

HEALTH AND DEVELOPMENT  
AN ANNOTATED, INDEXED BIBLIOGRAPHY

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TO THE MEMORY OF

HARALD S. FREDERIKSEN

WHO DEVOTED MUCH OF HIS LIFE  
TO UNRAVELLING THE INTRICATE BONDS  
BETWEEN HEALTH AND DEVELOPMENT

Harald Frederiksen was born in Cristobal, Panama Canal Zone, in 1924. He took advanced degrees at the University of Vienna, the Liverpool School of Tropical Medicine, and Harvard University.

In 1949, he was commissioned in the United States Public Health Service and served in many assignments abroad, for one of which he was the recipient of the Arthur S. Fleming Award. As Director of the Inter-American Cooperative Health Service in Bolivia, he had a notable part in the smallpox eradication program there, and he played a significant role as consultant to the Government of India's antimalaria campaign. From 1967 until his untimely death in 1970, he served as Chief of the Analysis and Evaluation Division in the Office of Population of the Agency for International Development.

His publications on the relationships between health, population, and development, the more important of which are noted in the Bibliography, represent a distinguished contribution to the literature.

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## PREFACE

This bibliography began as part of a pilot project to study health and development or, more specifically, the relationship between improved health, however measured, and economic development. The literature searches which provided most of the references were undertaken with the goal of improved health resources allocation in mind. Tangential subject areas were given less attention or deferred.

The mechanics of compiling this bibliography are described in the Users' Guide. Although we recognize the unfinished nature of this (or any) bibliography, we believe it can serve as a practical beginning for the reader. We hope users will point out omissions, give suggestions for expansion, note changes in citations or annotations, and suggest additions to or changes in the index.

To all the members of the Department of International Health who contributed to this volume, we extend our appreciation. In addition, we should like to single out for especial thanks the following persons: Mr. Albert Waterston; Drs. Hector Correa, Cecile DeSweemer, Abraham Horwitz, William Reinke, and Frederick Sparrow; and Anthony Ostrosky and Mauricio Pinto, graduate students. Finally, we are particularly indebted to Miss Marguerite Marr, who cheerfully devoted much time and effort to the preparation of the manuscript.

## USERS' GUIDE

Early in compiling this bibliography it became clear that assigning many references exclusively to one or even several subject categories would prove difficult, if not unworkable, because of the broad scope of many articles or monographs. Consequently, we decided to develop a subject index which could be expanded and within which individual terms could be added, discarded, combined, or substituted with ease.

The index is alphabetical, with two exceptions. First, all diseases and pathological conditions have been kept together and alphabetized internally. Second, countries and regions have been similarly grouped and alphabetized together.

With regard to the category of Countries and Regions, two explanatory notes should be kept in mind. First, articles which contain fragmentary information about specific countries may be indexed under Developing Countries or appropriate regional terms, rather than under the country name. This is particularly true of articles giving data on numerous developed or developing countries. Second, the many citations with information about the United States are not indexed under United States unless the data are compared with data from other countries.

For ease of reference, articles were assigned an accession number as they entered the master file. An attempt was made to keep four subject areas separate in the beginning, so that, in general, the health references are from 1 to 299 and 700 to 799, the operations research articles from 300 to 350, the population references from 500 to 699, and the economics articles from 800 to 999. A special case is the review of an exhaustive bibliography of Russian and East European literature (Health Planning and Health Economics in Countries of Eastern Europe), from which all the references in the 400's are drawn.

Most index terms have not been subdivided. Significant exceptions to this are: Costs, direct; Labor Force; Medical Care; Models; Mortality; and Planning.

In order to find references in a very general area, such as morbidity, the reader is advised to look at all the items listed after the appropriate term(s). For articles in a more limited or specific area, such as morbidity from tuberculosis, the user would probably find it more convenient to note the reference numbers under the specific term (e.g., tuberculosis) and then choose only those articles which also appear under the general heading (e.g., morbidity).

Because references here were assigned accession numbers irrespective of any alphabetical order for authors' names, an author index has been included following the subject index. Insofar as possible, names for all single or two author citations have been listed, together with the appropriate accession number(s).

An attempt has been made to provide an original capsule annotation for all citations. In some cases, the annotation indicates the content of the entire reference (especially in the case of articles); in other cases, only the material pertinent to the health and economic development topic has been noted. Two exceptions to the basic format should be noted. First, the annotations for the East European literature have been reprinted verbatim. Second, some citations were not available for review by the time the bibliography was put into final form. Either they were included on the basis of title alone and left unannotated or the annotation from the original source was used. In the latter case, it appears in quotation marks.

The literature review was initially done in four main areas: health, population and demography, operations research, and economics. The health literature was searched primarily through the SUNY computer system under a number of appropriate terms and combinations. At the time of this particular review, the index system included all National Library of Medicine (MEDLARS) citations from 1964 to April, 1971. The major categories were as follows:

1. Economics or Cost and Cost Analysis
2. Economics-Medical or Economics-Hospitals
3. Group of health terms: Family Planning; Population Control; Community Health Services; Public Health; Social Medicine; Preventive Medicine; Preventive Health Services; Public Health Administration

4. Group of named diseases: Amebiasis; Cholera; Dysentery, Bacillary; Filariasis; Leprosy; Leptospirosis; Malaria; Onchocerciasis; Poliomyelitis; Schistosomiasis; Smallpox; Trachoma; Tuberculosis, Pulmonary; Typhoid; Typhus; Yaws; Yellow Fever; Malaria Control
5. Expenditures, Health
6. Social Change

The combinations used were 1 and 3; 1 and 4; 2 and 3; 2 and 6; and 3 and 5. In order to avoid duplication, certain category combinations were deliberately omitted. Quantitatively, the most productive combination was 1 and 3 followed by 2 and 3. Some 750 references between 1964 and 1970 were returned, of which no more than one-third appeared to be directly relevant to the topic as we had defined it.

Various other sources, including other published indexes (such as Medical Economics and Medical Socioeconomic Research Sources) and references from classic publications, were also used. Special searches were made through a bibliography service in Germany (Institut für Dokumentation und Information über Sozial Medizin und Öffentliches Gesundheitswesen, in Dusseldorf) and at the Biblioteca Regionale de Medicina, Organizacion Panamericana de Salud, in Sao Paulo, Brazil, but these produced little that had not already turned up in the major searches.

The population literature was searched in part through the Population Index and in part by a special SUNY print-out. Some 600 references were originally reviewed by title, and again less than one-third were finally retained.

Abstracts of the operations research/systems analysis/management science field were reviewed for several recent years; many articles turned up in the area of health, but of those, few were in any direct sense related to health and development.

Finally, the economic literature was searched through published indexes (e.g., Journal of Economic Literature) under various appropriate categories. For the Journal of Economic Literature, the categories used for reviewing references from 1960-1971 were as follows:

- 111 - Economic growth and development theory
- 112 - Economic planning theory and policy
- 121 - Economic development studies of less developed countries

- 812 - Occupation
  - 813 - Labor force
  - 825 - Labor productivity
  - 840 - Population
  - 850 - Human capital
  - 913 - Economics of health
- For 1972, these additional categories were checked:
- 123 - Comparative economic development studies
  - 225 - Social indicators and accounts
  - 226 - Productivity and growth factors
  - 823 - Labor mobility; migration
  - 826 - Labor markets; demographic characteristics

In general, the systematic literature reviews were restricted to the period from 1964 to 1971. Some older classics, especially in the "human capital" area, are cited. No major effort was made to seek out articles which appeared before 1960.

The material collected in the initial searches was far greater than that which is presented here. This bibliography is a distillation of a larger body of literature on health economics (of which health and economic development is only a part). The final winnowing was done at the end of the project after the index was nearly complete and accounts for the breaks in accession numbers that occur throughout the bibliography.

A final word about what has been arbitrarily included or excluded is in order. In general, the list has been restricted to published works (journal articles, books and chapters in books, monographs, and so forth). Most mimeographed papers, draft papers presented at professional meetings, and the like were omitted on the grounds that the bibliography should include only citations which would be readily available through library services.

Bibliographies are by nature working documents, not polished treatises. In this sense, the present volume is intended to provide the user with citations which might otherwise have been lost to him; it is by no means intended to represent a final or complete collection of the literature in the area of health and development. In fact, those who find this bibliography a fruitful beginning for their own work in this field will perforce furnish the material for future supplements.

## BIBLIOGRAPHY

1. Abel-Smith, B., The Major Pattern of Financing and Organization of Medical Services that have Emerged in Other Countries. Medical Care 3:33-40, January-March, 1965.  
Patterns of financing and organizing medical care in the United States are compared with those in high income countries of East and West Europe where public control is more prominent. The major difference between East and West European systems centers on the independence of "out of hospital" physicians.
2. Acree, P.W., Comprehensive Health Planning and Its Relation to Cost. Journal of the Louisiana State Medical Society 122:128-132, May, 1970.  
The possible effect of comprehensive areawide health planning on four dimensions of medical care delivery system and expenditure priorities are discussed. The four dimensions are research, flow of funds into physical plants, medical and paramedical manpower, and health care delivery.
3. Alioto, J.L., How High a Priority is Health Care? Journal of Medical Education 45:104-107, February, 1970.  
This general article about the U.S. health system, advocates, among other things, a national health insurance plan, recruitment of minority group students and employees, a federal focus for health policies and programs, a national policy for health manpower (e.g., double present medical school enrollment and output, and open new schools), and expansion of biomedical research.
4. Anderson, O.W. and Lerner, M., Measuring Health Levels in the United States, 1900-1958. Health Information Foundation Research Series No. 11. New York: Health Information Foundation, 1960.  
This report describes in some detail the development of ways to measure reductions in mortality and decreases in illness and disability, partly as a means of evaluating what the public receives for its medical expenditures. Briefly discussed are factors associated with changes in health, changes in health levels in the United States since 1900, changes in leading causes of death (since 1900 and since 1930), shifting patterns of illness, and effects on society of improved health. Assorted tables and charts illustrate the various points.
5. Anderson, O.W. and Rosen, G., An Examination of the Concept of Preventive Medicine. Health Information Foundation Research Series No. 12. New York: Health Information Foundation, 1960.  
An elementary discussion of "minimum available data needed to show ... interrelationships of disease and social factors," with Sweden as a suggested model. Current concepts of prevention, levels of public knowledge and motivation, and determination of possible levels of achievement are discussed. Various charts give pertinent data.

7. Ast, D.B., Cons, N.C., Pollard, S.T. and Garfinkel, J., Time and Cost Factors to Provide Regular, Periodic Dental Care for Children in a Fluoridated and Non-fluoridated Area: Final Report. Journal of the American Dental Association 80:770-776, 1970.

Report of a study to determine the cost and time required to provide regular, periodic dental care for children which provides evidence of the benefits of water fluoridation.

10. Benerji, D., Tuberculosis: A Problem of Social Planning in Developing Countries. Medical Care 3:151-159, July-September, 1965.

The steps to apply in formulating a TB program in any developing country are outlined, with emphasis on integrating consideration of tuberculosis programs in overall plans for social and economic development. The author notes that "...Massive investment of money and resources to eradicate TB may interfere with other measures more important for the country's progress. But a limited investment in a suitably oriented TB program could hasten the decline of the disease."

11. Barlow, R., Economic Effects of Malaria Eradication. Bureau of Public Health Economics Research Series No. 15. Ann Arbor: University of Michigan, 1968. This work may also be found in American Economic Review (Papers and Proceedings) 57:130-148, May, 1967.

A significant study which details a simulation model for measuring the economic and demographic effects of malaria eradication in Ceylon. Much of the data used is based on reference No. 242. Short-run effects were deemed to be positive, but over time the effects become negative as population growth exerts a depressive influence on the economy. An appendix gives numerous equations.

13. Berman, H. and Manning, H., A Practical Approach to Incentives. Hospital Finance Management 24:24-25, 1970.

An incentive reimbursement system to meet the problem of rising hospital costs which emphasizes shared savings, and differs from methods most often considered today, is presented.

14. Blake, C.T., The Economics of the Nursing Home Industry. California Health 27:10-12, 1970.

Figures from a national study and California survey indicate that economics of scale do exist in the nursing home industry and that facilities with fewer than 50 to 60 beds are uneconomical to construct.

16. Brooks, R.G. and Buchanan, W.W., Economic Aspects of Arthritis and Rheumatism. Health Bulletin 28:42-43, 1970.

Investing resources in the treatment of rheumatic diseases can be justified on economic grounds, but the impact

and effectiveness of such health expenditures should still be evaluated in terms of the costs and benefits involved. Two attempts to estimate such costs and benefits are noted.

17. Brown, M., Jr., An Economic Analysis of Hospital Operations. Hospital Administration 15:60-74, 1970.

"The role of economic analysis in hospital operations has not been very significant, because of the lack of rigorous theoretical underpinning for the analysis that have been executed. The hospital has not been cast strongly in the role of a firm producing goods and services for consumption. Management and ownership are the final decision makers and policy makers; however, the quality of their decisions and policies will be partially a function of the quality of the economic analysis preceding those decisions."

18. Brown, R.E., Medical Problems of the Developing Countries. Science 153:271-275, 15 July 1966.

A general review of interrelated medical problems in developing countries, especially malnutrition both by itself and because of synergistic effects. The answers to these problems do not lie only in the realm of financial aid from rich countries. Long-range planning, emphasis on education, programs of birth control, improvement of agricultural methods, and better statistics are all needed, but all problems and solutions must be approached from the point of view of local conditions and resources, not a general "textbook" situation.

19. Btsh, S., International Research in the Organization of Medical Care. Medical Care Journal 3:41-46, January-March, 1965.

Research in the organization of medical care is of benefit to both developing and developed countries, but it is hampered by lack of a recognized methodology. The main problem is that health (the final product) is not measurable and no comprehensive mathematical model has been developed yet. Medical care organization should be studied from point of view of performance, economy, and effectiveness; and programs should be defined in terms of cost, utilization, and quality. WHO studies on these latter 3 factors are reported.

20. Burns, E.M., Social Policy and the Health Services: The Choices Ahead. American Journal of Public Health 57:199-212, February, 1967. (The Sixth Annual Bronfman Lecture).

In the U.S., the future will see demand for removal of financial and other barriers to receipt of medical care, for rationalization of the present nonsystem of health services delivery, and for further improvements in social environment which will have favorable impact on health. The leadership for these decisive steps must come from the medical profession itself, administrators of hospitals, and public health departments and staffs.

22. "The Chemotherapy of Tuberculosis in Developing Countries. Section 1: The Economics of Tuberculosis Control." A Conference held in London, September 25-27, 1967. Tubercle 49: Supplement, March, 1968.

To locate description of article see author index under: Citron, K.M.; Kent, P.W.; Muktari, L. (et al); Polansky, F.; Seymour, D.E.; and Waaler, H.T.

23. Chicou, F.J., Hetrick, G., Huet, M., Radenac, H. and Pist, N., Comparative Study of 2 Types of Oral Therapy of Pulmonary Tuberculosis (Ethionamide (and) Isoniazid, Thioacetazone (and) Isoniasid). Bulletin WHO 39:731-769, 1968. (In French; English Summary, p. 768.)

A 1963-1965 study in Morocco is reported in which 169 patients with isoniazid-sensitive bacilli on initial sputum culture were analyzed. At the end of 4 months, significant differences were seen between the Ethionamide and Thioacetazone regimens in terms of the number of patients with isoniazid-resistant bacilli. (16% on Etho and Iso versus 20% on Thio). However, radiologic results at same time suggest that the Thio regimen led to more rapid radiologic improvement than the Ethionamide regimen. The authors analyze and discuss results from the point of view of efficacy, price, and ease of administration and conclude that "only the cost of the Ethionamide regimen prevents its wider adoption in TB campaigns in developing countries".

25. Citron, K.M., Efficacy and Cost of Commonly Used Chemotherapy Regimens. Tubercle 49: Supplement 12-16, March, 1968.

The cost of drugs in the isoniazid-thiacetazone regimen is detailed and it is concluded that isoniazid/thiacetazone regimens are the "best bargain". Assorted studies of tuberculosis treatment, particularly in Madras, are cited.

27. Dannemann, Robert N., Problems of Human Resources in Brazil. International Labour Review 94:570-589, December, 1966.

"A discussion of Brazil as a developing country in which the human aspects of manpower are of great importance in economic development. The effective integration of the human element into the social processes of production demands the solution of a series of questions relating to education, health, nutrition, housing, and technical problems. A vicious circle exists: low standards of living make it impossible to mobilize manpower productively and deficient working conditions and low output hinder general improvement of the situation. Thus, more attention and resources must be devoted to the human potential so that it may become both the origin and objective of economic and social development."

