NO	NO	NO	YES Prov + KBP Dia Sum	YES Prov + KBP Dia Sum pink sheet
Kabupaten	Avail. Form When	NO	NO	NO	NO	YES Prov + KBP Dia Sum	YES Prov + KBP Dia Sum pink sheet
PusKesMes	Avail. Form When	NO	NO	NO	NO	YES KBP Dia Sum	YES KBP Dia Sum green sheet
SPECIAL OUTBREAK							
Pusat	Avail. Form When	NO	NO	NO	NO	YES OPL	YES OR
Province	Avail. Form When	NO	NO	NO	NO	YES OPL	YES OR
Kabupaten	Avail. Form When	NO	NO	NO	NO	YES OPL	YES OR
PusKesMes	Avail. Form When	NO	NO	NO	NO	YES OPL	YES OR

ANNEX D

ANALYSIS OF ORS ISSUE DATA FROM THE P2-DIARE INFORMATION SYSTEM OF THE CDD

1984 - 1987

ANALYSIS OF ORS ISSUE DATA
FROM THE
P2-DIARE INFORMATION SYSTEM OF THE CDD

1984-1987

This analysis of ORS issue data was done as part of a larger feasibility study for a National ORS Supply Management Information System which would gather and use existing data. In the feasibility study, ORS supply data was found in ten different sources in eight different offices in Jakarta. six of the ten sources of ORS data were formal information systems which includes the P2-Diare information system. As the study describes, there is a lot of ORS supply data already existing, but the data has not been gathered or processed to give a total comprehensive national picture. This analysis of P2-Diare ORS issue data is but one of many steps necessary to obtain the total National picture of ORS supply.

The P2-Diare information system is operated by the Diarrhoeal Disease Control (CDD). Originally this system was set up to track the "CDD PusKesMas" (health centers), which were centers where staff had received special orientations in the activities of the National CDD Program. Currently, in most provinces, all health centers are considered to be CDD PusKesMas This implies that the P2-Diare information system covers all of Indonesia, however it was uncertain from CDD reports how many and which health centers were included in each provincial report.

All data for the P2-Diare system are collected at a meeting held once yearly for the CDD provincial staff. At this meeting the provincial health officers bring data on diarrhoeal morbidity, mortality and issue data. Each year, a national report is made summarizing the incidence of diarrhea. A detailed description of forms and data flow in the P2-Diare system is in section 4.3 of the main report.

In the past, ORS issue data was totaled, but not processed into indicators or trends analysis. This four year review is intended to serve as a beginning example of how ORS issue data might be analyzed and presented for use by program managers. Note that this data set does not provide information about procurement, distribution or stock monitoring. For a complete National ORS supply monitoring, other data sources must also be brought into consideration.

It should be noted that the CDD staff did not express a high degree of confidence in the quality of data summarized at the yearly meeting. We were told that there has not been verification of the data, or retrieval of incomplete or missing data.

Table 1 shows the summary of indicators obtained in the analysis of the 1984-1987 P2-Diare data. This analysis resulted in the following observations.

INCREASE IN THE ISSUE OF ORS MILLILITER/DIARRHEA EPISODE. There appears to be a definite increasing trend in the milliliter volume of ORS issued per episode of diarrhea. The total average ranged from 624ml/case in 1984 increasing to 729ml/case in 1987. The PusKesMas volume/case was ranged from a low of 350ml in 1984 to a high in 436ml

TABLE 1

P2DIARE INDICATOR SUMMARY

YEAR	#CASES/ 1,000	# DEATHS/ 1,000pop	ORS ISSUED 200CC	ORS ISSUED 1000CC	RATIO 200/1000C	AVG ML/ CASE	DDD/ 1,000pop
1984	21	0.002	1,477,575	356,087	4.1	382	0.021
1985	17	0.006	1,738,461	817,065	2.1	388	0.019
1986	21	0.008	2,371,749	1,121,094	2.1	498	0.027
1987	17	0.006	1,569,377	693,873	2.3	459	0.017

#FILE: P2DIARE; RANGE BS185..CL203 (for formulas)

PUSKESMAS SUMMARY

YEAR	#CASES/ 1,000pop	# DEATHS 1,000pop	ORS ISSUED 200CC	ORS ISSUED 1000CC	RATIO 200/1000C	AVG ML/ CASE
1984	20	0.002	1,049,859	301,976	3.5	350
1985	16	0.005	1,303,987	725,349	1.8	368
1986	19	0.007	1,759,617	980,012	1.8	458
1987	15	0.005	1,064,241	558,467	1.9	436

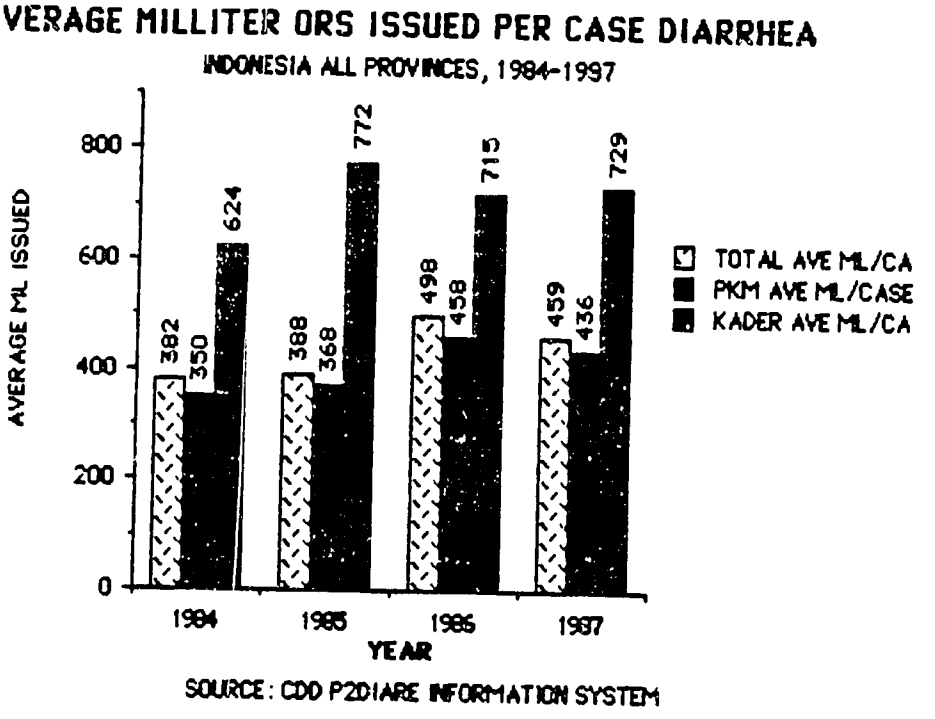
KADER SUMMARY

YEAR	#CASES/ 1,000pop	#DEATHS/ 1,000pop	ORS ISSUED 200CC	ORS ISSUED 1000CC	RATIO 200/1000C	AVG ML/ CASE
1984	1.4	0.00012	427,716	54,111	7.9	624
1985	1.3	0.00064	434,474	91,715	4.7	772
1986	2.7	0.00069	612,132	141,082	4.3	715
1987	2.1	0.00058	505,136	135,406	3.7	729

FILE: P2DIARE; RANGE BR185..CA237 (for values)

in 1987. On the average, kaders issued over 50% more milliliters/case than did the PusKesMas. Kader ORS volume/case ranged from a low of 624 in 1987 to a high of 772ml in 1985. Figure 1 shows these trends.

Figure 1



There could be many reasons why Kaders issued more ORS milliliters than the PusKesMas, a few of which might be:

- There might be an emphasis on Kader treating diarrhea at the local level as reflected by training, ORS supply, patient demand, availability of other treatments, etc.

The differences in ORS issues/case between Health Centers and Basic Health Workers might reflect how data are reported, including double counting of diarrhea incidence and/or stock control reporting.