29. Dawood, I.K., Dazo, B.C. and Farooq, M., Large-Scale Application of Bayluscide and Sodium Pentachlorophenate in the Egypt-49 Project Area. Evaluation of Relative Efficacy and Comparative Costs. Bulletin WHO 35:357-367, 1966.

Report of a study to evaluate the comparative efficacy of two molluscicides - Bayluscide and sodium pentachlorophenate - in controlling the snail population and to obtain an analysis of the comparative costs of application. Both molluscicides were found to be highly effective. Chemical costs were very similar as were the operational costs for the main canals; for other watercourses, however, the cost of applying sodium pentachlorophenate was nearly three times that for Bayluscide. Bayluscide is felt to be "the preferred molluscicide in the Egypt-49 project area and probably also in the rest of the Nile Delta Area." Data are presented in a number of detailed tables.

30. Deeble, J.S., An Economic Analysis of Hospital Costs. Medical Care 3:138-146, July-September, 1965.

A brief report of the application of some economic and statistical techniques to analysis of variations in hospital operating costs with tables giving data for 1950/51 to 1960/61. Conclusions: "In acute general hospitals, the cost of providing facilities as such are, on the average, a little less than one half of total operating costs. Average costs per patient treated at constant "quality" are very little affected by reductions in the length of patient stay, because the cost of the more intensive treatment required to achieve reductions almost completely offsets any economics."

31. De Geyndt, W., Five Approaches for Assessing the Quality of Care. Hospital Administration 15:21-42, 1970.

Five approaches for evaluating the quality of medical care are discussed: assessment of content, process and procedures, structure and organization, outcome in terms of altered health status of recipients, and impact on life and productivity of target populations. A bibliography on measuring the quality of medical care is included.

32. De Glanville, H., Group Occupational Health Service in a Developing Country. British Medical Journal 4:548-550, 1970.

Direct service to work force is considered to be more useful to developing country than purely advisory central occupational health unit, as evidenced by success of an experimental plan in Dar es Salaam providing physician, paramedical, and dispensary services for over 65 firms.

33. Dieterich, B.H. and Henderson, J.M., Urban Water Supply Conditions and Needs in Seventy-Five Developing Countries. Public Health Papers No. 23. Geneva: World Health Organization, 1963.

This study was made in connection with the Community Water Supply Program begun in 1959 by the 12th World Health Assembly and covers developing countries of Africa, Latin America, and Asia. The authors estimate future needs and calculate costs for the period 1962-1977.

34. Downing, R.I., Health and National Economy. Medical Journal of Australia 1:297-303, 29 February 1964.

Australian health services are compared with those in various other countries in terms of rising costs and expenditures and financing. Detailed data on national expenditures for early 1960's are given. The defects in the present system of paying for health care are described in some detail.

35. Drobny, A., Evaluation of Health Programs. Boletín de la Oficina Sanitaria Pan Americana 57:112-116, August, 1964. (In Spanish)

"The need of evaluation as an organized process in health projects is stressed. The usefulness of health indicators in evaluation is analyzed in an attempt to find a scale of measurements. It is implied that the known health indicators cannot always be used for evaluation purposes - because of limitations of projects, both in space and in time, and because of lack of reliability of health statistics in the developing countries. While statistical information is not completely reliable for the purpose of project evaluation, the use of a scale of measurements, based on assumptions of validity, is suggested. The method would consist in the pre-establishment of measurable objectives based on assumptions of validity, baselines related to the objectives, and targets to be accomplished in a given period of time. The evaluation process, then, would be concomitant with periodic reporting of achievements, measured against the pre-established targets."

36. Dunlop, J.T., Some Facets of the Economics of Health Care Delivery. Journal of Medical Education 45:133-138, March, 1970.

A new system of medical care will evolve over the next decade in the U.S. involving five principal "levers": financing of care, research, capital flow, manpower training (especially paramedical), and the delivery system itself. The market may play a role in medicine via capital flow and the labor market.

38. The Economic Value of Preventive Medicine and Organized Health Service. E/CONF. 39/F/145 (United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas.) Geneva: World Health Organization, 1962.

A general discussion of the benefits to be gained from prevention and control of malaria, tuberculosis, diphtheria, polio, and other infectious diseases. The organization and health statistics of several countries (including Czechoslovakia, Israel, Ceylon, and Puerto Rico) are presented.

42. Farooq, M., A Possible Approach to the Evaluation of the Economic Burden Imposed on a Community by Schistosomiasis. Annals of Tropical Medicine and Parasitology 57:323-330, September, 1963.

The economic loss to the Philippines resulting from incapacity due to schistosomiasis is 2,325,000 Pesos, cost of treatment is 10,750,000 Pesos and total cost is 13,075,000 Pesos annually (about 52.00 Pesos per infected person, or 13.00 Pesos per person exposed). Comparisons are made with economic loss due to malaria, with the conclusion that there is a heavier annual per capita loss from schistosomiasis. Methods in classifying disease and determining economic consequences are presented, along with several detailed tables.

43. Farooq, M., Medical and Economic Importance of Schistosomiasis. Journal of Tropical Medicine and Hygiene 67: 105-112, May, 1964.

There is some divergence of medical opinion on community significance of schistosomiasis, and evaluating this calls for defining the exact situation in any given locality. The economic importance and monetary estimates of loss are given for Egypt, Iraq, Japan, and Philippines. A long set of references is provided.

44. Fei, J.C.H. and Ranis, G., Innovation, Capital Accumulation, and Economic Development. American Economic Review 53:283-313, June, 1963.

A discussion of certain economic aspects of growth in developing countries, including growth of population and industrial labor force.

45. Feldstein, M.S., Health Sector Planning in Developing Countries. Economica (London) 37:139-163, 1970.

"This paper describes a method of allocating the scarce health sector funds, manpower and facilities of an underdeveloped country among different disease control programs and individual activities in the way which yields the optimum feasible reductions of mortality, morbidity and economic losses.

The linear programming formulation provides a natural framework for incorporating the multiple benefits and costs of health care programs."

46. Forbes, W.H., Longevity and Medical Costs. New England Journal of Medicine 277:71-78, 13 July 1967.

Longevity is measured here as average remaining lifetime (ARL) and U.S. figure is compared with that of about 30 other countries. ARL has remained nearly constant for 1947-1965, but our rank relative to other nations has fallen sharply for men and slightly for women. Figures give ARL and health expenditures and social security costs as % of GNP (for 30 countries). Author concludes that for U.S. and other industrialized countries, "there is no longer any significant relationship between money spent on health and the results achieved." The main determinants of longevity are cultural, not medical (except in countries where infectious diseases are predominant cause of death).

47. Foster, R., Schistosomiasis On An Irrigated Estate in East Africa. III. Effects of Asymptomatic Infection on Health and Industrial Efficiency. Journal of Tropical Medicine and Hygiene 70:185-195, August, 1967.

The author notes that some disagreement exists among authors in this field with regard to relative importance of *S. haematubium* and *S. mansoni*, and with regard to effect of chronic infection on economic productivity. Health and productivity records of infected and non-infected workers were compared indicating positive relationship between infection and absenteeism and requests for medical care. Tables give figures on direct and indirect costs. Authors note that if schistosomiasis infection is part of multiplicity of chronic diseases, alleviation will not necessarily lead to marked improvement in economic productivity.

48. Fuchs, V., The Economics of Health Care in the 70's. Hospitals 44:68-71, 1 January 1970.

In this interview, Fuchs foresees some sort of universal health insurance program for the U.S. soon, but he does not predict any major short-run effects on overall health of the nation. Costs will continue to rise, but not at same rate. The effectiveness of hospital management must be improved, possibly through elimination of cost reimbursement, common management of hospitals in a given local area and/or better hospital utilization patterns. He suggests that hospitals should move in direction of market price system, physicians in other direction (i.e., away from fee-for-service).

50. Gockel, C.W., Onchocerciasis. Its Epidemiology and Economic Significance. Münchener Medizinische Wochenschrift 107:1468-1474, 30 July 1965. (In German: Summary in English)

Onchocerciasis is caused by microfilaria, causing pathologic changes in the eye which frequently leads to blindness. Major infested regions are Africa and parts of America. Its control in many African countries is a "substantial prerequisite for possible economic development".

51. Gombault, A., The Cost of Hospitalization in Europe. Concours Med. 92:6410-6411, 1970.

Worldwide, hospital costs are steadily increasing, due in large part to shorter work days and increased wages of hospital workers. Health expenditures as a percentage of GNP in various European countries are noted.

52. Hackenberg, R.A., The Social Observatory: Time Series Data for Health and Behavioral Research. Social Science and Medicine 4:343-357, 1970.

Discussion of comprehensive health research at the Papago field station of the U.S. Public Health Service which purports to evaluate both the magnitude of health problems and the allocation of resources.

53. Hansen, W. Lee, A Note on the Cost of Children's Mortality. Journal of Political Economy 65:257-262, June, 1957.

The economic costs of high infant and childhood mortality rates basically equals the costs of past support of children who die each year before reaching age 15. The author criticizes some early work and notes that costs must be calculated on basis of life table cohorts, which may reduce the fraction of national income expended on the total number who die before 15. That is, not every child who dies, dies just before reaching 15; in fact, a large percent die under 1 year. The problems in estimating costs are discussed, and the author calculates "rough approximations of the costs by age" according to three child:adult cost ratios for India, United Kingdom, and the United States. The implications of the definition of economic cost and estimates presented in this article are discussed.

54. Harris, B.S.H. and Hallan, J.B., The Number and Cost of Prescribed Medicines: Selected Diseases, Inquiry 7:38-50, 1970.

Expenditures in the United States on medications for one year for non-hospitalized patients were estimated at \$2,552 billion, for a total of 782 million medicines. Breakdowns by diagnosis, age, sex, and type of medicine is given.

55. Hayes, T.L., Drugs and the Economy of the Country, New Zealand Medical Journal 67:495-501, April, 1968.

The introduction of drugs has certainly benefited society (to greater or lesser degree depending on the disease in question), but to estimate the economic benefit of drug therapy may be merely guesswork, because of the number of underlying assumptions. Various measures, such as hospital admission rates, the number of working days lost due to sickness, and mortality and morbidity rates of specific diseases which indicate the value of drugs to the economy are discussed.

58. Hospital Utilization, Estud. Hospital 1970:52-53, 1970.

Rates of hospital utilization can vary between and within underdeveloped, developed, under- and over-populated areas. Figures on proportional needs of medical care in the USSR and of hospitalization in Northwest India are presented.

59. Houston, C.J., The Task Force Report on the Cost of Health Services in Canada: One Man's Opinion. Canad. Med. Ass. J. 103:615-618, 1970.

A review of the work of 7 task forces on utilization, operational efficiency, salaries and wages, beds and facilities, methods of delivery of medical care, price of medical care, and on public health services.

61. Huxtable, D.L., Vital Statistics Aid in Developing Nations. American Journal of Public Health 57:504-508, March, 1967.

Prior to starting any vital statistics programs in developing nations, a review of the financial, administrative, and educational resources of the country is needed to determine whether the program is likely to be sustained. A pilot project in Kenya is described (using different procedures in four different districts of the country). Financing of any such program by international agencies calls for intensive follow-up.

62. Hyman, M.D., Some Links Between Economic Status and Untreated Illness. Social Science and Medicine 4: 387-399, November, 1970.

Discontent with medical care and with society may constitute one link between socio-economic status and the utilization of medical care. The author suggests that an attack on the economic component of poverty might be expected to reduce discontent and hence, discontinuity and by so doing alleviate the problem of untreated illness, but that one might attack the intervening variables themselves.

63. The Influence of Community Water Supply Programmes on Health and Social Progress. W.H.O. Chronicle 18:180-191, May, 1964.

Report of the technical discussion chaired by Abel Wolman. The effects on health and economic development are cited with several international examples. Losses due to inadequate water supplies in Germany and France are noted. Various aspects of financing water systems (capital, government expenditure, payment by consumers in cash, kind, or labor) are discussed. The necessary steps to be undertaken by World Health Organization are discussed in detail.

65. Jobin, W.R., Rationale for Selecting Molluscicides for Bilharzia Control Programs. Public Health Reports 83: 594-596, July, 1968.

"CTD" is a better indicator of relative value of chemicals for use in a bilharzia control program. This is  $CT \times \text{price}$  (in U.S.\$) where CT is concentration needed for complete mortality  $\times$  time in hours that the concentration must be applied. Assorted formulas for unit cost are given, and three molluscicides are analyzed. For the conditions given, the cheapest chemical is the one with the highest market price.

67. Jobin, W.R. and Berrios-Duran, L.A., Cost of Harvesting and Spreading Marisa Cornuarietis for Biological Control of Biomphalaria Glabrata in Aibonito, Puerto Rico. Bulletin WHO 42:177-179, 1970.

B. glabrata is intermediate host of *S. mansoni* snails were harvested in the field. Extra feeding did not cause a detectable increase in the harvest. Low cost of harvesting and planting is noted (~3.1¢ per snail). For small ponds, this compares very favorably with cost of best molluscicide (\$3.00 for snails versus \$10 for molluscicide). Only low cost and extreme simplicity of method is demonstrated; effectiveness was not evaluated.

68. Johnson, R.L., Solution to Hospital Costs May be Over-Simplified. Hospital Progress 51:80-85, 1970.

"It is doubtful whether applying modern management techniques to hospital operations would help contain costs. The author points out that rising hospital costs are a general and even international phenomenon. Changing the present health care delivery system and making it more efficient will increase productivity and also total costs. If health care will be more equally distributed to all economic classes the hospital manpower shortage will become more acute and labor costs will spiral upward. Medicare and Blue Cross cost reimbursement formulas do not cover new capital investment and tend to force hospitals to increase labor costs. Automation affords the least pay-off in low volume, wide variety

hospital activities: cost benefit analyses indicate it takes a hospital 40 years to turn it to profit. Unlike industry, large hospital systems have a higher cost than small hospitals. Hospitals are a labor intensive industry in which salaries represent two-thirds of operation costs, which is why they severely influenced by changes in the minimum wage level. Even employing industrial engineers will not lead to a reduction of operation costs of more than 15%. Four tables on cost affecting factors are included."

69. Johnston, B.F. and Mellor, J.W., The Role of Agriculture in Economic Development. American Economic Review 51: 566-593, September, 1961.

Labor-intensive agriculture has a place in planning for the economic growth of a country in that it may provide a surplus for investment in other sectors.

71. Kent, P.W., Tuberculosis Control -- Counting the Cost. Tubercle 49:Supplement 6-9, March, 1968.

When either case finding, treatment, or vaccination is operating at relatively efficient level (e.g., 80%), cost-accounting of that component should be initiated. Cost-accounting is irrelevant if the efforts being made have only a negligible effect on the situation. A few figures for East Africa are used for illustration.

72. Klarman, H.E., The Case for Public Intervention in Financing Health and Medical Services. Medical Care 3: 59-62, January-March, 1965.

Public intervention in the provision and financing of health and medical services is discussed from the economic point of view, including such factors as collective goods, external effects in consumption, declining unit cost, and support of voluntary forms of organization. Support for intervention is wide, but divergence of opinion concerning its application is equally wide.

73. Klarman, H.E., Rice, D.P., Cooper, B.S., and Stettler, H.L., III, Accounting for the Rise in Selected Medical Care Expenditures. American Journal of Public Health 60: 1023-1039, 1970.

"An accounting framework is presented for analyzing the increase in expenditures for dental services, short-term hospitals, and physicians' services over a period of almost 40 years. The very process of analysis serves to raise questions concerning some of the basic data themselves. The findings indicate that, in the late 1960's, both expenditures and prices have increased faster than they did in the early 1960's and over the entire period 1929-1968. Contributing factors are explained.

74. Kollar, K.L., Water, Industry, and Economic Growth. Boletin de la Oficina Sanitaria Panamericana 56:237-242, March, 1964. (In Spanish - English Summary)

Water is a keystone to economic progress, since it is catalyst for production, and public utility construction programs have multiplier effect. One table gives the economic status of 24 countries, circa 1957, according to several parameters (number and percent of workers, workers in industry, and workers in agriculture, and per capita income.)

76. Lave, L.B. and Seskin, E.P., Air Pollution and Human Health. The Quantitative Effect, with an Estimate of the Dollar Benefit of Pollution Abatement, is Considered. Science 169:723-733, 1970.

"Report of an investigation of the effects of air pollution on human health. The problem of isolating health effects is characterized, quantitative estimates of the effect of air pollution on various diseases are derived, and reasons are advanced for viewing some earlier estimates with caution. The economic costs of ill health are discussed, and the costs of effects attributed to air pollution are estimated."

77. Laverriere, M., Cost of Public Service in the Hospital Environment. Rev. Hosp. Fr. 34:479-510, 1970.

"Figures are presented on the cost of public services in French hospitals. Two important elements in hospital costs are average length of stay and average occupation of hospital services. Short-stay combined with maximum occupation shows high efficiency. Figures on stay and occupation are given for the various hospital services, also figures on the amounts of personnel employed in these services. Ambulance and first-aid costs amount to 6% of the costs of one day of surgery. Finally, figures are presented showing the costs of public hospital duties as education and research, and the fees paid in these hospitals."

79. Leiby, G.M. and Figueira, F., A Community Health Challenge--Northeast Brazil. American Journal of Public Health 54:1207-1221, August, 1964.

The first part of this article is a general discussion of the relationship between health and economy (and poor health and underdeveloped economy) with a description of how focusing on "paranatal" group by the community health services can lead to a significant influence on community development. There is a long discussion of internationally financed health facilities programs designed in part to meet the goals of the Alliance for Progress. A number of very detailed tables give specific information on FSESP health facilities.

80. Levin, A.L., Cost Effectiveness in Maternal and Child Health. Implications for Program Planning and Evaluation. New England Journal of Medicine 278:1041-1047, 9 May 1968.

This article presents an examination of the objectives, results, difficulties and implications of a study of cost-effectiveness in MCH done in 1966 at outset of PPBS in U.S. government agencies. Estimated yearly costs for 10 programs in health depressed community and estimated yearly effects per \$10,000,000 spent on alternative child health programs are given. Cost-effectiveness analyses are limited in certain ways, but at the very least can stimulate research in program design and evaluation, give impetus to improved allocation of government monies on rational basis, and influence development and responsible use of social indicators.

82. Linnenberg, C.C., Jr., Economics in Program Planning for Health. Public Health Reports 81:1085-1091, December, 1966.

Economic considerations do or must have a place in deciding on priorities for spending money (here specifically government money) and discusses PPBS and cost-effectiveness (using an example of kidney dialysis projects). The author warns against allocating resources on behalf of the producers of a good or service rather than on the behalf of the consumer (using an example of oystering in Florida) and calls for shaping of an adequate assortment of measures of effectiveness.

83. Livadas, G. and Athanassatos, D., The Economic Benefits of Malaria Eradication in Greece. Rivista di Malariologia 42:177-187, December, 1963.

The economic benefits of malaria eradication are divided into two classes. "Negative" benefits are derived from elimination of losses in the past, which are estimated at \$26 million annually. "Positive" benefits for the national economy are those gained through the direct contribution of the eradication program to the development of national resources. These second benefits are more important than the first, although not quantifiable. Data given include epidemiologic figures for malaria in Greece 1930-1940 and results of 1946-1949 campaign, and figures on which total benefits (negative and positive) were calculated. The latter are mainly the rise in production of wheat, cotton, and rice, and an increase in GDP.

86. Maramag, I., The Cost of Public Health Programs in the Philippines. Journal of the American Medical Women's Association 20:848-857, September, 1965.

Brief historical review of public health in Philippines is given. Development of rural health services and hospital

services is discussed, including detailed table of costs of public health programs (puericulture centers, rural units, dental services, social hygiene, malaria eradication, Tuberculosis control, environmental sanitation, laboratory services, filaria control, and sanitarium) and hospital services. Figures are given for health appropriations, expenditures, and average unit costs. UNICEF work and expenditures are discussed in detail.

87. May, P.R.A., Cost Efficiency of Mental Health Delivery Systems I. A Review of the Literature of Hospital Care. American Journal of Public Health 60:2060-2067, 1970.  
 "Rising costs and the increasing demand for psychiatric services are likely to focus attention on problems of manpower utilization and cost effectiveness in mental health care delivery systems. In the past, the cost of psychiatric hospital care has traditionally been expressed as a per diem rate based on average resident population. Such rates are inappropriate for cost effectiveness comparisons and may seriously mislead more responsible program planning and patient treatment. Cost per case treated is a more meaningful index of cost efficiency. A review of the literature demonstrates that there is a great need for more scientific investigation of this area, and for controlled studies that will provide hard, objective financial outcome data. In particular, there is a deplorable absence of controlled research on the comparative costs of the various treatment methods used for schizophrenic patients."
88. McCreary, C.B., Tuberculosis Control in India. Diseases of the Chest 53:699-708, June, 1968.  
 BCG vaccination is most economical method of TB control, but its benefit is limited to that percent of population not already affected. Bacillary-positive cases cannot all be treated in hospitals, so domiciliary chemotherapy is best hope for treatment of patients and control in community. Table 1 compares costs of various combinations of anti-TB drug regimens per patient per year, and a discussion of these various drugs and combinations is given (based on assorted studies done primarily in Madras). Author feels that control may be in the long-run questionable for a variety of reasons, including drug-resistance, measure of chemotherapy (especially by unqualified practitioners), and assorted administrative and operational difficulties.
91. Mitchell, G.E., The False Economy of Dental Neglect. In: Economic Benefits from Public Health Services. Objectives, Methods and Examples of Measurement. pp. 18-23. Public Health Service Publication No. 1178, Washington, D.C.: G.P.O., 1964.  
 The size and nature of U.S. dental health problems are described. Dental care is more closely associated with income than any other health source especially of a preventive

nature. Since neglect produces more extensive dental disease, it is a major, costly health problem. The cost is born partly by industry, by the school population and by the armed forces. The benefits from prevention are discussed, including those from fluoridation; if all communities in nation adopted fluoridation, dollar saving in dental treatment made unnecessary would be \$700 million/year. The author emphasizes that proven prevention measures would lead to economies, and the sooner they are put into effect, the better.

92. Muktari, L., Benghezal, A., Chaulet, P. and Largaoui, D., Some Economic Aspects of Tuberculosis Control in Algeria. Tubercle 49: Supplement 4-6, March, 1968.

"Budget for TB control in Algeria is about 70 million DA (\$14 million). More than 90% is spent on hospital beds. A new policy now being applied to reduce number of beds and increase number of clinics."

93. Molina, G. and Noam, I.F., Indicators of Health, Economy, and Culture in Puerto Rico and Latin America. American Journal of Public Health 54:1191-1206, August, 1964.

Authors argue that economic welfare, not health services per se, is the most important factor in improving levels of health. Indicators used to measure changes in standard of living, changes in health status, and changes in health services are discussed. Those under health status include life expectancy at birth; crude death rate (or, better, age-sex standardized death rate); proportional death ratio (percent of total deaths in persons 50 + years of age); infant mortality rate; disease-specific death rates, especially taken together. Socio-economic indicators are per capita national income and its distribution (including percent of income to labor versus percent of returns to capital); food consumption (e.g., milk, protein, or calorie intake per capita); literacy and education (e.g., percent over 10 years literate, percent 6-18 years registered in school). Health services indicators are percent of population with protected water; number of inhabitants per physicians; number of hospital beds per 1,000 inhabitants; per capita expenditures on health; percent deaths with medical certification; percent of births in hospital; number of prenatal and infant consultations per live birth. Some correlation coefficients between specific indicators are presented and discussed. Notion of "unbalanced socio-economic progress" is discussed, especially for Latin America. Authors call for high priority for compilation of better statistics. Eight tables give data on above indicators for wide variety of countries.

94. Muller, C., Health at What Price? Some Notes for Comprehensive Health Planners. American Journal of Public Health 59:651-656, April, 1969.

1966 and 1967 figures of public (mainly federal) expenditures on health are given. Assorted other statistics include percent rises in price of medical services, physician fees and earnings in hospitals. Pricing structure of doctors and of hospitals is discussed, as well as the effect of price movement within health on non-health expenditures.

96. Muller, C., Socio-economic Outcomes of Restricted Access to Abortion. American Journal of Public Health 61:1110-1118, June, 1971.

Unwanted pregnancies and resultant children have an economic impact on entire society, especially since higher percent occur in low-income families. This effect works primarily through "impaired educational chances which threaten future economic potential", especially among three groups: teenage father who must stop schooling to support family; mature woman with children (especially if she was married at early age); those who are already at poverty level and can not escape. "Underdevelopment of human capital," as in these three groups, operates especially via "mental retardation, physical, and psychiatric health problems, and educational undernourishment." A break in the cycle could be effected through greater access to legal abortion, especially for the poor (although it must be coupled with education aimed at reducing desired family size). 33 references.

97. Mushkin, Selma J., Health as an Investment. Journal of Political Economy 70: Supplement, October, Part 2, 1962.

Concepts of mortality, disability, and debility as used in labor product measurement are discussed, along with conceptual problems (multiple-diseases, valuation of housewife's services, unpaid family workers). Valuation of gain in output (in units of working time added are measured by 1) amount equivalent to total product per worker or 2) earnings as a measure of output attributable to labor. Estimates of the contribution to economic growth resulting from enlargement of work force through reductions in death rates over past decades are given including present value of future work-income stream.

98. Mushkin, Selma, Health Programming in Developing Nations. International Development Review 6:7-12, March, 1964.

The relationship between health programs and economic growth is examined, especially with regard to the crucial need for leadership within both fields.

99. Mydral, G., Economic Aspects of Health. Chronicle of the World Health Organization 6:203, August, 1952.  
(Address of Fifth World Health Assembly)

Studies of the economic value of health must always utilize "dynamic theory of social change " the "empirically observable balance of poverty, illiterac, , and sickness is not a stable equilibrium". Economic costs or rewards of health reform will differ in the short and long run, and the latter will depend on how all factors are inter-related in the particular situation to be studied. Growing economic gaps between already developed and developing countries are noted. This has important implications, for "calculating economic value of saving people from sickness disability, and premature death [cannot be done] except within a framework of definite and realistic assumptions in regard to economic development," and "the economic value of health reform is particularly dependent on the speed of economic development."

100. Navarro, V., Methodology on Regional Planning on Personal Health Services: A Case Study: Sweden. Medical Care 8:386-394, 1970.

A description of Swedish methods of planning the regionalization of personal health services, including estimating future demand (using a consumption unit index) and determining the size of a region and the geographic distribution of resources in it. The key factor is accessibility, and the best cost-efficient location will be the one that minimizes aggregate travel time and costs.

101. Novais, M., Integration of Health Programs into the Politics of Economic Development. Boletín de la Oficina Sanitaria Panamericana 57:117-128, August, 1964. (In Spanish)

"The author analyses the repercussions of economic development on health policy with a view to establishing guidelines for setting up programs aimed at promoting better levels of health in the general context of the changes produced by development. The topic is developed within the framework of the historic prospects at present confronting the underdeveloped countries, which are trying to achieve higher levels of per capita consumption as well as progressive economic growth. The author bases his arguments on the premise that health is a variable that depends on economic development and finds it both exact and fundamental to the formulation of a dynamic policy. Certain historical data are mentioned in favor of this subordination of health to economic factors, which determined it in the last century in the Western world and are doing so at the stage the economically underdeveloped countries are going through. The author also analyzes the problems of measurement of health indicators and the

existing methods for doing so and examines the means for evaluating medical care requirements in relation to the resources available to different communities. Finally, a critical reference is made on the concept of "balanced economic development" and to the systematization of general principles for the formulation of health programs, bearing in mind the particular conditions of the region under study."

102. Olson, S.W., Financing Graduate Medical Education. Journal of Medical Education 44:745-754, September, 1969.

Two studies of costs for graduate (house staff) education are cited. A big differential exists between house staff maintenance expenditures (including salary) and what the institution says is its education costs; the former is about two times the latter. The author calls for the following as a means of rationalizing and improving the economic situation of graduate medical education: (1) services rendered in teaching hospital should be paid for in full; (2) differentiation should be made between hospital services and professional services (and latter includes house staff services); (3) house staff income should be a stipend in lieu of salary and should not be equated with value of professional services rendered; (4) research and professional education costs should be paid for from other than patient-generated sources. The connotations of these goals are briefly discussed.

103. Omran, A.R., Impact of Economic Development on Health Patterns in Egypt. Archives of Environmental Health (Chicago) 13:117-124, July, 1966.

Epidemiological characteristics of a rapidly developing country are presented, and the value of various health indicators in reflecting the impact of social and economic development on patterns of health and disease are discussed. Indicators include those related to: mortality, morbidity, physical and sanitary environment, population and health services. The author concludes that no comprehensive health index is available, and thus a battery of health indicators must be relied on.

104. Ortiz, J.R., Estimate of the Cost of a Malaria Eradication Program. Boletin de la Oficina Sanitaria Panamericana 64:110-115, February, 1968. (In Spanish) This also appears in the English Edition, Selections from 1968.

Potential benefits of 8-year program to wipe out malaria in Paraguay are measured in terms of actual value of agricultural productivity now lost due to disease. In 1965, productivity loss was almost \$6.5 million. An eight-year program would cost \$6,950,000. Indicators are that by end of

fourth year, the favorable effects of campaign would be equal to the sum invested and the program would be financially self-sustaining. "The potential returns of the program are equal to difference between what would have been produced if malaria had not existed and what has in fact been produced." Costs and Benefits by year are given in tables.

106. Polak, S., Financial Implications of Leprosy and Tuberculosis Control in Thailand. Journal of the American Medical Women's Association 20:841-847, September, 1965.

Institutional care costs and mass campaign (ambulatory) costs for leprosy are given in Baht. Costs of tuberculosis control are divided into BCG vaccination, case finding, and treatment (also all in Baht). These costs are compared with per capita GNP and/or per capita public health budget.

107. Polansky, F., The Cost of Tuberculosis Control in Czechoslovakia. Tubercle 49: Supplement 9-11, March, 1968.

"Direct cost of tuberculosis services in Central Bohemia region was 32,682,000 CzKr in 1958. In chest clinics, almost half was on salaries, 40% on drugs. In hospitals, about two-thirds of expenditure was on food and other items not directly related to tuberculosis control." Tables give breakdowns of direct costs by category of expenditure.

108. Prest, A.R. and Turvey, R., Cost-Benefit Analysis: A Survey. The Economic Journal 75:683-735, December, 1965.

A general discussion of some of the elements and problems in measuring the costs of death and illness including: how to measure the value of housewives' services (opportunity cost vs. replacement cost) and what to do with consumption (whether to include as a loss to society or not).

109. Pyatt, Edwin E. and Rogers, Peter P., On Estimating Benefit-Cost Ratio for Water Supply Investments. American Journal of Public Health 52:1729-1742, October, 1962.

Public works programs, including those with ramifications for health (such as municipal water supply) can indeed be analyzed in quantitative cost-benefit terms, even in developing countries. A methodology for such analysis is presented, utilizing data from Puerto Rico.

110. Reinhard, K.R., Felsman, F.W. and Moody, I.F., Time Loss and Indirect Economic Costs Caused by Disease Among Indians and Alaska Natives. A Comparison with the General U.S. Population. Public Health Reports 85:397-411, May, 1970.

A study comparing the health status of Indians and Alaska Natives with the general population (all races) shows a large health deficit for the farmer. As part of the study,

the utility and relevance of using mortality, morbidity, and disability and other data, as well as computations of time lost and indirect economic costs were compared. Technical considerations in computing mortality losses, indirect costs, etc. are explained. There are several tables on: (1) estimated man-years lost due to mortality and morbidity, by cause; (2) estimated indirect costs of mortality and morbidity (e.g., time loss, potential earnings loss) by cause, age and sex; and (3) rank order of quantitative importance of major disease categories according to various methods of calculating impact. Problems and limitations of the approach are noted.

113. Rice, D.P., Measurement and Application of Illness Costs. Public Health Reports 84:95-101, February, 1969.

Morbidity costs are measured in a broad context (systematically distributing direct expenditures by disease category, and establishing a framework for use in estimating annual losses in output by diagnosis) and figures are presented for 1963. Economic losses from mortality also are calculated and discussed. Application of these illness costs to various PPBS programs and alternative analytical techniques are discussed, as well as the major issues which result in these different procedures (including intangible benefits and varying values placed on different age groups). Thirty-one references are noted, including many classic articles and a number of PPBS program analyses.

114. Rice, D.P. and Cooper, B.S., The Economic Value of Human Life. American Journal of Public Health 57: 1954-1966, November, 1967.

Present value of lifetime earnings by color, age, education for United States is given in detailed tables, and author discusses various aspects and problems inherent in establishing the economic value of human life (including discounting, housewife services, labor force participation, and consumption.)

115. Richardson, William C., Dimensions of Economic Dependency. Health Administration Perspectives No. A4. Chicago: University of Chicago, Center for Health Administration Studies, 1967.

Measurement of Poverty and Economic Dependency (which are not necessarily the same) and their interrelations are discussed, followed by section on relationships between low income, disease incidence (morbidity), health practices and utilization of medical care services, consumer expenditures for medical care, etc. Various studies of similar points (between the late 1950's and mid-1960's are cited.) Author notes that "work attitudes" and use of management skills among poor may be variables worth evaluating. The remainder of the paper deals with formal (e.g., AFDC) and informal (e.g., intrafamilial transfer) resources used to deal with

dependency. What alternatives are available for receiving assistance, how the spending unit decides which alternative to take, and the impact of this choice on subsequent expenditures or utilization behavior are all features of the strategy implicit in this study.