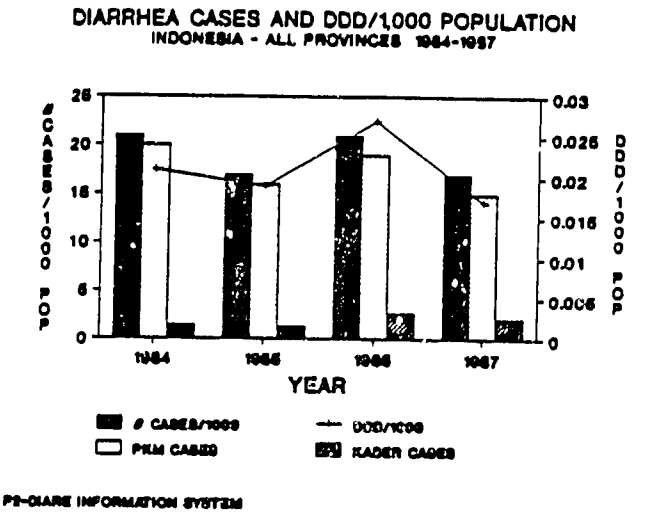
DIARRHEA INCIDENCE as reported in the P2-Diare system appears to be relatively constant at the health centers with an average of about 18 cases/1,000 population.

In contrast, the diarrhea treatment reported by kaders increased by over 60% from 1984 to 1987. Total Kader reported diarrhea incidence ranged from a low of 1.4 cases/1,000 to a high of 2.7 cases/1,000 in 1987. This might indicate that more diarrhea is being treated at the village level and reaching a wider number of cases.

Even though the Kader treated diarrhea cases are increasing, the health centers still treat the majority of diarrhea cases by a ratio of about 7 to 1.

Figure 2 shows the correlation of diarrhea incidence/1,000 population and Defined Daily Dose/1,000 population.

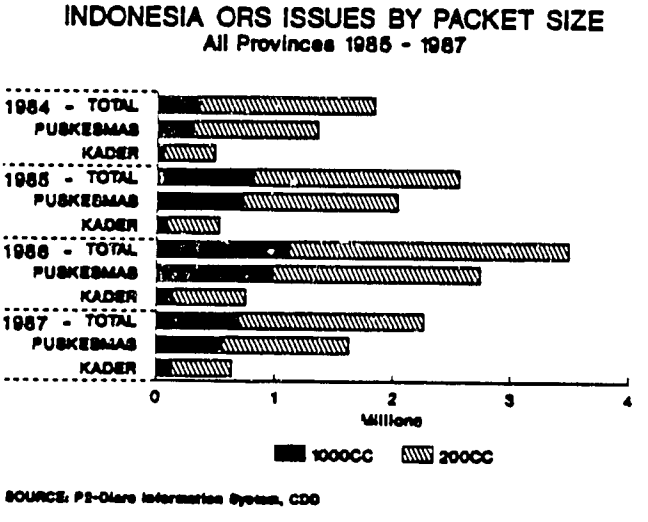
Figure 2



ORS PACKAGE SIZE USE were reported in 1985 to 1987 to be issued in a relatively consistent ratio of about 2 to 1, that is 2 200cc packets are issued to every 1,000cc packet. The exception to this was in 1984 when there were reported four 200cc packets issued to each 1,000cc packet.

PUSKESMAS AND KADER show a similar consistent trend with the Health Centers using ORS in about a 1.6 ratio and Basic Health Workers issuing ORS in a ration of abut four 200cc packets for every one 1,000cc packet size. Figure 3 displays this data graphically.

Figure 3



11

In summary, the P2-Diare information system contains some ORS issue data that can be utilized to obtain insights about ORS use and provider behavior. When ORS supply data is combined with population and disease incidence statistics, indicators can be calculated, and trends analysis made which can provide the program manager or policy maker with empirical evidence about the health care system performance and direction. This report was done for the National level; similar analysis could be done for each province.

Other types of ORS issue and supply data from other information systems currently exist and are described in detail in the main report of the feasibility study. We strongly recommend utilizing the existing data to get a comprehensive ORS supply system overview based upon empirical data rather than assumptions.

ANNEX E

ORS SUPPLY MANAGEMENT ASSESSMENT PACKAGE

SOUTH SUMATRA BASELINE STUDY

August 1987 - July 1988

BASELINE

ORS MANAGEMENT IN SOUTH SUMATRA

Sub Directorate CDD
Ministry of Health
Republic of Indonesia

BACKGROUND

The Sub Directorate CDD is implementing ORT intensification programs in three provinces, that is: West Java, South Sumatra and South Sulawesi. In each province, the program consists of efforts to improve mass communications, clinical training and supply management in support of ORT.

The present study, whose objective is to provide baseline data on ORS management in South Sumatra, has been designed and carried out by a joint pusat/province team consisting of staff from the Sub Directorate CDD in Jakarta and the KanWil Kesehatan in Palembang. During the first week of August, this team developed a data collection instrument based on experience from site visits within South Sumatra at the provincial, kabupaten, puskesmas and community levels. Subsequently, during the third and fourth weeks of August, KanWil staff collected the data. Finally, during the second week of September, the pusat/province team tabulated and analyzed the data and prepared this report. In the meantime, Sub Directorate staff have also been collaborating with their counterparts in South Sulawesi to carry out a similar study in that province.

STUDY DESIGN

The ORS management baseline survey consists of two parts: "Management of ORS Stocks" and "Prescribing for Diarrhoeal Disease." Structuring data collection and analysis under these two general topics permits systematic review of ORS management at each step in supply process, that is:

- Demand Estimation
- Product Selection
- Procurement
- Distribution
- and Product Use

For Management of ORS Stocks, the study sample of study sites consists of relevant administrative offices and/or storage points at the province level, three kabupatens, nine puskesmas and twenty one communities. At the province and kabupaten levels, the primary sources of information were interviews with appropriate DepKes staff. At the puskesmas, data were collected from the Monthly Morbidity Reports (LB1) and the Monthly Drug Reports (LB4). At the community level, interviews with kaders provided the information gathered.

Analysis of Prescribing for Diarrhoeal Disease is based on sub samples of sixty cases of diarrhoea (any diagnosis) collected at each of nine puskesmas, making for a total sample of 540 cases altogether. At each puskesmas, the study team drew the subsamples by selecting the first five cases of diarrhoea entered in the daily registers for each of the twelve months preceding the survey, that is from August 1987 through July 1988. Subsequently, the team gathered data on the types and numbers of units of each drug prescribed for each case from the daily register itself plus any or all of the following, depending on conditions at each puskesmas: Patients' status cards, dispensary prescription slips and interviews with staff concerning customary practices.

92

PART ONE: MANAGEMENT OF ORS STOCKS

Demand Estimation

In near future planning exercises Sub Directorate CDD and KanWil Kesehatan staff will estimate ORS needs for the South Sumatra ORT intensification program based on combinations of the following factors: Prevailing epidemiological trends in diarrhoeal disease; current demand for ORS; and service targets derived from training plans for puskesmas staff and kaders.

As this is a base line study, however, the task at hand is to estimate current demand for ORS. Analysis of recorded cases of diarrhoea treated shows that, on average, the sample puskesmas together with kaders, treated 2.30 cases per 1000 persons of population per month during the study period. In treating these cases, puskesmas and kaders dispensed an average of 2.23 mixed liter equivalents of ORS per month. This gives an average of 1.0 liter per case. For the sample studied, the total quantity of ORS dispensed was 6,164 MLE, of which 76% (5,042 packets) was ORS 1000cc, and 23% (7862 packets) was ORS 200cc. See Management Report One.

The one liter per case average is closely corroborated by findings from the Prescribing for Diarrhoeal Disease Study which gave an average of 1.12 liters per case. Since the management and prescribing studies drew on very different data sources, we may have a reasonable degree of confidence in accuracy of this particular finding for puskesmas.