116. Roberts, J.M.D., The Control of Epidemic Malaria in the Highlands of Western Kenya. Journal of Tropical Medicine and Hygiene 67:161-168, 191-199, and 230-237, 1964.

A detailed account of the establishment of a malaria control program in Western Kenya. For the economist, the most relevant point made in this article is the fact that economic considerations played a major role in the determination of the areas of Kenya to be sprayed. Part II (the campaign) gives some figures on costs. The author claims that this program achieved a high degree of elimination "at a cost of one-quarter the price of complete eradication." (p. 199) In Part III, he argues that any such campaigns must be geared to a realistic appraisal of region's resources.

118. Rowland, A.J., What Price Screening? I. A Look at the Prospects in Bristol. Bristol Medicochirurgical Journal 84:31-36, April, 1970.

Examination of the proposal of setting up a mass screening program for city of Bristol. Costs of running the screening centers needed are estimated in a general way. The past experience in the U.S. and Great Britain with screening for a variety of conditions is reviewed, indicating variable results. The author lists 10 questions which must be answered before any screening surveys are undertaken, and argues that "screening" (must) not become a widespread and accepted technique until it is based on firm, scientifically acceptable foundation. Research must precede any cost-benefit analysis for a screening program.

121. Saxena, V.B. and Prasad, B.G., An Epidemiological Study of Yaws in Madhya Pradesh--Economic Aspects. Indian Journal of Medical Research 51:805-820, July, 1963. (Companion article: pp. 784-804. Social and Cultural Aspect.)

Yaws areas in Madhya Pradesh State are very backward, as seen in poor road and railway communications. Population is quite dispersed relative to India as a whole. The most important sources of occupation are forestry, agriculture, and mining, all of which may contribute to maintenance and/or transmission of yaws, through nomadic life, migration of laborers, and paddy cultivation. Economic loss to society is discussed in terms of temporary incapacity due to papillomatous eruptions and hyperkeratosis (100 days absenteeism per year) and permanent disability due to bone and joint pains, ulcers, and bony deformities. Financial loss to community is

calculated to be Rs 12,802.10 per 1,000 population with 98 cases (based on prevalence in sample survey), and annual loss to Madhya Pradesh State for 80,000 cases is Rs 10 million. To this must be added diminution in production output as well. Anti-yaws expenditures are insignificant in the face of this loss. (The companion article on the social and cultural aspects appears on pages 784-804 of the same journal).

122. Schultz, Theodore W., Investment in Human Capital. American Economic Review 51:1-17, March, 1961.

One reason for the rapid recovery of the German and Japanese economies after World War II was a plentiful supply of human capital. "The improved quality of human resources" is used to explain that part of increased production which could not be explained by regular economic factors of production. The paper also discusses the policy implications of situations in which the rate of return to investment in human capital is greater than that of physical capital.

123. Schwab, P.M., Economic Cost of St. Louis Encephalitis Epidemic in Dallas, Texas, 1966. Public Health Reports 83:860-866, October, 1968.

Economic concepts and methodology are used to study an epidemic situation. Major cost estimates are given for epidemic control, patient treatment, morbidity, and mortality, with detailed discussion and tables on how the figures were arrived at. Short discussion of the general impact on Dallas.

125. Sofoluwe, G.O., Promotive Medicine. A Boost to the Economy of Developing Countries. Tropical and Geographical Medicine 22:250-254, June, 1970.

Attacks over more than 30 years (1935-1968) in Nigeria on prevalent infective and parasitic diseases, skin infections, and respiratory and diarrheal diseases had been concentrated on curative measures and relatively ineffective and inadequate preventive measures, and "it would seem that pattern of morbidity was on the whole unchanged." A new approach is called for, and author advocates a socioeconomic one--health promotive measures, including low cost housing from all available raw materials in developing countries, pipe-borne water and effective sewage disposal, and other public health measures. Author advocates monetary resources formerly spent on curative measures be used for promotive medicine.

129. Sorensen, B. and Thomsen, M., The Total Number of Economic Consequences of Burn Injuries in a Scandinavian Population. Panminerva Medicine 11:51-56, January-February, 1969.

Epidemiology of burns in Copenhagen is discussed in detail. Annual expenditures per million population for hospital treatment is kr. 1,800,000; expenditure for damages is

kr. 600,000; and value of lost earnings is kr. 1,940,000. Burn injuries cost each inhabitant kr. 4.35 (0.6 U.S. dollars) every year. Tables give detailed figures.

131. Steinfeld, J.L., Remarks Delivered at the First International Conference on Vaccines Against Viral and Rickettsial, and Bacterial Diseases of Man. Washington, D.C.: Pan American Health Organization, 1970.

The place of cost-benefit analysis in rational allocation of resources is discussed. Gives as an example of the approach a synopsis of a study published by the Center for Disease Control on the costs and benefits of measles immunization programs begun in 1963. As for international considerations, analysis of costs and benefits had led the U.S. government to decide that cholera vaccination would not be required as condition of entry into the country.

132. Sterne, M., Distribution and Economic Importance of Anthrax. Federation Proceedings 26:1493-1495, September, 1967.

Anthrax can be eradicated by inoculation, but high cost of inoculating all animals at risk in a country like Britain (versus lower cost of immunizing only those animals involved in outbreak) makes this a less desirable alternative. In developing areas, however, large-scale immunization is virtually the only way to limit important losses in livestock and reduce the number of cases in man, especially since the true incidence undoubtedly exceeds the known incidence. Maps gives outbreaks of anthrax per million susceptible stock for entire world (except China).

133. Strategy of Malaria Eradication: A Turning-Point? Lancet 1:598-600, 21 March 1970.

Resume of discussions on malaria eradication at World Health Assembly in May, 1969. Gains have been great on a worldwide scale: malaria morbidity decreased from 250 million to 100 million, and annual death total of 2.5 million is estimated to have decreased to under 1 million. However, these changes have occurred mainly in temperate and subtropical areas, whereas tropics (the core of endemic malaria) have seen little change. The problems encountered in some control or eradication programs are briefly noted. The main conclusion is that "eradication should remain the ultimate objective, a long-term investment because of its impact on health and consequent socio-economic benefits."

137. Thompson, J.D., On Reasonable Costs of Hospital Services. Milbank Memorial Fund Quarterly 46:33-51, No. 1, Part 2, January, 1968.

Aspects of classifying hospital costs are analyzed in historical context. One refinement of cost data is the Hospital Administrative Services (AHA) attempt at uniform derivation of critical cost and functional "indicators" directed

at measuring performance and cost of units of service. Cost reimbursement is reviewed, and experience with using it in Connecticut is presented. Monitoring, partitioning, and studying hospital costs are all discussed, but author notes that these are all just parts of a more general problems, namely, proper allocation of one of the most important of community resources.

140. Urban Water Supplies in Developing Countries. WHO Chronicle 18:93-99, March, 1964.

This review presents some of the material in an earlier WHO Public Health Paper (see reference 33). Notably a long table on urban water needs and costs of construction (in U.S. dollars, and average annual cost as percent of 1960 GNP). If distributed equally over a 15-year period, the necessary investment equals about 0.25 percent of 1960 GNP of the 75 countries, and is well within their economic capacity. Although international loans will be important, local resources will have to meet much of the cost (usually 40 percent or more).

141. Waaler, H.T., The Economics of Tuberculosis Control. Tubercle 49: Supplement 2-4, March, 1968.

"Solution of the many problems in tuberculosis control depends on allocating resources in such a way that there is the largest reduction of total health problems for the given budget. Such problems of allocation exist at all levels (government to individual clinician)." The author notes that one must take cognizance of the marginal impact (marginal epidemiological impact) which can be obtained for given amount of money.

143. Waaler, H., Geser, A. and Andersen, S., The Use of Mathematical Models in the Study of the Epidemiology of Tuberculosis. American Journal of Public Health 52: 1002-1013, June, 1962.

Epidemic models reflecting the epidemiology of tuberculosis are constructed and explained. Data from a previously published longitudinal study of tuberculosis in South India are used to illustrate the use of the model as a predictor of future trends, but the authors feel that using the best available epidemiological knowledge would still be fruitful. They feel that the model method may be profitable in evaluating specific control programs by reflecting their interference in the natural trend of disease. The appendix gives further explanation of calculations of various formulae and equations.

144. Webster, M.H., Health Service Administration in Developing Countries. South African Medical Journal 43: 1043-1046, 23 August 1969.

History of development of medical services in Rhodesia is outlined and present functions are described. The situation

with regard to hospital beds, rates of hospitalization, hospital costs and utilization, and other factors is discussed. Future objectives must be to reduce unnecessary demands on medical facilities and to increase their efficiency, and author advocates two main approaches--limiting population growth through expanded family planning services, and practicing preventive medicine (which depends on advancement of economic status of whole population and research into social and cultural background of people who must be reached by health education program). Planning of preventive programs and medical care services is discussed. Financing is briefly examined; author notes that "simple system of modest per capita taxation" might be used to meet costs, especially those produced by that part of population which subscribes to subsistence economy but also produces greatest demand for medical services.

145. Wilkinson, J.L., Smith, H. and Smith, O.I., The Organization and Economics of a Mobile Child Welfare Team in Sierra Leone. Journal of Tropical Medicine and Hygiene 70:14-18, January, 1967.

A mobile clinic responsible for a 200 square mile area in Eastern Sierra Leone reduced infant mortality from 332 to 156 (between 1959 and 1961). Annual attendance of kids was 35,000 and cost was shilling per child. Activities (described in detail) include registration and weighing, consultation prophylaxis and treatment, and registration of new babies, and Health Talk. Appendix gives costs of drugs and other material, and costs of recurrent expenditures (salaries, car expenses, etc.). The authors feel this mobile team approach could have wide practical application in developing countries, since it is economical.

146. Winslow, C.E.A., The Economic Values of Preventive Medicine. WHO Chronicle 6:191-202, August, 1952.

An address at the Fifth World Health Assembly. Much of the material presented here also appears in reference 239.

147. Wolf, A.C., Health as a Factor of International Economic Development. Boletín de la Oficina Sanitaria Panamericana 62:289-294, April, 1967. (In Spanish)

"Several economic factors justify investment in health, among them the increased productive capacity of a work force whose quantitative growth has been aided by improved health, and whose quality has been improved by health and education. There are wide variations in the health and economic status of the countries of Latin America, and even among various areas within the same country, and for that reason additional investments, both domestic and foreign, will be required. To ensure the maximum utilization of such investments it is proposed that the external financial agencies exert every effort to assure that the projects they finance make a greater contribution to social and economic development by improving the

quality and supply of the human resources available for developmental purposes. By broadening the eligible fields of health lending, the strategy takes account of the key factors in the environment, such as nutrition, sanitation, and facilities which influence the health of the people of Latin America. By suggesting support for new approaches to training, research, and planning, it recognizes that the supply and quality of medical personnel must be increased and that the countries of material and human resources in the health field. Since national and international resources are always scarce, the practical goal everywhere is to obtain maximum results in order to protect and improve the health of the greatest number of people."

150. Smith, W.F., Cost-Effectiveness and Cost-Benefit Analyses for Public Health Programs. Public Health Reports 83:899-906, November, 1968.

Differences between cost-benefit and cost-effectiveness analysis are explained; with simplified examples of both. Problems often encountered are discussed: marginal vs. total cost, obtaining greatest benefit with lowest cost simultaneously, discounting, interest rate to use. Example of actual cost-benefit study (preventing auto accidents) and actual cost-effectiveness (treatment of kidney disease) are given, complete with selected tables.

151. Griffith, D.H.S., Ramana, D.V. and Mashaal, H., Contribution of Health to Development. International Journal of Health Services 1:253-270, August, 1971.

Health planners in developing countries face a number of difficulties including: defining the role of health in economic growth, obtaining recognition of the effects of ill health upon economic development, and quantifying health benefits. Three examples of these problems are examined in some detail in this paper: the relationship between investment, health expenditures, income, and productivity as reflected in data from Ceylon for 1948-1958; the negative economic effects of the loss (from morbidity, not mortality) of some 6 percent of the paddy labor force in Southeast Asia due to a 1957 influenza epidemic; and the positive economic benefits to a Thai mining operation resulting from a program of malaria prophylaxis.

152. Cibott, R., Introduction to the Analysis of Development and Planning. International Journal of Health Services 1:201-224, August, 1971.

Underdevelopment of health services planning into the total development plan is discussed, along with elements which must be considered in evaluating the level of development. The difference between mobilization of financial resources and real resources is noted, and a brief description is given of a method for distinguishing between activities in the

health sector (i.e., those activities whose object is to expand the ability to provide services and services activities proper). Problems for government health services in Latin America which center on public income are examined.

153. Kuhner, A., The Impact of Public Health Programs on Economic Development. International Journal of Health Services 1:285-292, August, 1971.

An attempt is made to describe the economic effects of a health program and to measure these effects, partly in terms of the working capacities of the labor force. For the computation of economic losses due to malaria mortality and morbidity in Thailand, a model was constructed in which the main variables are combined. The computations show the Gross Domestic Product (GDP) lost year by year by the agricultural laborers who die or are sick as a result of malaria. The losses of GDP are calculated over a period of 12 years. Their downward trend is attributed to the impact (benefits) of the malaria eradication program. A separate series of computations indicates the economic losses of GDP that would be expected in the absence of a malaria eradication program.

154. Scott, W., Cross-National Studies of the Impact of Levels of Living on Economic Growth: An Example. International Journal of Health Services 1:225-232, August, 1971.

"The paper describes a study carried out at the United Nations Research Institute for Social Development to discover a few of the conditions that in six developing countries affected the linkage between certain social levels or "inputs", such as the level of education and health and educational and health services, on the one hand, and economic growth, on the other. The conditions that were found to be important, to various degrees, and that should be considered in subsequent analysis (and policy making) of the relationships of levels of living to economic growth include the structure of production, selected aspects of the social structure, and the nature and distribution of the social characteristics themselves."

155. Dahl, T., Operations Research on Health Care in Chile: An Experiment. International Journal of Health Services 1:271-284, August, 1971.

Applying operations research techniques in a real setting is the subject of this paper. A group of faculty members at the University of Chile studied operations research in theory and practice at the University and at the same time collected statistical information in the field, and formulated a flow model of the pediatric services system in the North Area of Santiago. Integration of the flow of patients, resources, and records led to the development of a simultaneous

equation model reflecting an operating health services system which is described in some detail. This in turn spurred a set of recommendations for translating these results into policy measures. The experiment proved that health care professionals can be trained quickly and effectively for complex analytical tasks, and that such training is applicable to real-world problems.

156. Waterston, A., An Operational Approach to Development Planning. International Journal of Health Services 1:233-252, August, 1971.

Conventional planning to accelerate development suffers from a number of drawbacks, the most crucial of which may be that it is based on inaccurate assumptions about the environment in which the plans will be implemented. The author proposes an alternative approach, "planning from the bottom up," which includes annual plans, improved budget-making procedures, and multi-annual sector programs, and he discusses why this approach is more promising than the conventional one.

158. Chorba, R.W. and Sanders, J.L., Planning Models for Tuberculosis Control Programs. Health Services Research 6:144-164, Summer, 1971.

Discrete-state, discrete-time simulation model of tuberculosis is presented, with submodels of preventive interventions. Preventive and control programs and their optimal budgets may be planned by using the model for cost-benefit analysis: costs are assigned to program components and disease outcomes to determine ratio of program expenditures to future savings on medical and socioeconomic costs of tuberculosis. Optimization is achieved by allocating funds in successive increments to alternative program components in simulation and identifying those components that lead to greatest reduction of prevalence for given level of expenditure.

159. Shuman, L.J., Young, J.P. and Naddor, E., Manpower Mix for Health Services: A Prescriptive Regional Planning Model. Health Services Research 6:103-119, Summer, 1971.

"A model is formulated to determine the mix of manpower and technology needed to provide health services of acceptable quality at a minimum total cost to the community. Total costs include both the direct costs associated with providing the services and with developing additional manpower and the indirect costs (shortage costs) resulting from not providing needed services. The model is applied to a hypothetical neighborhood health center, and its sensitivity to alternative policies is investigated by cost-benefit analyses. Possible extensions of the model to include dynamic elements in health delivery systems are discussed, as is its adaptation

for use in hospital planning, with a changed objective functions."

162. Denison, E.F., The Sources of Economic Growth in the United States and the Alternative Before Us. New York: Committee for Economic Development, 1962.

The major purpose of this study is to quantify the contribution of a wide variety of factors to U.S. economic growth from 1929-1957. That part of growth which can not be explained (the residual factor) is attributed to advances in knowledge. An example is given of the estimation of resources to be gained from decreased mortality.

163. Austin, C.J., Selected Social Indicators in the Health Field. American Journal of Public Health 61:1507-1513, August, 1971.

A theory of social change is developed in terms of "first cybernetic" and "second cybernetic" models. The latter deals with amplifying deviations from norms in order to establish new norms with the minimum social disruption and/or obstruction. The author discusses the types of health indicators and statistics that fit into the second cybernetic system: they are "developmental," "show deficiencies in existing goals and norms," "provide future direction," and "are related to other social problems which are factors in disease. (They are not: disease-oriented, categorical, or supportive of the status quo.) Examples of needed second cybernetic statistics are population growth, poverty, malnutrition, accessibility and equality of services and comparative disease rates by SES category.

164. Zukin, P., Planning a Health Component for an Economic Development Program. American Journal of Public Health 61:1751-1759, September, 1971.

Article of a general nature discussing place of health sector planning within (planning for) economic development. A simplified and idealized scheme for health program planning based on Division of Indian Health model, is presented.

166. Latham, M.C. and Cobos, F., The Effects of Malnutrition on Intellectual Development and Learning. American Journal of Public Health 61:1307-1324, July, 1971.

The association between malnutrition early in life and impairment of intellectual development is discussed. Work in various Latin American countries is presented.

167. Hamon, J., Burnett, F.G., Adam, J.P., Rickenbach, A. and Grjebine, A., Culex pipiens fatigans Wiedemann, Wuchereria bancrofti Cobbold and the Economic Development of Tropical Africa. Bulletin of the World Health Organization 37:217-237, 1967. (In French; English Summary.)

Distribution and spread of foci of bancroftian filariasis, and the factors correlated with it, are discussed. The authors warn that rural and urban environmental changes and population movement growing out of economic development in Africa will result in a wide spread of the vectors.

168. Malenbaum, W., Progress in Health: What Index of What Progress? Annals of the American Academy of Political and Social Science 393:109-121, 1971.

"Preliminary statistical analysis of changes in health and in health programs in poor areas, where labor is the dominant factor of production, suggests a positive effect of health inputs on subsequent output. There is an economic rationale for such a relationship in poor lands, through changes in the vigor and motivation of the self-employed workers who are predominant in the labor force. Such a positive role also fits new doctrines of growth, in which quality of factor inputs receives greater weight than quantity of labor or capital. There exists a need for such additional statistical analyses, and especially in small areas (villages, counties, districts), where outputs and production processes are more homogeneous than in nations as a whole. The results of such work could be fundamental to understanding the dynamic of health population progress in poor lands. Existing documentation shows positive association between growth in population and growth in output per person in the early progress years of today's rich lands. Parallel developments seem to pertain in the recent growth history of many of today's developing lands. The possibility that some measure of health inputs could serve as a tool and an index of economic and social progress would call for changes in important current programs postulated on the negative influence of health inputs on the economic growth of today's poor lands. It would also encourage a re-allocation of the world's health resources in order to handle critical development tasks in areas with great unmet health needs."

169. Training in National Health Planning. Report of a WHO Expert Committee. Technical Report Series No. 456. Geneva: World Health Organization, 1970.

This report presents a diagram which depicts the relation of the subsystem of training in national health planning to the larger systems of which it is a part (the national health planning system and socioeconomic development system), and the internal relationships of the elements of the subsystem. Training in national health planning can be viewed

as a coherent subsystem integrating the elements of its various components, with its character related to and determined by the larger systems of health planning and socioeconomic development. Some needs in the field of training in health planning are noted.

170. Roghmann, K.J. and Haggerty, R.J., Theoretical and Methodological Problems of Medical Care Research: Some Consequences for Secondary Analysis. Inform. Soc. Sci. 9:125-154, Paris, 1970.

Application of systems analysis to medical care organization results in a methodology for studying the cumulative effects of multiple variables on human behavior (specifically, patients' behavior). Statistical difficulties are discussed, and selected results are given as evidence of the method's usefulness and relevance for planning and program evaluation.

172. Csoban, G., Fulop, T. and Schonfeld, R., Efficiency of General Care in a Rural GP's District. Nepegesz-segugy 51:345-353, 1970.

The authors have investigated the turn of diseases connected with disability to work (sick allowance conditions) in two GP's districts of the village Nagymaros - one of which has been applying the method of general care since 1963 - in order to demonstrate the efficiency of the method of general care. Two conclusions are given by the authors: (1) evaluation of the method of general care applied in a rural GP's district is possible on the basis of sick allowance indices obtained in a relatively simple way, and (2) sick allowance conditions can take a more favourable turn in a given GP's district as a result of the application in the method of general care than in a district where it is not applied.

173. Feldstein, M.S., An Econometric Model of the Medicare System. Quarterly Journal of Economics 85:1-20, 1971.

This paper presents an econometric model of Medicare which attempts to explain the great variation in use and benefits under the system in terms of demographic and economic characteristics of the population, state health policy variables, and factors in the local health care system. Weaknesses of the program are examined carefully, and ways that the overall performance of Medicare might be improved are noted. The model indicates the importance of a "more spatially disaggregated approach to health care policy."

174. Lahdenmaki, T. and Sulonen, L. Simulation Techniques in Hospital Planning. World Hospitals 6:193-196, 1970.

Projects of the Finnish Hospital League for developing general simulation models for certain hospital systems are reviewed, and the positive and negative aspects of such an approach are noted.

176. Brehm, H.P. and Cormier, R.H., Medical Care Costs of the Disabled. Social Security Bulletin 33:21-29, 1970.

Summarized information from the Social Security Administration survey of the disabled underscores the relationships between medical care costs and the severity of disability, the age of the disabled, and their social security beneficiary status, and is discussed in the light of recent proposals to extend U.S. government sponsored health insurance to this group.

177. International Health Expenditures. Social Security Bulletin 33:18-19, 1970.

The WHO figures from the early 1960's and the British Office of Health Economics figures from the late 1960's on health expenditures as a percentage of gross national product (GNP) are compared for Canada, France, Sweden, Great Britain, the United States and the Netherlands, and Germany. All the countries experienced rising medical expenditures which outpaced growth in the GNP, and they closed the 1960's spending about 2 percent more of annual GNP on medical services than they did at the beginning of the decade.

178. Seccombe, E.W.C., The Appraisal of Health Service Projects Using Cost Benefit Analysis. World Hospitals 6:214-221, 1970.

A method of cost benefit analysis is briefly described partly as a basis for discussion by multidisciplinary management courses in health service. A glossary and a select bibliography are appended in order to provide additional detail and to assist further reading.

200. Hopkins, C.E., editor, Outcomes Conference I-II: Methodology of Identifying, Measuring and Evaluating Outcomes of Health Service Programs, Systems and Subsystems. Report No. PB 196 001. Los Angeles: California Center for Health Services Research, University of California Los Angeles, 1970.

Two conferences designed to review the present state-of-the-art of measurement and evaluation of the effects, or outcomes, of health care services are summarized. A wide range of outcomes are described and evaluated. These include conceptual models versus the real world of health service delivery; health improvement; indices of health; impact of health care services on the economy; and the neighborhood health center.

201. Jeffers, J.R. and Bognanno, M.F., Medical Economics. Inquiry: Special Issue 7: 1 March 1970.

A reprint of Report No. PB 194 667 of the Medical Economics Workshop conducted at the University of Iowa in

1969. Chapters include: Improving the Health Services System through Research and Development; Increase in the Cost of Physician and Hospital Services; Philosophy, Faith, Fact, and Fiction in the Production of Medical Services; Allied Health Manpower; Product Heterogeneity and Hospital Cost Analysis; Causes and Consequences of Salary Differentials in Nursing; An Appraisal of Physician Manpower Projections; and Efficiency, Incentives, and Reimbursement for Health Care.

202. McKnight, E.M. and Steorts, R.C., Nursing Home Simulation Model. Final Report. (PB 190 795). Santa Monica, California: Consolidated Analysis Centers, Inc., 1969.

This report describes the nursing home simulation model previously reported in reference 205 and identifies the types of users for whom the model would be beneficial. It discusses a validation study to insure that the model produces reliable and representative outputs. It also describes a case study in which the model was used to evaluate the staffing patterns of three specialized nursing units. The report closes with a basis for potential users to evaluate the model's local applicability. Possible uses of this model are health standards determination, survey work, administration, and facility construction. (See also reference 203.)

203. McKnight, E.M. and Steorts, R.C., Nursing Home Simulation Model. User's Manual. (Report No. PB 190 796). Santa Monica, California: Consolidated Analysis Centers, Inc., 1969.

This concluding report describes input to the model via user-oriented input forms which define the home in terms of: number and size of nursing units, patient mix to be served, skills categories employed and staffing assignments, and the type of care provided. (See also references 202 and 205).

205. Turner, J.B., Moser, B.A., Colley, J.L., et al, Computer Simulation Models of Nursing Homes. Final Report. (PB 190 794). Research Triangle Park, N.C.: Research Triangle Institute, 1969.

This report documents research in the design, construction, and validation of two computer simulation models of nursing homes developed to help health planners, operators, and standards and licensure agencies to evaluate the effectiveness and efficiency of alternative configurations of nursing homes. Model I is designed primarily to determine approximate resource levels in nursing homes. Model II has a cost accounting system and evaluates the detailed interaction of patient demands, resource utilizations and costs in nursing homes. See reference 202 for an update of this document.

206. World Bank Atlas. Population, Per Capita Product, and Growth Rates. Washington, D.C.: International Bank for Reconstruction and Development, 1970.

Tables give recent figures on the following:

(1) mid-1968 population and average annual growth rate (1961-1968) (for countries with populations of 1 million or more), (2) Gross national product per capita (1968) and average annual growth rate (1961-1968) (countries with population of 1 million or more), and (3) similar figures are also given for all countries in Africa, Asia (including Far East, Near East, Middle East, India subcontinent, and Southeast Asia), Europe, North and Central America, South America, Oceania and Indonesia.

207. Robertson, R.L., Economic Effects of Personal Health Services. Work Loss in a Public School Teacher Population. American Journal of Public Health 61: 30-45, January, 1971.

Effects of comprehensive health plan coverage especially as related to prepaid group practice are evaluated in a population of public school teachers. Work loss due to sickness and injury was less for those insured by a prepaid group practice program which gave broad coverage through a closed panel than for those insured by a plan with fewer benefits but free choice of provider.

208. Robinson, D., Cost and Effectiveness of a Program to Prevent Rheumatic Fever. HSMHA Health Reports 86: 385-389, April, 1971.

Program in Massachusetts to identify and eradicate infection by group A beta-hemolytic streptococcus was evaluated in terms of effectiveness (especially of utilization of laboratory procedures) and cost (\$497 per case prevented.)

209. Axnick, N.W., Shavell, S.M. and Witte, J.J., Benefits Due to Immunization against Measles. Public Health Reports 84:673-680, August, 1969.

Net dollar savings due to immunization against measles are detailed for 1963-1965 and 1966-1968, as well as health benefits (in terms of such factors as cases averted, workdays and school days saved, and cases of retardation averted.)

212. Saslaw, M.S., Vieta, A. and Myerburg, R.J., Cost of Rheumatic Fever and of its Prevention. American Journal of Public Health 55:429-434, 1965.

Direct and indirect costs by functional capacity are estimated, together with the potential net savings to be gained from a program of primary prevention of rheumatic fever (through surveillance of school children for streptococcal infection). A demonstration service program for communities and a surveillance program for the nation are outlined.

213. Hughes, C., Disease and "Development" in Africa. Social Science and Medicine 3:443-493, 1970.

Although economic progress has historically preceded or been associated with rising levels of health, such "development" has in fact often had the deleterious effect of fostering disease, when some development scheme is introduced without due consideration of all the ecological variables. Examples of such "ecologically-unenlightened" undertakings are noted, especially with regard to trypanosomiasis, schistosomiasis, tuberculosis, malaria, and malnutrition. The role of migration and urbanization is also discussed. The author argues that programs of economic or agricultural development must be viewed from the beginning within an ecological framework. Over 200 references are given, as well as summaries in French, German, and Spanish.

214. Holly, N., Economic Benefits of Malaria Control in Ethiopia. Washington, D.C.: Department of Health, Education, and Welfare, Office of International Health, July, 1970.

Examination of malaria control program in Ethiopia covers several areas, including the effect of malaria on gross domestic product, costs of present programs, and the detrimental effects of malaria control. With regard to specific regional program, the author considers the question of whether the marginal gain outweighs the marginal outlay, and suggests that this can be evaluated in terms of net present worth of future returns and the internal rate of return.

215. Socio-Economic Aspects of the Malaria Programme. WHO Malaria Eradication Program Strategy Team: Thailand. Part II, pp. 1-29. Washington, D.C.: Agency for International Development, July-August, 1968. (mimeo.)

Economic aspects of eradication are discussed, with special attention to such matters as marginal productivity of labor, marginal propensity to save, the place of "agri-business" in the overall economic picture in developing country, losses in agriculture due to malaria, and the cost of malaria programs.

216. Adelman, Irma and Morris, Cynthia Taft, Analysis-of-Variance Techniques for the Study of Economic Development. The Journal of Development Studies 8:91-106, October, 1971.

"The process of economic development is a complex phenomenon which entails economic, institutional, social, cultural and political transformations interacting with each other in complicated mutual feedback relationships. The study of economic development should, therefore, be concerned with disentangling the fundamental interactions among these diverse forces as they impinge both upon each other and upon the capacity of the system to generate widespread and continuous economic growth."

217. Blumenthal, I.S., Social Cost of Peptic Ulcer. P-3588  
Santa Monica: Rand Corporation, April, 1967.

An updating of the data on the social cost of peptic ulcer presented in an earlier Rand study, R-336-RC (see reference 230). Total deaths ascribed to peptic ulcer in 1954 were 9,610. The number for 1963 was 11,900. If the 1963 rate is projected to the 1965 population, the total deaths are then estimated to be 12,500. The updated estimate of the economic cost of peptic ulcer approximates \$1.0 billion.

218. Taylor, V.D., How Much is Good Health Worth? P-3945  
Santa Monica: Rand Corporation, July, 1969.

A consumer demand or subjective value approach to government-provided or -subsidized medical services in which subjective value is defined as "combined total of the maximum prices that all individuals in the society would pay to have the activity carried out." The usual cost/benefit or human capital approach is irrelevant to human preferences and actions of decisionmakers. For the nonpoor, government action should generally be restricted to what consumers cannot obtain elsewhere: regulatory actions, control of infectious diseases and pollution, aid to biomedical research. Government activities are worth what people would be willing to pay for them and is worth undertaking if its cost is less than its subjective value. Services to those who would not pay are justified by the willingness of the nonpoor to pay for them. Giving the poor what they want instead of what some index says they need would better serve the total perceived well-being, since present programs arouse hostility. Direct money transfers to the poor cost far less to deliver than medical services and would probably contribute more to improving health through better living conditions.

219. Leveson, I., Ullman, D. and Wassall, G., The Effects of Improved Health on Productivity Through Education. P-3952 Santa Monica: Rand Corporation, September, 1968.

"An examination of the relationships between health status and educational attainment, achievement, and absenteeism. Earlier materials on absenteeism, school dropouts, and armed forces rejectees are examined, and new data from a study of school health records and armed forces rejection are presented. Some rough, overall calculations are made of the effects of health on productivity through education, such as: (1) a minimum estimate of productivity losses through dropping out of school for health reasons is \$3 to \$4 billion for employed persons; (2) absenteeism from school results in a loss of output of \$2 billion. Much needs to be done in this area of research, since omission of productivity effects in estimates of the value of improved health biases our thinking about resource allocation away from medical care toward other investments."

220. Newhouse, J.P., Allocation of Public Sector Resources in Medical Care: An Economist Looks at Health Planning. P-4406 Santa Monica: Rand Corporation, July, 1970.

Health planning, as it is often conceived, attempts to determine the best allocation of medical resources, where best is defined as that allocation which is most efficacious for health. This approach makes two errors: first, the effect of non-medical inputs on health is ignored; second, the effect of medical inputs on things the consumer desires other than health status is ignored. The author argues that a "market signal approach" is misleading and that the production function approach is better.

221. Keeler, E.B., Models of Disease Costs and Their Use in Medical Research Resource Allocations. P-4537 Santa Monica: Rand Corporation, December, 1970.

"Biomedical research today is selected on the basis of its "scientific merit" as panels of experts see it; instead, it should be judged by its probable effects on American health. Two cost models to help judge those effects--and allocate medical research funds--are introduced. One treats health and life as an investment and measures the costs of a disease in terms of its medical costs and work days lost to illness and death. The other treats health as a consumption good and measures the costs of a disease by how much people would be willing to pay to avoid it. Discussion is focussed on using the models to evaluate the potential pay-off of specific research proposals, thus improving the process by which scientific study groups rate them for selection."