There is, however, room for questioning the average of 2.30 cases treated per month treated by puskesmas and kaders. While records on numbers of cases of diarrhoea treated at puskesmas were relatively consistent throughout the twelve month study period, this was not so for cases treated by kaders. It appears that some, perhaps much, of the diarrhoea treated/ORS dispensed by kaders is not consistently recorded. Accordingly, the overall number of cases of diarrhoea treated per month is probably somewhat higher than the 2.30 average.

Product Selection and Procurement

Review of records for fiscal year 1987/88 show that the province of South Sumatra procured 122,730 MLE of ORS. The total procurement consisted of 603,570 packets of ORS 200cc and 2,016 packets of the 1000cc product. This gives proportions of 98% MLE in the 200cc packet size and 2% in the 1000cc packet size. In guiding procurement policy, the Sub Directorate CDD recommends proportions of 80% MLE in ORS 200cc and 20% MLE in ORS 1000cc. The 200cc packets are intended for outpatient use, while the 1000cc product is to be reserved for use within clinical facilities. See Management Report Two.

South Sumatra arranged its FY 87/88 procurement through four sources, that is, the Nutrition Program, local budget funds, the CDD Program and the INPRES Drug Procurement Program. Details of the MLE and packet sizes provided by different sources are provided by Management Report Three.

Is the ORS supply procured for FY 87/88 sufficient to meet demand? Based South Sumatra's population of 5,717,087, the FY 87/88 procurement of 122,730 MLE ORS would provide an average of 1.78 MLE per 1000 per month. At first glance, this would not appear to be sufficient for meeting the past year's estimated demand of 2.29 MLE per 1000 per month. Further analysis, however, suggests the existing supply is probably adequate for this level of demand.

This conclusion rests on the facts that

- 76% MLE of all ORS dispensed during the study period through the sample puskesmas was in the 1000cc packet size. In the prescribing study, the average dose for this product was 1.40 packets, that is 1.40 liters.

- Data from the prescribing study also show, however, that when ORS 200cc was dispensed, the average dose was three packets or 0.60 liter.

This means that while prevailing prescribing practices treat an average of 0.70 cases with one MLE of ORS 1000cc, one MLE of ORS 200cc will treat over two times that amount or 1.67 cases. Putting all this together, we may project that the FY 87/88 procurement, of which 98% MLE is in the 200cc packet size, will provide 202,343 "average does" of ORS. This is enough to treat 2.55 cases for each 1000 persons of South Sumatra's population per month, or 28% more cases than the 2.3 per 1000 per month estimated by the survey.

Finally, it should be emphasized that the present study collected no information on the varying degrees of dehydration represented in the sample cases. Accordingly it is not possible to comment on the appropriateness of the doses of ORS prescribed; our results can only tell us what those doses were, as part of a measurement of current demand.

Distribution

South Sumatra distributes its ORS supply through five administrative levels, that is, province, kabupaten, puskesmas and hospital, puskesmas pembantu and community. Outlets operating at the community level include pos yandu which are held once a month; "pos oralite" or the homes of kaders designated to keep and dispense ORS between pos yandu rallies; and ordinary kaders some of whom have ORS but operate in communities where the pos oralite concept has not been formalized. Given South Sumatra's sizable population of 5,717,087, the overall distribution network is a complex one. The numbers of dispensing outlets at each level of the health services delivery system for the three sample kabupatens is given in Management Report Four. In general, much more is known about distribution in the formal services delivery system than at the community level.

The study found ORS in stock at all sites visited within the formal services delivery system, that is, provincial and kabupaten godowns and puskesmas. No hospitals or puskesmas pembantu were visited. Estimates of the number of months of ORS in stock at each godown and puskesmas were prepared based on: 1) respective populations; 2) estimated cases per month at an average of 2.30 per 1000 population; 3) average doses per case for each product, that is, 1.5 packets of ORS 1000cc and 3 packets of ORS 200cc. The results of this exercise are given in Management Report Five and may be summarized as follows

Level	Months in Stock
Province	1.82
Kabupaten	4.88 - 8.35
Puskesmas	4.34 - 23.25

Management Report Six shows the average length of the ORS pipeline for each kabupaten in the sample, weighted for population at the puskesmas level. This ranges from an estimated 15.04 months for Lahat to 25.32 months for Musi Rawas. While these pipelines seem very ample, this result should be treated with caution. It is ultimately based on only one year's data for cases of diarrhoea treated and stock levels at only 9 of 61 puskesmas.

86

The study reviewed data on ORS stock levels for fifty one pos oralit (or kaders) located in twenty six communities. Management Report Seven summarizes the results. These too must be treated with caution. The pusat/province study team did not collect this data directly. Rather, while enumerators were busy within the puskesmas collecting data for the prescribing study, the task of visiting communities was delegated to puskesmas staff. This sub optimal approach to sample selection/data collection was imposed by budget constraints. There is every reason to believe that community distribution points visited were those most accessible and active. Therefore, it is unlikely that the number of community distribution points with ORS in stock is as high as 42 out of 51 or 82%. Still this part of the study does provide useful points of information, which may be summarized as follows

- There is already in South Sumatra a practical mechanism for distributing ORS to the community level. This consists of pos oralit which are resupplied from either pos yandu or directly from puskesmas.

- The pos oralit tend to have more average doses of ORS 200cc than ORS 1000cc. If all the ORS stocked by the forty two sites that had the product is combined and converted into the doses used at puskesmas, each site would have had enough to treat seven cases.

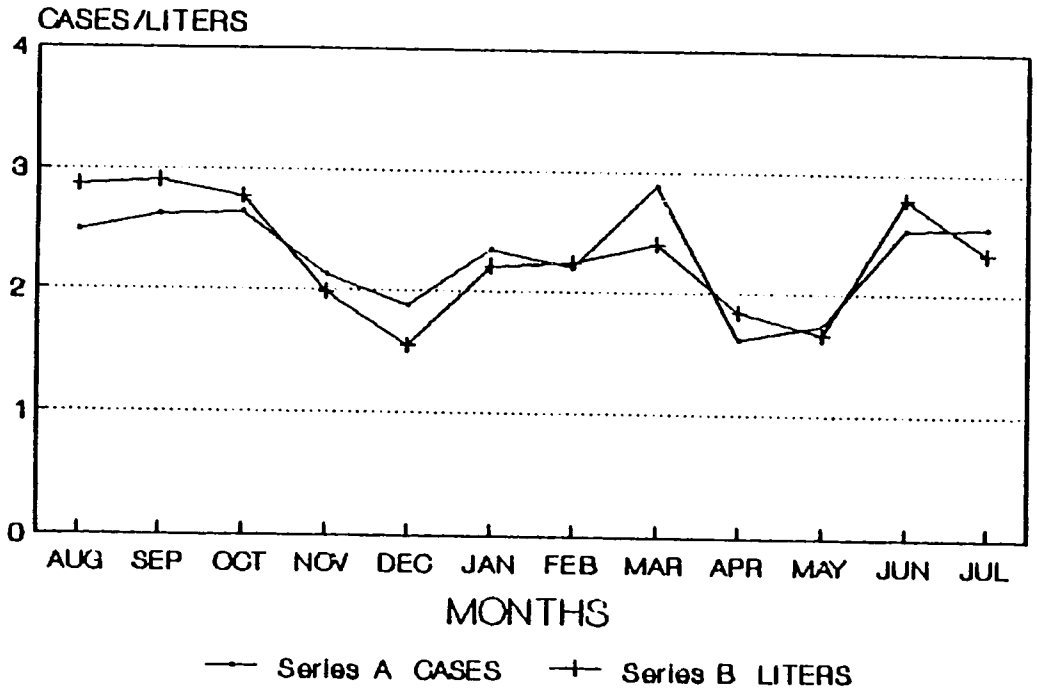
Given the very thin basis for confidence in the results of the community distribution segment of this study, it should be regarded primarily as a departure point for further inquiry.