222. Trends in Developing Countries. Population, Economic Growth, International Capital Flow and External Debt, and International Trade. Washington, D.C.: International Bank for Reconstruction and Development, August, 1970.

Twenty-seven pairs of charts and tables are given for population, economic growth, international capital flow and external debt, and international trade for developed and developing countries. Some of the data are through 1969, some through 1970, and the rest through about 1968.

223. Frederiksen, H., Determinants and Consequences of Mortality Trends in Ceylon. Public Health Reports 76: 659-663, 1961.

The idea that malaria program led to the post-World War II reduction in the death rate is not supported by facts, namely that: (1) the precipitous decline (19.8 to 14.0 per 1,000 from 1946 to 1947) had preceded large-scale application of insecticides and (2) decline in mortality in malarious and non-malarious areas was about the same. Basically, the 1946-1947 decline was a return to the pre-war trend (following the wartime rise in mortality.) In fact, the

author argues that the wartime rise and postwar fall are more closely associated with "development and alleviation of a wartime food deficit." He also notes that other improvements in economic indices occurred along with the decline in the death rate. He discusses the relationship of lower mortality rates and birth rate, and notes a "remarkable correlation" between death rates in 1938 and birth rates in 1958.

224. Correa, H., Health Planning. Kyklos 10:909-922, 1967.

An explanation of a basic econometric model for use in making the optimum allocation of resources for preventing or curing disease. The output index used is number of deaths - specifically, minimization of the number of deaths. (Other indices might be number of days of health, or economic losses, but these have statistical limitations as well as theoretical difficulties.) The basic model is presented and an expanded version incorporating a means of evaluating two specific parameters (the number of cases that can be avoided by spending \$1, and the number of deaths that can be avoided by spending \$1). A numerical example of data on whooping cough in Northern Santiago, Chile, is given. A non-linear model is briefly discussed leading to the conclusion that for a minimum number of deaths, the marginal return of money in prevention must be equal to marginal return of money used in treatment. Allocation of resources with regard to several diseases is discussed; inter-dependences among diseases and health activities is noted.

226. Dublin, Louis I. and Lotka, Alfred J., The Money Value of a Man. New York: The Ronald Press Company, 1946.

Early landmark examination of the value of human life as measured by the discounted future earning power of a man. Various problems in applying this human capital assessment are discussed, and the authors present a useful historical review of the subject.

227. Fein, Rashi, Economics of Mental Illness. New York: Basic Books, Inc., 1958.

A significant addition to the human capital literature, this monograph estimates the direct and indirect losses due to mental illness and discusses their significance in terms of age of admission to mental hospitals and diagnosis. Measures of indirect costs include labor force years lost and present value of future expected income (discounted at various interest rates). The author discusses the place of consumption in these estimates and argues that it should not be subtracted from output in part because it is on end in itself.

228. Weisbrod, Burton A., Economics of Public Health: Measuring the Economic Impact of Diseases. Philadelphia: University of Pennsylvania Press, 1961.  
This classic volume in the field of human capital measures economic losses from morbidity and mortality due to cancer, tuberculosis, and poliomyelitis in terms of the present value of net future earnings (discounted at 4 and 10 percent). Various methodologic problems are discussed, and two appendices deal with consumption and the value of women's household production in some detail.
229. Reynolds, D.J., The Cost of Road Accidents. Journal of the Royal Statistical Society 119:393-409, 1956.  
Assessment is made of monetary losses due to auto accidents in terms of net losses of future output (taken as per capita net domestic product at factor cost) appropriately discounted (4 percent). This is an example of the "total-product-per-worker" approach in which values are assigned to units of labor work time.
230. Blumenthal, I.S., Research and the Ulcer Problem. R-336-RC Santa Monica: Rand Corporation, 1959.  
The social cost of peptic ulcer is estimated for 1954-1956 in terms of deaths, prevalence in the population, and economic loss. The latter has three components: direct cost of resources diverted to medical care of the disease, indirect cost due to productivity losses, and indirect cost due to loss of future productivity.
231. Economics of Health and Medical Care. Proceedings of the Conference on the Economics of Health and Medical Care, 10-12 May 1962. Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.  
See references 255, 277, 278, 279, 280, 344, 345, 346, 347, 348, 349, 351 and 352.
232. Good Health is Good Business. National Planning Association. Planning Pamphlet No. 62. Washington, D.C.: National Planning Association, 1948.  
An early paper in the general area of human capital, in which the costs to society of tuberculosis morbidity and mortality are estimated.
233. Klarman, Herbert E., Syphilis Control Programs. In: Measuring Benefits of Government Investments. R. Dorfman, editor. Washington, D.C.: Brookings Institution, 1965.  
Economic benefits of syphilis control programs are those direct and indirect costs of the disease which might be averted. Factors in estimating such costs, including earnings, consumption, discounting and housewife services, are discussed, and a brief review of appropriate literature

is given. Detailed figures for cases in 1962 are presented in terms of medical care expenditures, productivity loss, reduced earnings, and loss of consumer benefits for various stages of the disease.

234. Chadwick, Edwin, Report on the Sanitary Condition of the Labouring Population of Great Britain. 1842. Edited with an introduction by M.W. Flinn. Chicago: Aldine Publishing Company, 1965.

In the section on "cost to tenants and owners of public measures" Chadwick deals briefly with cost of sickness in terms of wages lost (or, how a more healthy life would lead to earnings not lost which could help pay for various sanitary measures.)

235. Petterkofer, Max Von, The Value of Health to a City. Two Lectures Delivered in 1873. Translated from the German, with an Introduction, by Henry E. Sigerist. Baltimore: The Johns Hopkins Press, 1941.

Historically significant attempt to place a monetary value on health for the city of Munich based on the average loss of wages and the costs of medical care. Improved public health services (such as water and sewerage) might decrease the death rate and in turn lead to a considerable monetary saving (through fewer deaths, less morbidity, less absenteeism) and how this might be achieved is considered in the second lecture.

236. Economic Costs of Cardiovascular Diseases and Cancer, 1962. Health Economics Series No. 5. U.S.P.H.S. Publication No. 947-5. Washington, D.C.: Government Printing Office, 1965.

Much of this publication is devoted to the direct costs of heart disease, cancer, and stroke -- i.e., "dollar value of resources used in connection with these diseases (on) prevention, detection, treatment, rehabilitation, research, education, and construction of facilities". One chapter is given over to "indirect costs," and the report undertakes to develop "an estimate of the added output in a single year--1962--had heart disease, stroke, and cancer been eliminated." Estimates on indirect costs were made by applying prevailing average earnings to the productive time lost (by age and sex) due to the three conditions. Consumption was not deducted. Housewife services were included (figured as mean earnings of a domestic servant). Wage supplements were also included. A series of tables present figures on estimated man-years lost and costs due to heart disease, cancer, and stroke mortality by sex and age, in 1962 and in previous years, with additional breakdowns for institutionalized persons and labor force status (labor force or keeping house). Some similar tables for morbidity. Details of methods are also given.

238. Marshall, A.W., Cost/Benefit Analysis in Health.  
P-3274 Santa Monica: Rand Corporation, 1971.

Discussion of cost-benefit analysis is divided into three parts: (1) review of some relevant work of economists on the economic implication of improved health; (2) an example of a program budget for health programs in the Department of Health, Education and Welfare; and (3) problems and opportunities for cost-benefit analysis. The author argues for finding some way to "reflect the consumption value of improved health", not just using the monetary value of increased labor force participation.

239. Winslow, C.E.A., The Cost of Sickness and the Price of Health. Geneva: World Health Organization, 1951.

A book-length treatment of the loss of productivity which is attributed to poor health conditions in many different parts of the world, primarily a review of the existing literature. Numerous studies of the impact of health on productivity are cited. In addition, the effects of malaria eradication on regional development are discussed in some detail.

240. Elliott, Charles, Poverty 2000. SE/10. Study Encounter 7: No. 3, 1971.

Initial description of a project to be undertaken by Sodepax (under the auspices of World Council of Churches and Pontifical Commission Justice and Peace) to "present the scale and nature of poverty in the year 2000, including development of a monitoring system that compares possible paths ... to deliver minimal social goals to the lower quantile ... with the actual paths that the given (national) economy takes." The model will be developed to reflect disparities between wealth and welfare (e.g., wealthy but politically powerless or educated but unemployed). Indicators of poverty include income per family, employment, nutrition, education, access to health facilities, housing. Why and how these factors will be included are discussed.

241. Taylor, C.E. and Hall, M.-F., Health, Population, and Economic Development. Science 157:651-657, 1967.

The interrelationship between health, population growth, and economic development are examined. A strong case is made for the point that improvements in health conditions are a prerequisite for birth rate decline, although in the short run falling death rates may accelerate population growth. The effect of health programs on output per worker and regional development is discussed, in terms of numbers and quality added to labor force, areas opened to development, and changed attitudes toward planning. Studies reviewed include one on malaria in the Philippines and one on yaws in Haiti.

242. Newman, Peter, Malaria Eradication and Population Growth with Special Reference to Ceylon and British Guiana. Ann Arbor: University of Michigan, Bureau of Public Health Economics, 1965.

A study of the importance of malaria eradication in the growth of the population in Ceylon and British Guiana. Newman attributed 60 percent of the acceleration of population growth in Ceylon between 1931-1946 and 1947-1960 to malaria eradication, and about 40 percent in Guiana. (See also references 11, 223, 243, 281, 283, 611, 657, 658, and 659 for various reactions to this original work.)

243. Frederiksen, Harald, Malaria Control and Population Pressure in Ceylon. Public Health Reports 75:865-868, 1960.

This article refutes the arguments made by Newman and others that malaria eradication played a major role in lowering the death rates in Ceylon. He argues that most of the decline in the death rate occurred before the malaria eradication program was instituted.

244. Ruderman, A. Peter, Lessons from Latin American Experience. In: Economic Benefits from Public Health Services. U.S.P.H.S. Publication No. 1178. Washington, D.C.: Government Printing Office, 1964.

A brief article which contains much of the "conventional wisdom" regarding cost-benefit analysis of health programs. Some examples of the effect of malaria eradication on development are given. In addition, a discussion of the incentives to firms to invest in health programs are presented.

245. Giglioli, G., Achievements, Setbacks, and Developments in the Malaria Eradication Campaign in British Guiana, 1945-1963. Industry and Tropical Health 5:173-190, 1964.

Due to the economic consequences of endemic malaria, an eradication program was undertaken by the local producers association. Had this program not been instituted, many profitable estates would have closed down due to lack of labor.

246. Malenbaum, Wilfred, Health and Productivity in Poor Areas. In: Empirical Studies in Health Economics. Herbert Klarman, editor. Baltimore: The Johns Hopkins Press, 1970.

A multiple regression analysis of the effect of health inputs on agricultural development in Mexico, India, and Thailand. While Malenbaum finds that health factors are important, there is some difficulty in interpreting this study because some health variables are inputs and others are outputs.

247. Weisbrod, Burton A., Andreano, R.L., Baldwin, R.E., Epstein, F.H. and Kelley, A.C., Disease and Economic Development: The Impact of Parasitic Diseases in St. Lucia. Madison: University of Wisconsin, February, 1971 (unpublished).

An attempt to measure the effect of schistosomiasis on the fertility of women, the educational achievement of school children, and the output per day of laborers on a banana plantation in St. Lucia. The authors conclude that the impact of the disease was negligible. The most common criticism of this study is that schistosomiasis is not severe enough on St. Lucia to inhibit development.

248. Frederiksen, H., Feedbacks in Economic and Demographic Transition. Science 166:837-847, 14 November 1969.

The author criticizes the "neo-Malthusian" model of development and proposes alternative model which combines mortality, fertility, and levels of living in a "current, circular, and cumulative process of transition from low to high levels of production and consumption, and from high to low levels of mortality and fertility." Differences between the two models are discussed.

250. Abel-Smith, B., Paying for Health Services -- A Study of the Costs and Sources of Finance in Six Countries.

The preliminary report of a WHO study on health expenditures, in which much of the explanatory material on the original methodology appears. (See also reference 362.)

251. Kerr, Alex and Williamson, Robert B., Regional Economics in the U.S.: A Review Essay. Growth and Change 1:1-15, 1970.

A review of the existing literature on economic aspects of regional development.

252. Taylor, Carl E., Health and Population. Foreign Affairs 43:475-486, April, 1965.

Notable discussion of the interactions of improved health and better health services and acceptance and utilization of family planning.

253. Logan, John A., The Sardinian Project: An Experiment in the Eradication of an Indigenous Malarious Vector. Baltimore: The Johns Hopkins Press, 1953.

This book presents a detailed epidemiological description of a malaria eradication project on the island of Sardinia shortly after the close of World War II. Although malaria was not entirely eradicated, considerable progress was made. As a result of the latter, economic development, spurred by tourism, has accelerated.

255. Ruderman, A. Peter, Comment on: Some Economic Aspects of Public Health Programs in Underdeveloped Areas. pp. 299-305. In: Economics of Health and Medical Care. Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.
- Four difficulties are inherent in examining development activities at the project level: (1) public health programs are by definition not selective; (2) communicable diseases are also not selective; (3) "indiscriminate" general public health programs have nationwide ramifications which give them legitimate claims on health resources; (4) institutional and administrative drawbacks to local projects exist.
256. Newhouse, Joseph P. Determinants of Days Lost from Work due to Sickness. In: Empirical Studies in Health Economics. Herbert Klarman, editor. Baltimore: The Johns Hopkins Press, 1970.
- A model to explain variation in work-loss days is specified in terms of four categories of variables - demographic, environmental, medical and economic. Difficulties in the statistical procedures are noted, and results of the estimation procedure are given.
257. Chum, H.J. and Otsyula, Y., Leprosy Disability in Yimbo and Its Economic Effects. East Africa Medical Journal 47:389-394, July, 1970.
258. Stitt, P.G., Pediatrics, Poverty and Poor Health. A Look at Some Pertinent Considerations. Clinical Pediatrics (Philadelphia) 5:713-714, December, 1966.
259. Patterson, G.D., The Economics of Illness. An Employee Sickness Study. Medical Journal of Australia 2:249-252, 2 August 1969.
260. The Economics of Malnutrition. Nutrition Reviews 27: 39-41, February, 1969.
- "Malnutrition has many economic implications. In the Commonwealth countries of the Caribbean inpatient treatment and child-wastage due to malnutrition are estimated to cost over one million dollars annually."
261. Dublin, L.I. and Whitney, J., On the Cost of Tuberculosis. Journal of the American Statistical Association 17: December, 1920.
- An early estimation of the direct and indirect costs of tuberculosis mortality and morbidity which foreshadowed some concepts of human capital.
262. Ash, L., The Michael M. Davis Collection of Social and Economic Aspects of Medicine. Bulletin of the New York Academy of Medicine 43:598-608, July, 1967.

263. Gabaldon, A., Health Services and Socioeconomic Development in Latin America. Lancet 1:739-744, 12 April 1969.

Health problems in Latin America cannot be solved by exclusive reliance on programs designed to meet problems in more advanced and/or more temperate countries; rather, the basic principles of epidemiology and public health must be more widely applied. The economic aspects of this approach are discussed at some length.

264. Hood, Thomas R., Culp, Russell L., Hunter, Charles A. and Campbell, Bertha H., Economic Justification for Public Health Activities. American Journal of Public Health 44:1565-1571, December, 1954.

265. Conley, R.W., Conwell, M. and Arrill, M.B., An Approach to Measuring the Cost of Mental Illness. American Journal of Psychiatry 124:755-762, December, 1967.

266. Cost of Illness in New Orleans in 1850. Bulletin of the History of Medicine 15:498-507, May, 1944.

267. Horwitz, Abraham, Health - A Basic Component of Economic Development. Miscellaneous Publication No. 66. Washington, D.C.: Pan American Sanitary Bureau, 1961.

268. Mushkin, Selma J. and Collings, Francis D'A, Economic Costs of Disease and Injury. Public Health Reports 74:795-809, September, 1959.

Preliminary examination of some of the concepts underlying the human capital approach to estimating the direct or indirect costs of illness.

269. Ferrero, C., Health and Levels of Living in Latin America. Milbank Memorial Fund Quarterly 43:281-295: No. 4, Part 2, October, 1965.

Wide range of health pathology seen in Latin America emphasizes the contradictions of underdevelopment. Solution to these problems is more likely to come from better administration of currently available resources than from any increase in public expenditures on health. Morbidity and mortality data from early 1960's on a number of conditions are given.

271. Health and Economic Development, Comparative Studies in Society and History, July, pp. 432-483, 1966.

Much of this issue is devoted to an historical review of the relationships between health and economic development, including a review of the early and more recent literature on human capital and assessments of the effects of cholera, plague, and pestilence on European development before 1900.

272. Petty, Sir William, Political Arithmetick, or a Discourse Concerning the Extent and Value of Lands, People, Buildings, etc. London: Robert Clavel, 1699.

A very early assessment of the capital value per capita of the English population, in which the author suggests that such figures could be used to compute the losses to the economy from deaths due to disease, war, and other foreign adventure.

274. Fisher, Irving, Report on National Vitality. Its Wastes and Conservation. Washington, D.C.: Government Printing Office, 1909.

The money value of "preventable wastes" - as estimated by the valuation placed on human life - is discussed, as are the costs of conserving a life. This represented the first efforts in the United States to estimate the economic value of life by the capitalization of earning power.

275. Klarman, Herbert E., Socioeconomic Impact of Heart Disease. In: The Heart and Circulation. Second National Conference on Cardiovascular Diseases. Washington, D.C.: Federation of American Societies for Experimental Biology, 1965.

Estimation of direct and indirect costs of cardiovascular disease, which includes a consideration of many of the same methodologic factors as are presented in the author's work on syphilis. (See reference 233.)

276. Thedie, J. and Abraham, C., Economic Aspects of Road Accidents. Traffic Engineering and Control 2:589-595, 1961.

An early attempt to apply some of the concepts of the human capital approach to estimating the direct or indirect costs of morbidity and mortality from traffic accidents.

277. Goode, Richard, Comment on: Health Programs and Economic Development. In: The Economics of Health and Medical Care, pp. 282-285. Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.

With regard to expenditures on health care in developing countries, a minimum baseline would be that point at which marginal cost and marginal contribution to production are equal; the countries can then consider additional expenditures. Some implications of this hypothesis are briefly noted. (See reference 352.)

278. Labovitz, I.M., Comment on: Trends in the Organization of Health Services: The Private Sector. In: The Economics of Health and Medical Care, pp. 42-47. Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.

Changes in local, state, and federal expenditures on health services are described. Concern with organizational matters, however, leads to the larger question of how existing organizational structure and emerging changes in that structure affect the attraction of resources into health services, and the allocation of resources among health services. (See reference 349.)

279. Reid, M.G., Comment on: An Index of the Cost of Medical Care -- A Proposed New Approach. In: The Economics of Health and Medical Care, pp. 142-147. Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.

The author criticizes attempts to formulate a medical care price index (see reference 347), noting, however, the increasing importance of insurance in medical care costs.

280. Goode, Richard, Comment on: Investment in Health. In: The Economics of Health and Medical Care. pp. 270. Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.

In his comment on the Mushkin-Weisbrod paper (see reference 344), Richard Goode suggests minor qualification for the determination of the stock of investment in health.

281. Meegama, S.A., Malaria Eradication and Its Effect on Mortality Levels. Population Studies 21:207-237, 1967.

In part, a refutation of the thesis that the fall in mortality after World War II in Ceylon was due primarily to malaria eradication. One major point of the author is that coincident with eradication attempts were steps to improve or initiate medical care and public health measures, and the drop in deaths from malaria also did not by itself lead to a decline in mortality from other causes.

282. Dunn, C.L., The Economic Value of the Prevention of Disease. Indian Journal of Economics 4:127-141, January, 1924.

Adequate expenditure on prevention of disease as a part of public health is not wasted, because the per capita "revenue" to be gained from the lives which might be saved more than balances the costs of appropriate programs.

283. Frederiksen, Harald, Determinants and Consequences of Mortality and Fertility Trends. Public Health Reports 81:715-727, August, 1966.

A discussion of whether public health measures in developing countries have resulted in precipitous reductions

in the mortality rates without improvement in the levels of living or reductions in the fertility rates. The conclusion to be drawn from the technical analysis presented is that "the maximum improvement in the levels of living as well as the desired changes in mortality and fertility will result from the synergism of optimum efforts in the demographic as well as the economic aspects of economic and demographic transition."

284. Berg, A., Priority of Nutrition in National Development. Nutrition Reviews 28:199-204, August, 1970.

A discussion of the economic, health, social, and humanitarian justifications for a massive attack on malnutrition as a means of eradicating major nutritional deficiencies in developing countries.

285. Nutrition and Working Efficiency. Freedom from Hunger Campaign, Basic Study No. 5. Rome: Food and Agriculture Organization of the United States, 1962.

One monograph in a series designed to provide background material for study groups and public discussions on the problems of hunger and malnutrition and on ways in which these problems might be attacked on national or international basis. This report covers such topics as dietary requirements for different activities, the relation between diet and working capacity, economic and sociocultural factors affecting good consumption, and measures to improve workers' nutrition.

286. Cook, R., The Financial Cost of Malnutrition in the "Commonwealth Caribbean." The Journal of Tropical Pediatrics 16:60-65, June, 1968.

A detailed report on various financial costs of malnutrition in terms of inpatient and outpatient treatment, child-life wastage, physical handicaps and mental retardation in survivors, loss of learning efficiency in school-children, and earning and productivity loss in adults.

287. Berg, Alan D., Malnutrition and National Development. The Journal of Tropical Pediatrics 14:116-123, September, 1968. (This article appeared originally in Foreign Affairs, pp. 126-136, October, 1967.)

A discussion of the implications of malnutrition for mental growth of children in developing countries and, in turn, for national development. Improved nutrients, altered food habits and other steps which might be taken to combat malnutrition are noted.

288. Marshall, C.L., Brown, R.E. and Goodrich, C.H., Improved Nutrition vs. Public Health Services as Major Determinants of World Population Growth. Clinical Pediatrics 10:363-368, July, 1971.

A review and discussion of some of the significant literature on the question of whether better nutrition and/or health programs can be held accountable for the global drop in mortality and consequent rise in population. The authors criticize the argument implied by some workers that economic development would proceed more rapidly if population growth were held down by elimination of given health programs, leading to a stabilization of death rates.

289. Koenig, E.H. and Altschul, A.M., Proteins: Breaking the Poverty Cycle. Journal of the Albert Einstein Medical Center 18:14-24, 1970.

An examination of the interrelationships between malnutrition and poverty, including brief notes on the economic and social costs of the former. The authors indicate what initial and secondary steps might be taken (by the United States in its food distribution program and by developing countries in cultivating or utilizing new foods and grains) to break the cycle.

290. Furthering Family Planning Objectives via Nutrition Intervention. Information Bulletin SU-509. Research Triangle Park, North Carolina: Research Triangle Institute, September, 1970.

A highly structured examination of a series of propositions linking nutrition, infant and child mortality, fertility, and fertility control programs in order to "show the effects on fertility and rate of population growth that might be expected from programs of nutrition intervention linked to family planning programs."

291. Berg, Alan, Increased Income and Improved Nutrition: A Shibboleth Examined. International Development Review 12:3-7, 1970.

Certain assumptions about increasing per capita income, increasing per capita expenditures on food, and improving nutritional levels are questionable and must be examined more systematically before decisions about ways to improve the nutritional well-being of children in developing countries are made.

292. Aykroyd, W.R., Nutrition and Mortality in Infancy and Early Childhood: Past and Present Relationships. American Journal of Clinical Nutrition 24:480-487, April, 1971.

A consideration of how past trends in infant and childhood mortality, and present differences in such mortality between developed and developing countries, can illuminate the problems of protein-calorie malnutrition.

293. Wray, J.D., Population Pressure on Families: Family Size and Child Spacing. Reports on Population/Family Planning. (Population Council). Number Nine, August, 1971. (This originally appeared in: Rapid Population Growth: Consequences and Policy Implications. Baltimore: Johns Hopkins Press, 1971.)

"This report documents the effects of family size, child spacing, and birth order on the physical and intellectual development of children and examines the relationship that exists between the number and spacing of children and maternal health and family welfare." The author notes that these factors have significant implications for national growth and development. A variety of tables and figures give data on Great Britain, India, Thailand, and Colombia.

294. Bengoa, J.M., Significance of Malnutrition and Priorities for its Prevention. In: Proceedings of the International Conference on Nutrition, National Development and Planning, October, 1971. Cambridge: Massachusetts Institute of Technology, Department of Nutrition (to be published).

Some problems of major significance in the area of nutrition are reviewed, with special emphasis on protein-calorie malnutrition and on priorities for control of this condition. The role of nutrition policy in socioeconomic development is given particular consideration.

295. Cravioto, J., The Effect of Malnutrition on the Individual. In: Proceedings of the International Conference on Nutrition, National Development and Planning, October, 1971. Cambridge: Massachusetts Institute of Technology, Department of Nutrition (to be published).

A summary of existing knowledge on the physical and mental consequences of protein-calorie malnutrition and a discussion of how it affects the ability of an individual to make a significant contribution to society (and, by implication, to national development). A systematic model of the interrelation among biosocial factors and low weight gain is presented.

296. Call, David L. and Levinson, F. James, A Systematic Approach to Nutrition Intervention Programs. In: Proceedings of the International Conference on Nutrition, National Development and Planning, October, 1971. Cambridge: Massachusetts Institute of Technology, Department of Nutrition (to be published).

Determinants of a group's nutritional status include family purchasing power, the nutritional content of common foods, traditions and beliefs, the health of children, and non-family feeding programs. To improve the nutritional

status of the group calls for intervention in at least one of these areas, through income, commodity prices, protective foods as sources of protein, other commercially processed nutritious foods, fortification of harvested food, and health status of children. These and other alternative interventions and their implications for the planner are discussed.

297. Berg, Alan and Muscat, Robert, Nutrition Program Planning: A Conceptual Approach. In: Proceedings of the International Conference on Nutrition, National Development and Planning, October, 1971. Cambridge: Massachusetts Institute of Technology, Department of Nutrition (to be published).

Ways in which significant nutritional improvements might be made by national leaders in developing countries even when the slow pace of national growth would appear to make such improvements only a remote possibility are discussed on a "macro" scale.

298. Bengoa, J.M., Recent Trends in the Public Health Aspects of Protein-Calorie Malnutrition. WHO Chronicle 24:552-561, December, 1970.

The relationships between malnutrition, morbidity and mortality, and education and the alarming implications for the future in developing countries are discussed.

299. Halley, Edmund, Degrees of Mortality of Mankind. Edited with an Introduction by Lowell J. Reed. Baltimore: Johns Hopkins Press, 1942.

A reprint of two economic tracts which appeared in the late seventeenth century and which had a notable impact on the field of population statistics. The more famous article is "An estimate of the degrees of the mortality of mankind, drawn from curious tables of the births and funerals at the city of Breslaw; with an attempt to ascertain the price of annuities upon lives."

300. Dior, Y., Systems Analysis and National Modernization Decisions. Academy of Management Journal 13:139-152, June, 1970.

Potential and specific problems and the limitations inherent in the applications of systems analysis to modernization decisions of developing countries are discussed.

301. Haussmann, F., Operations Research in National Planning of Underdeveloped Countries. Operations Research 9: 230-248, March-April, 1961.

Description of a model for allocation of resources in underdeveloped countries.

302. Horvath, W.J., The Systems Approach to the National Health Problem. Management Science 12:B391-B395, June, 1966.

The systems approach is proposed to deal with the increasing rate of innovation and effect greater economy in the practice of medicine. To this end, gaming and simulation are suggested as a first step. In addition, a tentative list of problems which might be studied is proposed, along with the objectives to be attained (in terms of lower absenteeism, lower costs, and lower national health expenditures.) The use of part of the system as a testing laboratory is also suggested.

303. Packer, A.H. and Shellard, G.D., Measure of Health-System Effectiveness. Operations Research 18:1067-1070, November-December, 1970.

An alternative set of measures of health system effectiveness are developed as an extension of concepts presented in an earlier analysis. (See reference 369.)

304. Revelle, C., Feldman, F. and Lynn, W., An Optimization Model of Tuberculosis Epidemiology. Management Science 16:B190-B211, December, 1969.

A descriptive model of the progress of tuberculosis in a population and an optimization model to select methods of control, for developing countries are developed.

305. Shakun, M.F., Operations Research and Developing Countries: Focus on India. Opsearch 7:79-88, June, 1970.

Some ideas how operations research may contribute to innovative change and economic growth in developing countries such as India are suggested.

307. Banerji, N.S., Comment on: B.C. Dass: Estimates of Hospital Demand Based on Age-Specific Measures of Utilization. Opsearch 1:169, July 1964.

Infectious diseases like tuberculosis, typhoid and so on, which play an important role in an underdeveloped country are not related to age or sex. Thus, any estimate based on sex-age structure is inadequate in those countries. (See reference 309.)

308. Bassie, V.L., Outline of Economic Planning for Underdeveloped Countries. Socio-Economic Planning Sciences 1:461-464, August, 1968.

An overall view of the character, necessities and organization of economic development planning is presented within a framework of the author's advisory experience.

309. Dass, B.C., Estimates of Hospital Demand Based on Age-Specific Measures of Utilization. Opsearch 1: 165-168, July, 1964.

This paper assumes that the age-sex structure of a population can provide a basis for estimating demand for hospital services, and a statistical method based on this assumption is explained. Annual male admissions to all hospitals in Great Britain is used as an example. (See reference 307.)

310. Engel, A., MacMillan, D. and Sibery, D.E., Area-wide Planning of Health Services. World Hospitals 4:212-225, October, 1968.

"A special section contains articles on areawide hospital and health planning in Sweden, Britain, and the United States by experts from each country."

311. Feldstein, Martin S., Economic Analysis for Health Service Efficiency. Economic Analysis No. 51. Chicago: Markham Publishing Co., 1968.

"Doctoral dissertation which investigates two sets of problems associated with the British National Health Service: those concerned with identifying and estimating the relevant decision-making information and those concerned with the efficient technical production of a given set of health services. The first section of the study deals with the acute hospital as a producing unit, as an example of public sector microeconomics. The second section deals with planning the supply and use of health care resources at a generally more aggregate level." A number of models appropriate to each section are developed.

312. Scitovsky, Anne A., The Higher Cost of Better Medical Care. Trans-Action 6:42-45, December, 1968.

Examination of the medical care price index, with various criticisms noted. Use of treatment costs for selected illnesses as a basis for the index is discussed.

313. Bailey, Richard M., An Economist's View of the Health Services Industry. Inquiry 6:3-18, March, 1969.

"The effect of income and price on consumer demand for health services is analyzed in terms of three types of consumer demand: for life-sustaining health services, for health services to alleviate acute or chronic conditions and for preventive health services. Article indicated income and price have little effect on life-saving services, have strong effect on curative services and some relationship to preventive services. A strong educational effort, coupled with price changes will be needed to generate demand for preventive health care. Reasons why economists do not view the medical market place as a free competitive market are discussed, and various questions of political economy are discussed."

314. Park, K.S. and Freeman, J.R., Community Health Resource Allocation with Linear Programming Methods. Gainesville: University of Florida, Health Systems Research Division, 1969.

"A methodology for maximizing effectiveness of health resources under given restrictions in the community health planning process is developed. Conceptual issues regarding the relationship between health and economy were reviewed, followed by an examination of alternative health indicators. A two-stage linear programming model was developed, first to estimate the values of the effectiveness parameters of individual health care categories and then to maximize the effectiveness of available resources."

315. Jelinek, R.C., An Operational Analysis of the Patient Care Function. Inquiry 6:53-58, June, 1969.

The patient care function of a general hospital can be quantitatively analyzed through a model which includes the patient's relationship to: personnel and physical facilities, supervisory policies, workload factors, and environmental factors. A methodology for the quantitative and qualitative measurement of these factors is suggested.

318. Klarman, Herbert E., Present Status of Cost-Benefit Analysis in the Health Field. American Journal of Public Health 1948-1953, November, 1967.

Current issues in cost-benefit analysis are discussed, and an extensive bibliography is included.

320. Crystal, Royal A. and Brewster, Agnes W., Cost Benefit and Cost Effectiveness Analyses in the Health Field: An Introduction. Inquiry 3:3-13, December, 1966.

Cost benefit and cost effectiveness analyses in health field are examined as techniques for estimating the magnitude of a disease, including the anticipated return of various alternative plans designed to meet the problem. Methods for constructing cost benefit and cost effectiveness models are explained. These techniques can serve as tools in developing programs and aid administrators in allocating health resources more efficiently.

321. Mann, Judith K. and Yett, Donald E., A Reinterpretation of Hospital Cost Analyses. Welfare and Social Security Administration Grant No. 300. Los Angeles: Research Center, University of Southern California, n.d.

Three major hospital cost studies are re-examined, and the authors attempt to reconcile apparently conflicting results obtained by these investigations especially with regard to returns to scale. It is concluded that these studies are not as inconsistent as they might appear and

differ mainly in the models used. A more consistent and definitive cost model should help to solve some of these issues, and such a model is proposed.