MANAGEMENT GRAPHICS

87

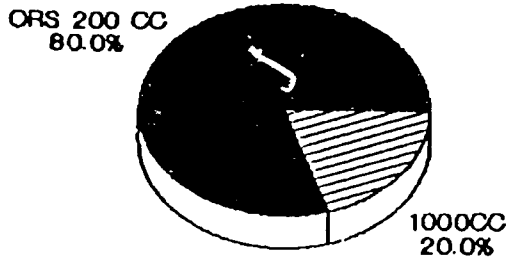
MANAGEMENT REPORT ONE

CASES REPORTED/LITERS OF ORS DISPENSED

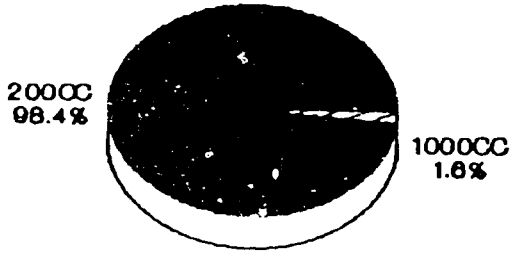


PER 1000 POPULATION

MANAGEMENT REPORT TWO
MLE ORS PROCUREMENT FY 87/88

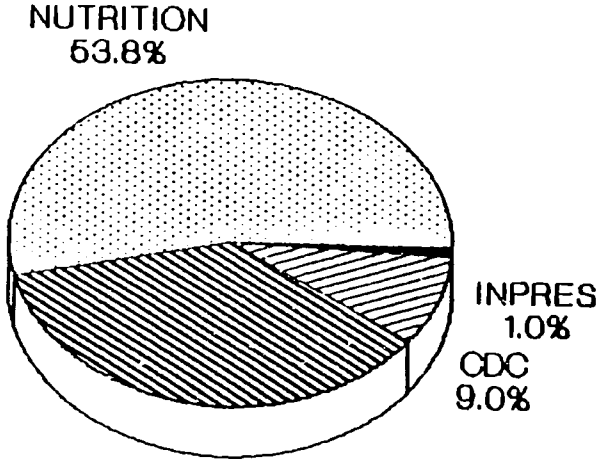


CDD POLICY



ACTUAL PROCUREMENT

MANAGEMENT REPORT THREE A
MLE ORS PROCURED BY SOURCE



603670 PKT 200CC & 2016 PKT 1000CC

MANAGEMENT REPORT THREE B

QUANTITIES OF ORS 200CC, 1000CC AND MLE PROCURED BY SOURCE

SOURCE	200CC	1000CC	MLE
NUTRITION	330000	0	66000
LOCAL BUDGET	222500	0	44500
CDC	50000	1000	11000
IMPRES	1070	1016	1230
TOTAL	603570	2016	122730

91

MANAGEMENT REPORT FOUR

ORS DISTRIBUTION NETWORK FOR THE THREE PRIORITY KABUPATEN

OUTLETS	KABUPATEN			TOTAL
	LAWAT	[illegible]	MUSI PAWAS	
HOSPITAL	1	1	1	3
PUSKESMAS	19	26	16	61
PUSKESMAS PEM	48	94	63	205
POS YANDU	625	950	375	1950
POS DESA.IT	719	777	373	1869
KADER	3125	5534	2755	11414

MANAGEMENT REPORT FIVE A

PROPORTIONS OF ORS 200CC AND ORS 1000CC PLUS AVERAGE DOSES
IN STOCK AT DIFFERENT LEVELS OF THE SYSTEM

LEVEL	TOTAL MLE	# PKT/% 1000CC	# PKT/% 200CC	# DOSES IN STOCK
PRO SUMATRA SELATIN	1276	3070/24%	48450/76%	18197
KAB LAHAT	5390	0/0%	26950/100%	8983
PKM JARAI	230	0/0%	1150/100%	383
PKM PAGAR ALAM	714	554/78%	800/22%	636
PKM SANDAR ANGIN	151	0/0%	757/100%	252
KAB OGAN KUMERING ULU	6304	0/0%	31520/100%	10507
PKM MUARA DUA	840	0/0%	4200/100%	1400
PKM PENYANDENGAN	73	50/68%	117/32%	72
PKM SIMPANG	200	0/0%	1000/100%	333
KAB MUSI RAWAS	3023	1000/33%	10160/66%	4053
PKM MANGUNHARJO	1751	1751/100%	0/0%	1167
PKM MAWANG SASI	903	790/87%	589/13%	723
PKM TABA	1500	1500/100%	0/0%	1000

SUMMARY BY LEVEL IN MLE

PRO 200CC/76% 1000CC/24%

KAB 200CC/94% 1000CC/6%

PKM 200CC 27% 1000CC 73%

MANAGEMENT REPORT FIVE B

ESTIMATED ORS NEEDS AND MONTHS IN STOCK AT DIFFERENT LEVELS

LEVEL	POPULATION	EST CASES PER MONTH	CASES RECU'G ORS	DOSES ORS IN STOCK	MONTHS IN STOCK BY LEVEL		
					PRO	KAB	PKM
PRO SUMATRA SELATIN	5117087	13149	9993	18197	1.82		
KAB LAHAT	615504	1415	1075	8983		8.35	
PKM JARAI	45965	105	80	383			4.78
PKM PAGAR ALAM	70280	161	122	836			5.21
PKM SAMDAR ANGIN	32850	76	58	252			4.34
KAB OGAN KUMERING ULU	855257	1967	1494	10507		7.03	
PKM MUARA DUA	57663	133	101	1400			13.86
PKM PENYANDENGAN	8377	19	14	72			5.14
PKM SIMPANG	38665	89	68	333			4.89
KAB MUSI RAWAS	474416	1091	829	4053		4.98	
PKM MANGUNHARJO	29185	67	51	1167			22.98
PKM NAWANG SASI	35068	80	61	723			11.85
PKM TABA	24693	57	43	1000			23.25

94

MANAGEMENT REPORT SIX

ESTIMATED LENGTHS OF ORS PIPELINE BY KABUPATEN

KABUPATEN	MONTHS OF ORS IN STOCK BY LEVEL			EST LENGTH OF PIPELINE
	PUSKESMAS	KABUPATEN	PROVINCE	
LAHAT	4.37	8.35	1.82	15.04
OGAN KEMERING ULU	3.95	7.03	1.82	18.7
MUSI RAWAS	18.62	4.88	1.82	25.32

NOTE: ESTIMATED LENGTHS FOR PUSKESMAS SEGMENTS ARE WEIGHTED FOR POPULATION.

REPORT SEVEN

ORS IN STOCK AT THE COMMUNITY LEVEL

COMMUNITIES VISITED AT PUSKESMAS	# POINTS VISITED	# WITH ORS	# WITHOUT ORS	TOTAL MLE IN STOCK	AVG MLE IN STOCK	TOTAL PKTS 1000CC	TOTAL PKTS 200CC
JARAI	4	4	0	19	4.75	0	95
PAGAR ALAM	5	4	1	25.6	6.4	23	13
SAMOAR ANGIN	6	4	2	10.6	2.55	0	53
MUARA OUA	7	7	0	20	2.96	0	100
PENYANDENGAN	4	4	0	12	3	0	60
SIMPANG	6	6	0	16.8	2.8	8	44
MANGUNHARJO	7	7	0	109	15.57	101	40
NAWANG SASI	3	3	0	46.4	15.46	20	132
TABA	9	3	6	33	11	33	0
TOTAL	51	42	9	292.4	6.449	185	537

PART TWO: PRESCRIBING FOR DIARRHOEAL DISEASE

Use of ORS

The prescribing study reviewed diagnoses and prescriptions for 540 cases of diarrhoea collected at nine puskesmas. Complete information was collected for a sample of 532 cases, of which 62% or 330 were in the five years and under age group and, and 202 or 38% were over five years of age.

Over all, 76% of of the sample, or 406 cases received prescriptions for ORS, with the rate for five and unders being 78%. Prescribing Report One A breaks this down by age group and packet size. It shows that 80% MLE of the ORS prescribed was the 1000cc product and 20% was 200cc. This squares well with findings of the management study which gave proportions of 76% 1000cc and 14% 200cc.

Prescribing Report One B shows the average doses of ORS given by age group and packet size. Overall, the average case received 3.01 packets of ORS 200cc and 1.42 packets of ORS 1000cc. For the priority age group of five and unders, the doses were 3.20 packets of ORS 200cc and 1.36 packets of ORS 1000cc.

Other Drugs

Other studies, particularly the April 1986 "Garut Study" in West Java and the May 1988 "Child Survival Pharmaceuticals Study" in East Java, have documented prevailing practices of multiple prescribing for diarrhoeal disease. The present study, to no one's surprise, documents the same broad tendency in South Sumatra.

Practitioners prescribed forty seven different drugs in tablet/capsule, syrup and injectable forms for a total of fifty three products altogether. Prescribing Report Two give the complete list. Prescribing Report Three shows that average number of prescriptions per case was 3.30 overall with cases in the five years and under age group receiving 3.10 different products.

Prescribing Report Four shows, for each age group, the six most frequently prescribed drugs on a per case basis. For all ages, practitioners most frequently prescribed ORS, tetracycline, terramycin, vitamin B complex, and metronidazole. This is in line with results from the two studies cited above in which antimicrobials and vitamins also figured prominently in treatment of diarrhoeal disease. When all drugs prescribed are grouped into categories, as in Prescribing Report Five, it is seen that for the sample overall, the average case received 1.31 prescriptions of an antimicrobial drug with the figure being 1.19 for the five years and under age group.

Cost Analysis

Analysis of the costs of all drugs prescribed gave an average prescription cost of Rp 749 per case. See Prescribing Report Six. Prescribing Report Seven shows the percent of total cost accounted for by the most frequently prescribed drugs. Prescribing Report Eight shows proportions accounted for by the products with the highest cost for all units prescribed. And Finally, Prescribing Report Nine shows the proportions of total cost accounted for by drugs in the ORS, antimicrobial, antidiarrhoeal and vitamin categories. Just as antimicrobials were the most frequently prescribed category of drugs, they also accounted for the greatest proportion of total costs. For this sample, the figure was 63% overall and 66% in the five years and under age group.

PRESCRIBING GRAPHICS

PRESCRIBING REPORT ONE A

PROPORTION OF TOTAL CASES RECEIVING ORS

	TOTAL CASES	TOTAL REC'D ORS	% REC'D ORS
< 5 YEARS	330	260	78%
> 5 YEARS	202	146	72%
ALL AGES	532	406	76%

PRESCRIBING REPORT ONE B

QUANTITIES OF ORS PRESCRIBED

	ML	# PKTS	# CASES	# PKTS/CASE
< 5 YEARS				
1000CC	213.00	213.00	157	1.36
200CC	66.00	330.00	103	3.20
> 5 YEARS				
1000CC	151.00	151.00	100	1.51
200CC	23.60	118.00	46	2.57
ALL AGES				
1000CC	364.00	364.00	257	1.42
200CC	89.60	448.00	149	3.01

TOTAL ML 456.30
ORS 1000CC 364.00/80%
ORS 200CC 89.60/20%

DAFTAR OBAT YANG DIBERIKAN

OBAT	UNIT
TETRASIKLINL	CAP 250 MG
TETRASIKLIN	SIR 60 CC
ORS	PKT 200 CC
ORS	PKT 1000 CC
CTM	TAB 4 MG
METRONIDAZOL	TAB 250 MG
KLORAMFENIKOL	CAP 250 MG
KLORAMFENIKOL	SIR 60 CC
PARASETAMOL	TAB 500 MG
PARASETAMOL	SIR 60 CC
AMPISILIN	CAP 250 MG
AMPISILIN	SIR 60 CC
TRISULFA	TAB 500 MG
PAPAVERIN	TAB 40 MG
ENTERO	TAB 250 MG
B COMPLEX	TAB
ANTALGIN	TAB 500 MG
ACETOSAL	TAB 500 MG
NORIT	TAB
B 1	TAB
PREDNISON	TAB 5 MG
VIT K	TAB 10 MG
VIT B6	INJ 1 CC
TERRAMISIN	INJ 1 CC
KANAMYCIN	INJ 1 CC
BICNAT	TAB
ASPILET	TAB
S G	TAB
KOTRIMOKSAZOL	TAB 400/80 MG
ADONA	TAB
EMETIN	INJ 1 CC
PENICILLIN PROCAIN	INJ 1 CC
ASPEN	TAB
DELLADRIL	INJ 1 CC
VIT B 12	INJ 1 CC
OBH	SIR
CMC	
VIT C	TAB 50 MG
CLOROQUIN	TAB 250 MG
DEXTRO	SIR 60 CC
RESERVIN	TAB 0,25 MG
KALK	TAB 500 MG
EXTRAC BELADON	TAB
TETES TELINGA	FLAC 10 CC
XYLOMIDON	INJ 1 CC
ROBURANSIA	INJ 1 CC
NICISTATIN	TAB 250 MG
B 12	INJ 1 CC
ANTALGIN	INJ 1 CC
CALOXY	INJ 1 CC
OBAT CACING	SIR 15 CC
B COMPLEX	INJ 1 CC
GESTABIL	TAB 500 MG

PRESCRIBING REPORT THREE

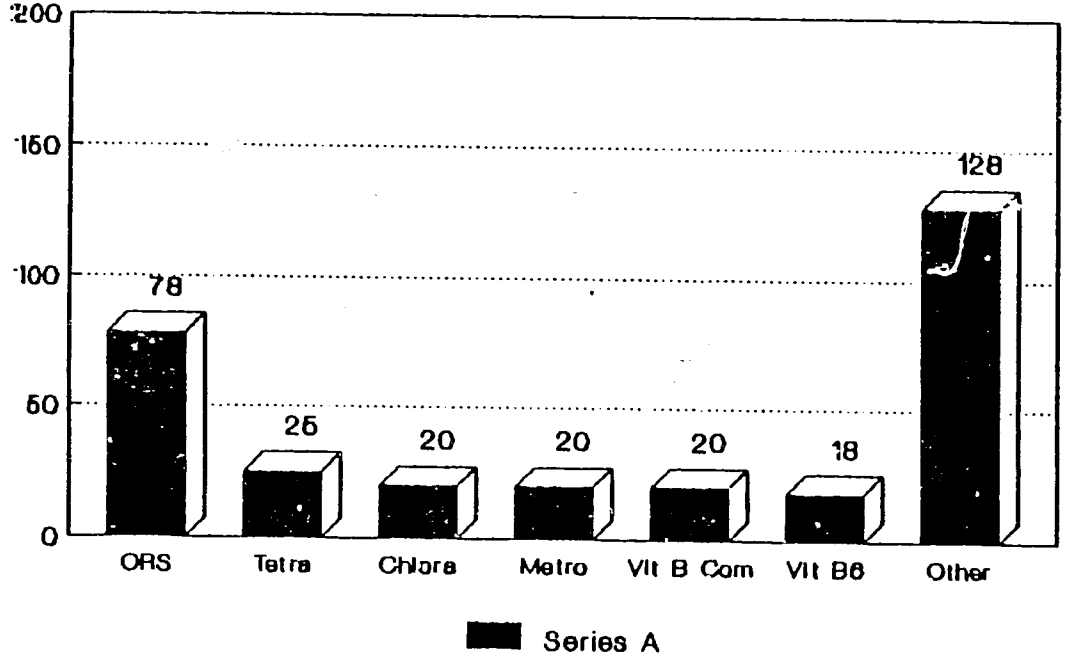
AVERAGE NUMBERS OF PRESCRIPTIONS PER CASE

	# CASES	# PRES	# PRES/CASE
(5 YEARS	330	1023	3.10
) 5 YEARS	202	699	3.50
ALL AGES	532	1722	3.30

102

PRESCRIBING REPORT FOUR A

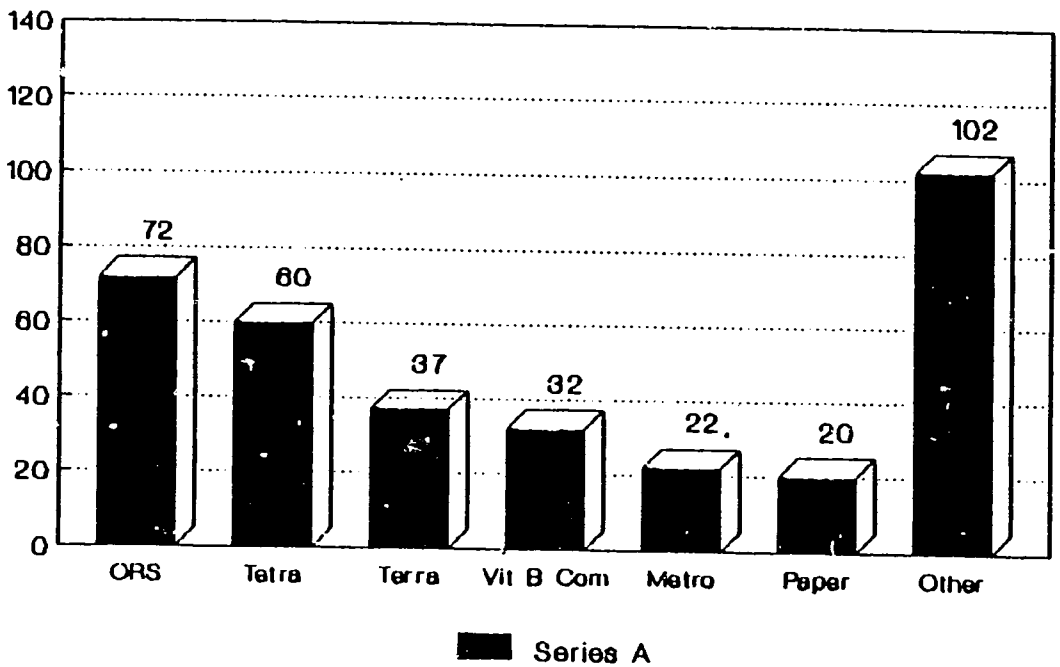
Most Frequently Prescribed Drugs



% under fives receiving these products

PRESCRIBING REPORT FOUR B

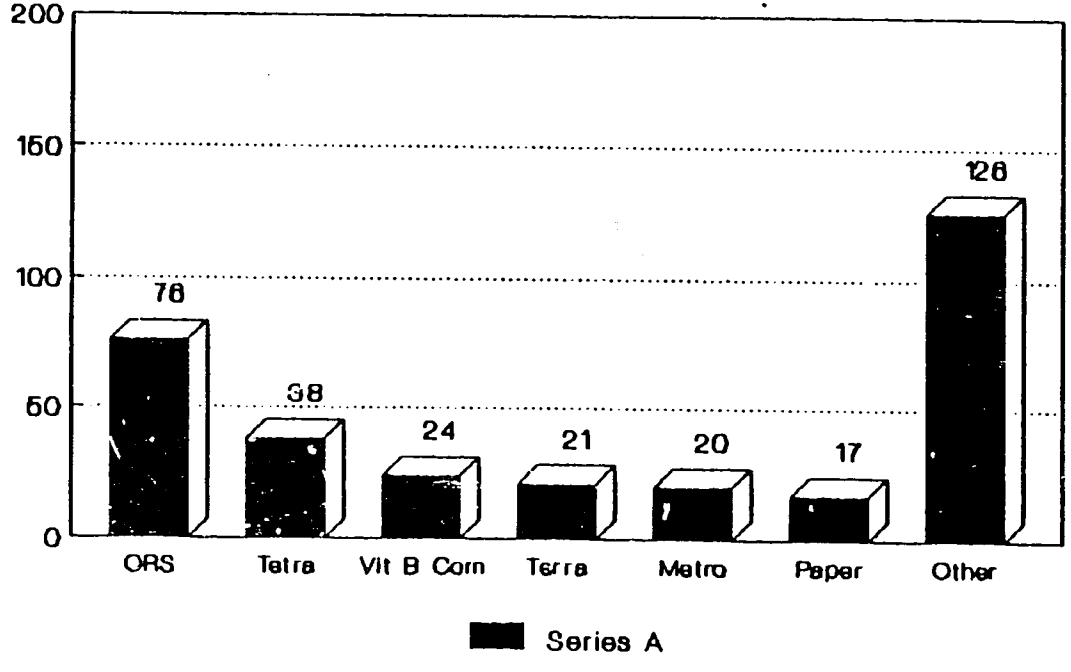
Most Frequently Prescribed Drugs



% over fives receiving theso prodduots

PRESCRIBING REPORT FOUR C

Most Frequently Prescribed Drugs

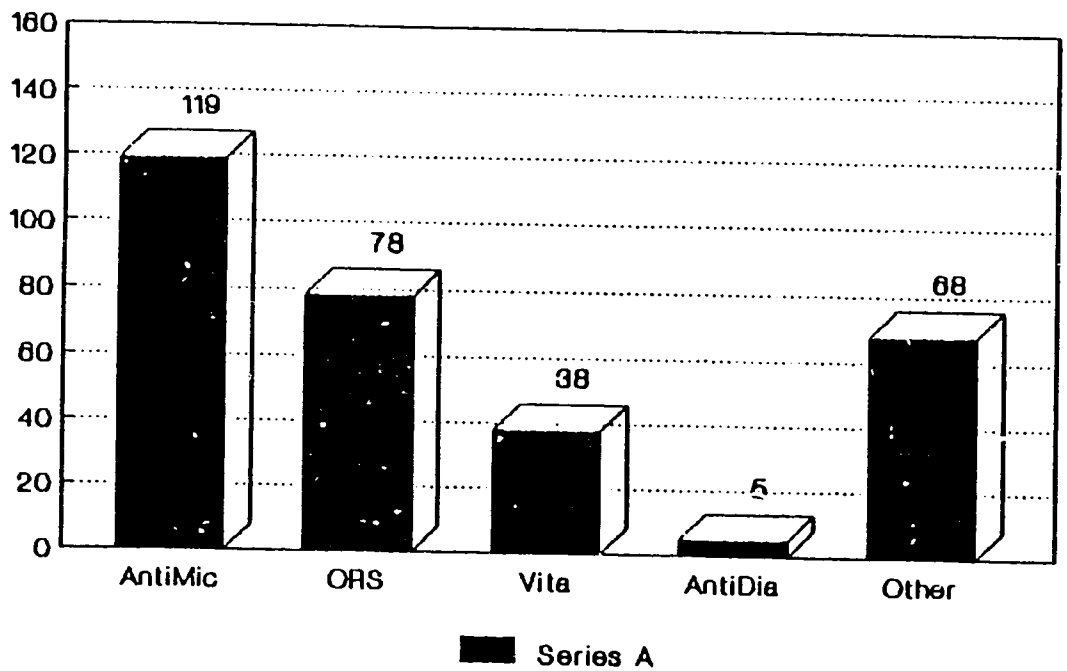


% all ages receiving these products

1061

PRESCRIBING REPORT FIVE A

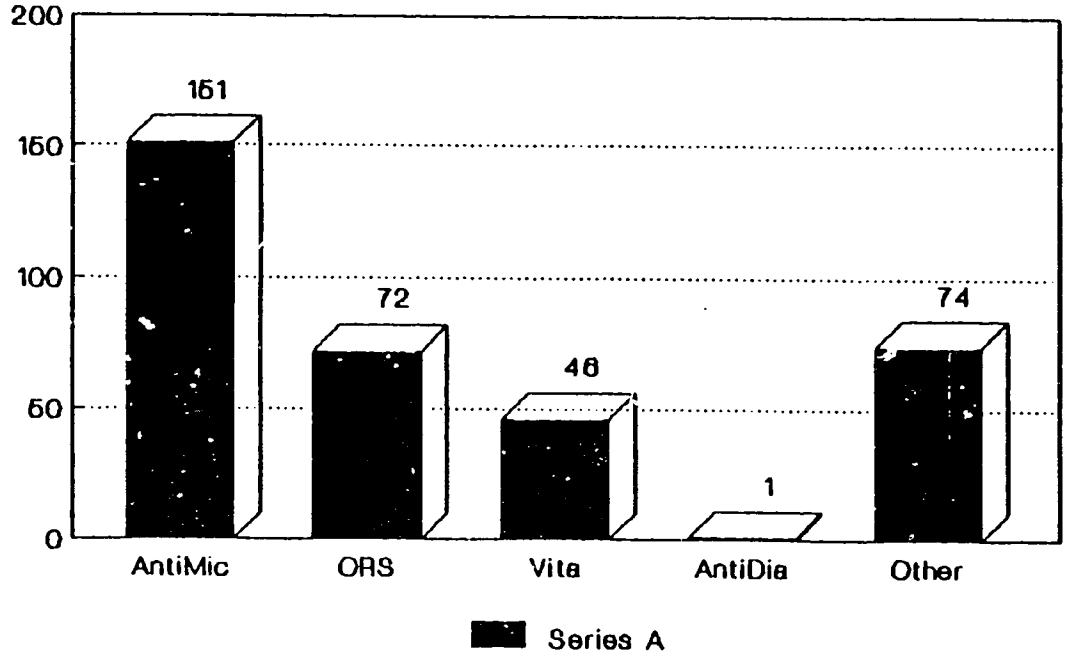
Drugs Prescribed By Category



% under fives receiving

PRESCRIBING REPORT FIVE B

Drugs Prescribed By Category

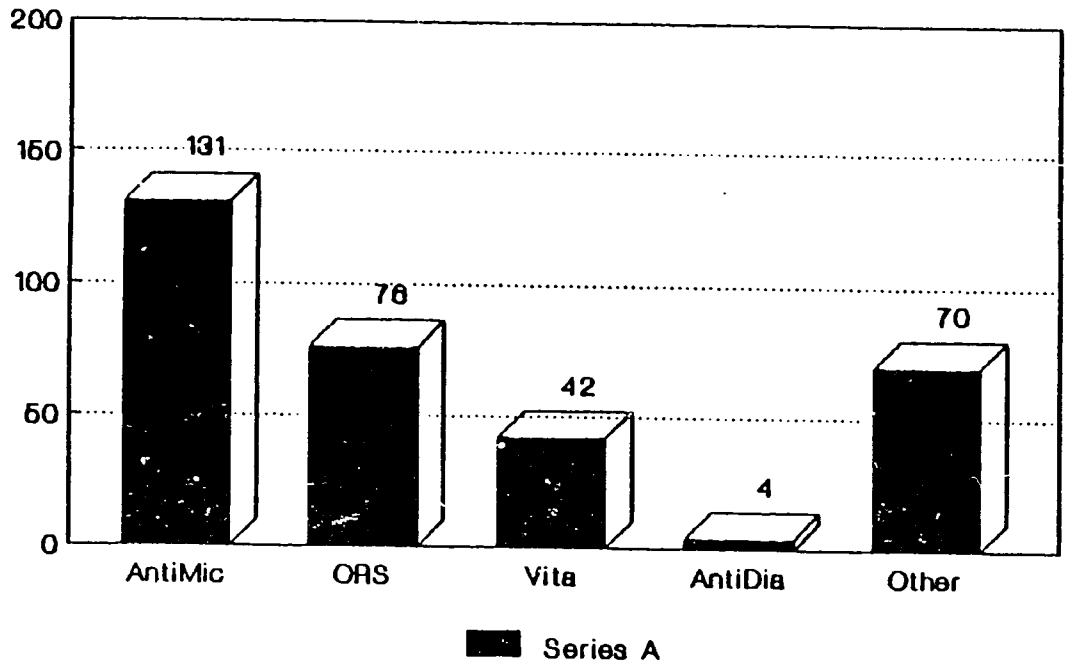


% over fives receiving

107

PRESCRIBING REPORT FIVE C

Drugs Prescribed By Category



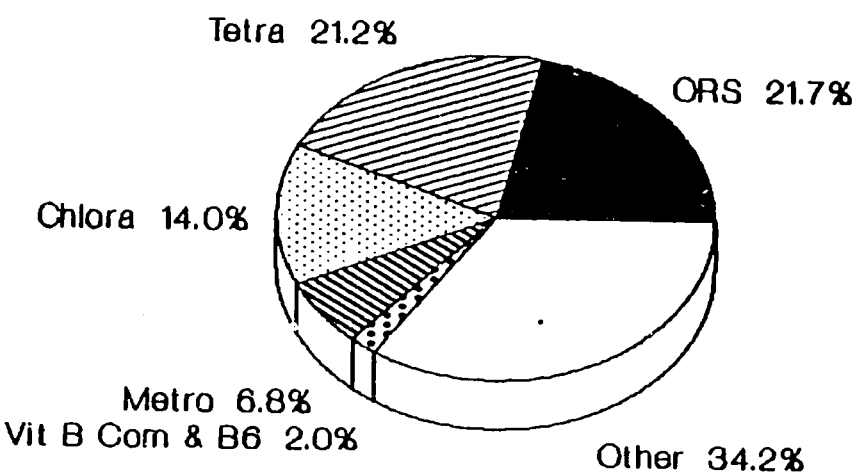
% all ages receiving

PRESCRIBING REPORT SIX

AVERAGE COST OF DRUGS PRESCRIBED

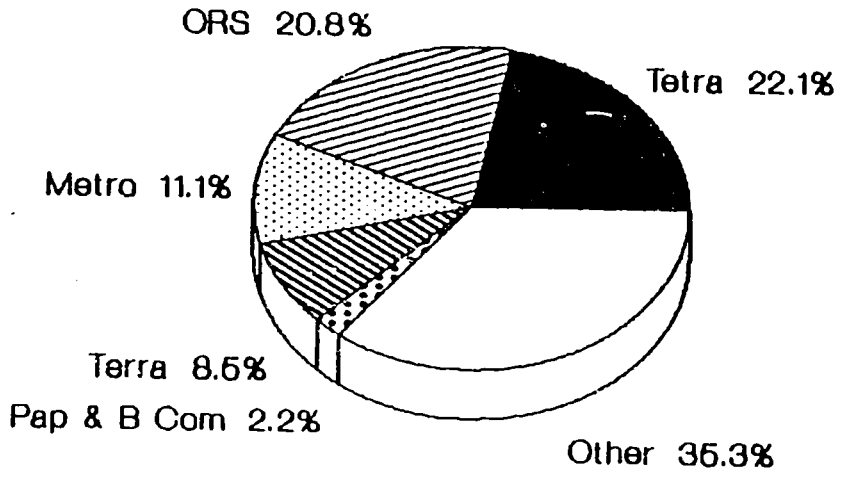
	TOTAL COST	TOTAL CASES	AVG COST PER CASE
< FIVE YEARS	RP 246715	330	RP 747
> FIVE YEARS	RP 151771	202	RP 751
ALL AGES	RP 398486	532	RP 749

PRESCRIBING REPORT SEVEN A
Cost Of Most Frequently Prescribed Drugs



% total cost for under fives

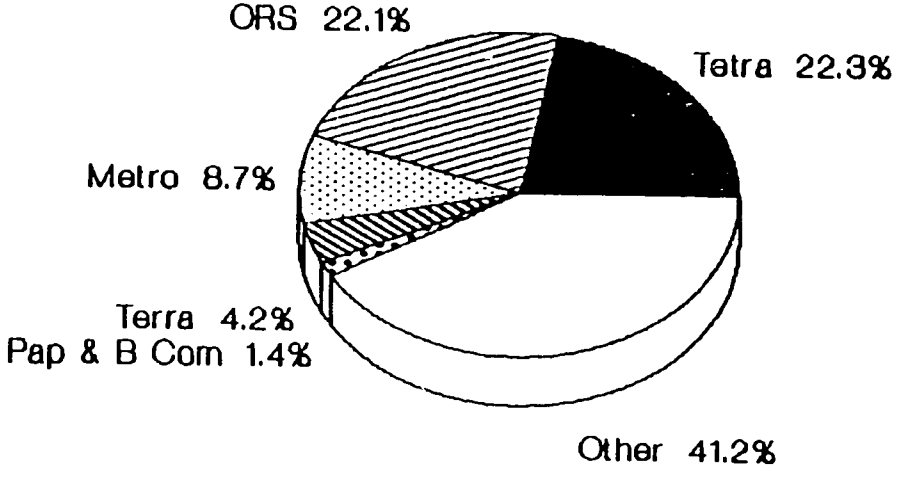
PRESCRIBING REPORT SEVEN B
Cost Of Most Frequently Prescribed Drugs



% total cost for over fives

110

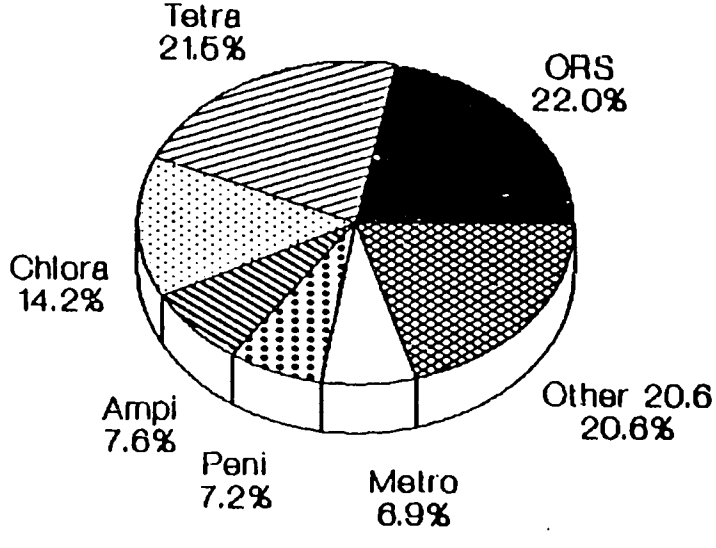
PRESCRIBING REPORT SEVEN C
Cost of Most Frequently Prescribed Drugs



% total cost for all ages

PRESCRIBING REPORT EIGHT A

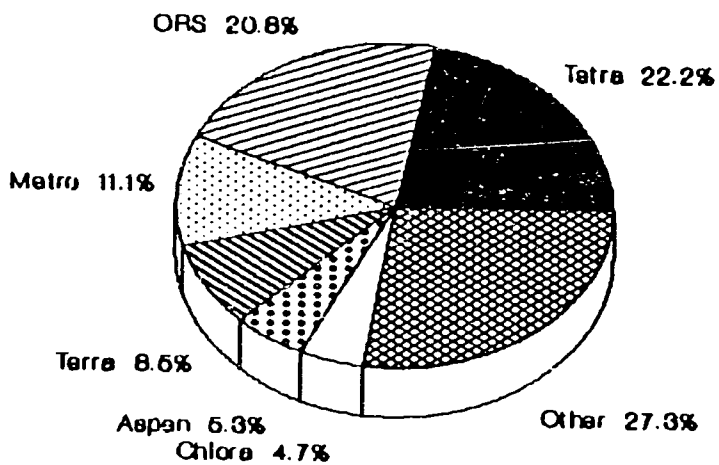
Most Costly Drugs Prescribed



% total cost for under fives

PRESCRIBING REPORT EIGHT B

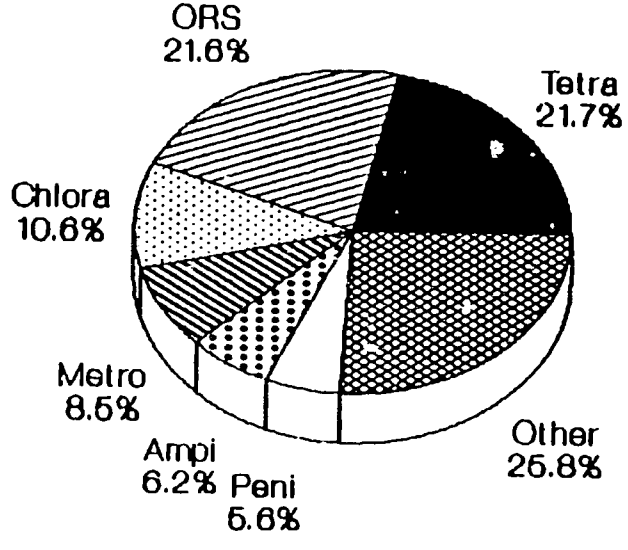
Most Costly Drugs Prescribed



% total cost for over fives

PRESCRIBING REPORT EIGHT C

Most Costly Drugs Prescribed

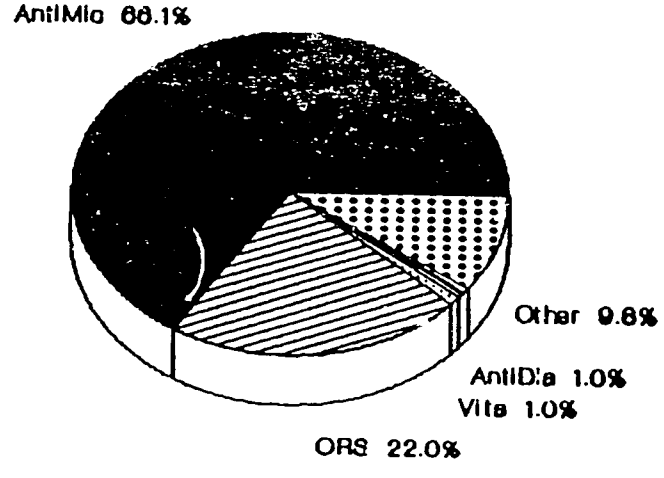


% total cost for all ages

114

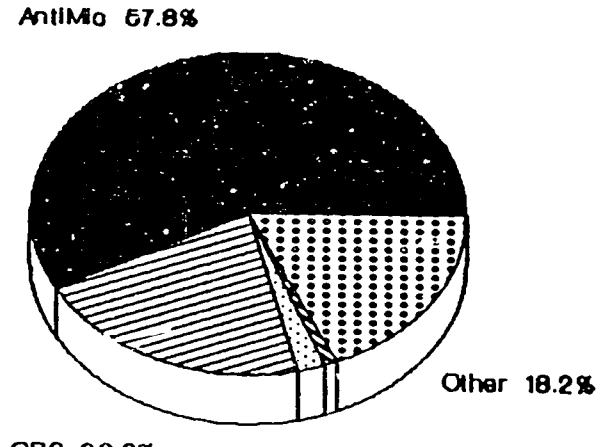
PRESCRIBING REPORT NINE A

Drug Costs By Category



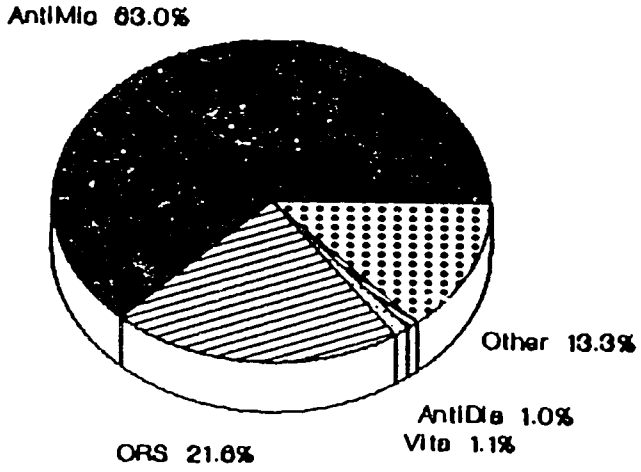
% for five and unders

PRESCRIBING REPORT NINE B
Drug Costs By Category



% for over fives

PRESCRIBING REPORT NINE C
Drug Costs BY Category



% for all ages