322. Peterson, O.L., Burgess, A.M., Berfenstam, R., Smedby, B., Logan, R.F.L. and Pearson, R.J.C., What is Value for Money in Medical Care? Experiences in England and Wales, Sweden, and the U.S.A. Lancet 1: 771-776, 1967.

A comparative review of the operation of the systems of medical care and their economic implications. Some inconsistencies are seen in the comparisons of health status and health resources and services.

323. Somers, H.M. and Somers, A.R., A Program for Research in Health Economics. Health Economics Service No. 7, Public Health Service Publication No. 974-7. Washington, D.C.: Government Printing Office, 1967.

This monograph served as a background paper for a conference on health care and medical research in which the following areas, among others, are considered: health facilities, supply and utilization of health manpower, relationships among health care providers, medical research, and insurance.

324. Klarman, H.E., Francis, J.O.S. and Rosenthal, G.D., Cost Effectiveness Analysis Applied to the Treatment of Chronic Renal Disease. Medical Care 6:48-54, 1968.

"An inquiry into the respective advantages of hemodialysis at a medical center, a hemodialysis at home, a kidney transplantation, or a mix of the various treatments for chronic renal disease from a cost-effectiveness perspective. The authors used projections of anticipated life years of the patients under various treatments from experience to date in order to estimate cost/benefits. Tabulated data on mortality for kidney failures by age groups and treatment patterns given as well as lifetime costs of the treatments."

328. Collins, Gavin, Cost Analysis of Efficiency Measures for Hospitals. Inquiry 5:50-61, 1968.

"The cost data taken from normal bookkeeping system for each department of a Midwestern short-term general hospital of 200 beds are used to support the contention of the author that the current state of cost analysis does not provide data necessary to provide a basis for equitable rate setting, measures of departmental effectiveness, a basis for future planning, or comparative data for cost comparisons among hospitals. A methodology is suggested which considers volume effect and provides a measure of output and can be effective in determining equitable rate setting and comparing intra-hospital and inter-hospital efficiency."

331. Anderson, Odin W., Toward a Framework for Analyzing Health Services Systems with Examples from Selected Countries. Social and Economic Administration 1:16-31, 1967.

Health services systems range from the loosely to the highly structured, as seen in the U.S., Sweden and Great Britain, and can be analyzed in terms of two sets of characteristics - existing illness patterns and perception of people about them, and perceptions and actions of physicians about prevention or treatment. Costs, financing, remuneration, and problems of the elderly are covered in this review of the three systems.

332. Feldstein, Martin S., An Aggregate Planning Model of the Health Care Sector. Medical Care 5:369-381, 1967.

A simultaneous non-linear multiple regression model for estimating parameters of hospital use in a given population is developed as a preliminary to a larger econometric model. Methodologic concepts and procedures are explained. A study of supply and demand of hospital inpatient services is used to illustrate ways the model might be utilized as a means of predicting the effects of alternative policies.

333. An International Study of Health Expenditure. WHO Chronicle 22:83-94, 1968.

Data on health expenditures (mostly as of 1961) are given for a variety of countries in Western Europe, North America, Africa and Asia. Included are death and birth rates, health services expenditures as a percentage of Gross National Product and national income, and the percentage of expenditures for capital or current accounts.

335. Rice, Dorothy P. and Cooper, Barbara S., National Health Expenditures, 1950-1967. Social Security Bulletin 32:3-20, January, 1969.

Data on U.S. health expenditures for 1950, 1955, 1960 are presented by type of expenditure, and for 1965-1967 by source of funds.

342. Klarman, Herbert E., The Economics of Health. New York: Columbia University Press, 1965.

A monograph intended for both policy-makers and economists. Much of the volume is given over to a more qualitative discussion of demand (general, government) supply (of personnel, hospital services) and medical care organization and regulation. One chapter is devoted to problems of measurement (the medical care price index, costs and benefits of health care programs). A long bibliography is included.

344. Mushkin, Selma J. and Weisbrod, Burton A., Investment in Health -- Lifetime Health Expenditures on the 1960 Work Force. In: The Economics of Health and Medical Care, pp. 257-270. Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.

An attempt is made to determine how much of the economic growth of the United States resulted from investments in health, partly through a comparison of the expenditures on health with those on education for employed persons (in 1960). The returns to health investment are seen in increased productivity (per man-hour) and output (through longer life expectancy and larger labor force). Areas needing future definition and research are discussed. (See reference 280.)

347. Scitovsky, Anne A., "An Index of the Cost of Medical Care -- A Proposed New Approach". In: The Economics of Health and Medical Care, pp. 128-142. Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.

Disadvantages of the present medical care price index are discussed and a new one is proposed to be based on specific illnesses. Its advantages over the present one are presented. (See reference 279.)

348. Klarman, Herbert E., The Increased Cost of Hospital Care. In: The Economics of Health and Medical Care, pp. 227-254. Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.

Changes in hospital costs in New York City from about 1935 to 1957 are examined, and alternative explanations are presented. The usual explanations (especially of increases in patient-day costs) are not by themselves entirely satisfactory, and the author discusses the implications of this analysis. He also argues for further research into the factors underlying increased hospital costs.

349. Roberts, Markley, "Trends in the Organization of Health Services: The Private Sector." In: The Economics of Health and Medical Care, pp. 23-41. Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.

Changes in the organization of private health services are described in terms of such factors as utilization of auxiliary manpower, rising productivity of health personnel, better structure of health services, continued efforts in the area of comprehensive health care, and more effective controls of the cost, quantity, and quality of health services. More complex and better coordinated units of health services are called for.

350. Rice, Dorothy P., Estimating the Cost of Illness. Health Economic Series No. 6. Washington, D.C.: U.S.P.H.S. Publication No. 947-6, May, 1966.

A significant part of the human capital literature. This study attempts to formulate a systematic way of calculating the economic costs of disability, morbidity, and mortality. Data on direct costs by diagnosis for certain health expenditures in 1963 are presented. Annual indirect costs are also given in detail, including estimate of productivity losses and man-years lost. Finally, the methods and estimating procedures are discussed, including those for determining the present value of the future earnings of those who died in 1963.

351. Perlman, Mark, Some Economic Aspects of Public Health Programs in Underdeveloped Areas. In: Economics of Health and Medical Care, pp. 286-299, Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.

This paper points out the close association between health programs and economic development in various parts of the Amazon Valley in Brazil. In some areas, health served as a prerequisite or catalyst to growth; in others, health was one of a number of contributing factors. Perlman argues in favor of selectivity of health programs; that is, health programs should be located in those regions with the greatest economic potential.

352. Fein, Rashi, Health Programs and Economic Development. In: The Economics of Health and Medical Care, pp. 271-282. Ann Arbor: University of Michigan, Department of Medical Care Organization, 1964.

Examination of some historical and economic aspects of the assessment of the value of human resources, with some emphasis on the effect of better health on the quality and size of the labor force. (See reference 277.)

353. Bourgeois-Pichat, Jean, Population Growth and Development. New York: Carnegie Endowment for International Peace, 1966.

Life expectancy, changing mortality rates, contraception, desired family size, and other factors influencing population growth (and their interrelationships) are discussed with regard to countries in Asia, Africa, and Latin America.

354. Enke, S., The Gains to India from Population Control: Some Money Measures and Incentive Schemes. Review of Economics and Statistics 42:175-181, 1960.

An early estimate of the value of a prevented birth.

355. Enke, S., The Economic Aspects of Slowing Population Growth. Economic Journal 76:44-56, March, 1966.

An analysis of the relative merits of investing in population control measures versus investing in physical means of production leads to the conclusion that the former would have a far greater positive effect on, among other things, per capita income.

356. Kuznets, Simon S., Quantitative Aspects of the Economic Growth of Nations: I. Levels and Variability of Rates of Growth. Economic Development and Cultural Change 1:28-31, October, 1956.

In evaluating the effect of a high rate of population growth on the economic growth of developing countries, excessive emphasis should not be placed on purely economic factors such as capital formulation, dependency ratios, or savings. Institutional and sociological aspects of the problem must also be considered.

357. Titmuss, R.M. and Abel-Smith, B., Social Policies and Population Growth in Mauritius. London: Methuen, 1961.

Declining mortality rates appear to have resulted from malaria eradication but also to have been associated with a sharp downturn in economic conditions.

358. Sauvy, A., De Malthus á Mao Tse Tounq. Paris: Denoël, 1959.

Costs of population are estimated in terms of the cost per excess birth of childrearing, education, and welfare. Productivity in adulthood, however, has not been incorporated into the final result.

359. Paglin, M., "Surplus" Agricultural Labour and Development: Facts and Theories. American Economic Review 55: 815-834, September, 1965.

Discussion of the possible absorption of excess labor in the agricultural sector in India as production becomes increasingly labor-intensive.

360. Spengler, J.J., Malthus and World Hunger. In: Control or Fate in Economic Affairs. Edited by R.H. Connery and E.L. Jones. (Proceedings of the Academy of Political Science XXX: No. 3.) New York: The Academy of Political Science, Columbia University, 1971.

Reprint of his 1949 essay on population growth and its ramifications on food production and consumption.

361. Wyon, John B. and Gordon, John E., The Khanna Study. Population Problems in Rural Punjab. Cambridge: Harvard University Press, 1971.

Field studies of population dynamics in rural India over almost a decade are reported, with special emphasis on a contraceptive program as a means to lower birth rates. The implications of population pressure on available resources are noted, and detailed findings on births, deaths, and migration in the villages studied are reported. Some of the material has already been published (see, for example, references 604, 623, and 653), but a new integrated interpretation of the major results is presented.

362. Abel-Smith, B., An International Study of Health Expenditure and its Relevance for Health Planning. Public Health Papers No. 32. Geneva: World Health Organization, 1967.

Health expenditures, financing, and trends in both are examined through data collected by questionnaires submitted to over 30 nations in Africa, Europe, North and South America, Southeast Asia, the Near East, and the Pacific. Statistical data on health facilities, personnel appear in Chapter 1; Chapters 3 and 4 give specific information on total expenditures and hospital expenditures. Trends in health services expenditures are examined in greater detail for Canada, Israel, the Netherlands, Sweden, the United Kingdom, and the United States. (Reference 250 is the preliminary report of this study.)

363. Harbison, Frederick and Myers, Charles A., Education, Manpower, and Economic Growth. New York: McGraw-Hill Book Company, 1964.

An examination of some economic, political and social factors in the development of human resources, specifically in this case through education and manpower training. The first part of the book develops a set of quantitative indicators of human resource development and of general development, grouping most of the countries of the world into one of four levels (underdeveloped, partially developed, semi-advanced, and advanced). In reviewing strategies for human resource development appropriate to countries in these groups, the authors also attempt to elucidate the relationships between such development and economic growth. The latter part of the book deals with the place of education and manpower planning within planning for general economic development.

364. Lewis, W. Arthur, Development Planning. The Essentials of Economic Policy. New York: Harper and Row, Publishers, 1966.

Although basically an economic treatise, the section on public expenditures briefly but clearly notes some of the issues in trying to calculate or evaluate the economic return on medical expenditures. These issues include increased productivity versus increasing unemployment and the relative return of public health measures versus curative medicine.

365. Kindleberger, Charles P., Economic Development. New York: McGraw-Hill Book Company, 1958.

Part of the Economics Handbook Series, this volume attempts to clarify the problems of economic growth in underdeveloped countries, with some emphasis on the importance of social and political development in this process. Much of the book is given over to purely economic topics -- land, capital, labor, entrepreneurship -- but one chapter deals with population and others deal with the relationship between developing and developed countries.

366. Galbraith, John Kenneth, Economic Development in Perspective. Cambridge: Harvard University Press, 1962.

A presentation in essay form of five lectures given in India while the author was the U.S. Ambassador there. Aside from the title essay, topics include: developing and developed countries, development planning in theory, the relationships between investment in education and economic growth, and the corporation as the instrument of production.

367. Hicks, Ursula K., Development from Below. Oxford: Clarendon Press, 1961.

A detailed examination of the development of local government in developing countries of the Commonwealth (including the West Indies, India and Ceylon, and Africa). Health is covered only briefly in terms of expenditures on public health and medical services.

368. Madhava, K.B., editor, International Development, 1969. Proceedings of the Eleventh World Conference of the Society for International Development. Washington, D.C.: Society for International Development, 1970.

Papers and comments at each of seven roundtables at the conference, on redefinition of development goals; developmental assistance and foreign aid; the relationships between manpower, education, and development; the role of schools in communication about population; social communications in development; social, cultural, and political requirements for development; and challenges to development theorists and strategists (especially economic). Three papers on nutrition appear in the first section.

369. Packer, A.H., Applying Cost-Effectiveness Concepts to the Community Health System. Operations Research 16: 227-253, 1968.

Ways in which concepts of model building and cost-effectiveness can be applied to the health planning process are investigated and large-scale digital-computer simulation techniques are recommended. The applicability of a measure of effective (as defined in the paper) and other measures to specific health problems is discussed. Finally, problems of estimating costs are examined in terms of the various kinds and who bears them.

370. Zemach, R., A Model of Health-Service Utilization and Resource Allocation. Operations Research 18:1071-1086, 1970.

This paper presents the initial basis for a descriptive mathematical model of the total utilization of personal health and medical services by the population of a community or region, the allocation of resources used to provide these services, and the cost of health care as derived from the prevailing costs of resources. A simplified illustrative example is presented. The patterns by which resources are allocated to provide services, and the patterns by which the population groups use the total mix of services available, are identified as parameters in the model. On the basis of past data, the model can be used to predict allocation and use of services over time, as a function of population dynamics. Problems of implementation are discussed.

371. Reinke, William A., The Role of Operations Research in Population Planning. Operations Research 18:1099-1111, 1970.

"This paper deals initially with the family decision process and then with the organization of professional activities toward population control. Hypothetical models are developed, field information is used to illustrate their significance, and suggestions for further research are offered. The decision model considers the utility of child-bearing for different population groups compared with the subjective valuation these groups give to contraception, and means of measuring these poorly defined values are proposed. In assessing the role of operations research in the organization and delivery of family planning services, the paper directs attention to the allocation problem (including contraceptive methods provided, personnel employed, etc.) and the attitudes of target populations toward both services and providers."

372. Fanshel, S. and Bush, J.W., A Health-Status Index and its Application to Health-Services Outcomes. Operations Research 18:1021-1066, 1970.

Operational definitions of health, time, and target population are developed and used to give a quantitative definition of the output of a health program "as the changes in the functional history of the target population resulting from the intervention of the health program (or system)." Program effectiveness and health status of the population are also defined quantitatively. The paper also examines the relationship between health program output and modern decision theory. Two illustrations of the method are presented in the paper. Over 50 references are cited.

373. Smallwood, R.D., Sondik, E.J. and Offensend, F.L., Toward an Integrated Methodology for the Analysis of Health-Care Systems. Operations Research 19:1300-1322, 1971.

"This paper introduces patient state and physician state of information as two unifying concepts for the analysis of health-care systems. The concepts are presented in the context of four specific problem areas (medical diagnosis and treatment, health-service programs, individual facility designs, and regional health-system design). As a demonstration of the utility of these concepts, a technique for evaluating alternative facility macroplans is described and some results from an actual application are presented and reviewed."

374. Rosenhead, J.V., Experimental Simulation of a Social System. Operational Research Quarterly 19: September, 1968.

Prescribing habits of doctors are used as an example of a simulation model which can be used to examine complex and dynamic social problems.

375. Subramanian, M., Formulation of a Tuberculosis Control Programme on a Community Basis. Indian Journal of Public Health (India) 8:48-60, April, 1964.

Quick evaluation of various approaches to a nationwide tuberculosis control program can be carried out with the mathematical methodology presented.

376. Stimson, David H., Utility Measurement in Public Health Decision Making. Management Science: Application 16:B17-B30, 1969.

Resource allocation model based in part on utilities obtained from the Churchman-Ackoff approximate measure of value method is described, and decisions derived from it are compared with ones already made by the agency allocating a federal grant.

377. Fetter, Robert B. and Thompson, John D., Simulation of Hospital Systems. Operations Research 13:689-711, 1965.

A set of computer simulation models (of a general nature) of hospital subsystems is described, and data from the experimental use of three of them (maternity, surgical, and outpatient) are given. Assorted other models in a developmental stage are also described.

378. Kant, V.I., Ispol'zovanie Metoda Lineinogo Programirovaniya pri Perspektivnom Planirovanii Zdravookhraneniya. (The Use of Linear Programming in the Perspective Planning of Preventive Medicine.) Zdravookhranenie (Kishinev): 11-13, 1964. (In Russian)

Linear programming methods, most specifically the transportation distribution method, are used to solve the problem of the rational location and allocation of hospitals.

379. Das, Rhea S., Service Gate Information and Prediction of Demand for Hospital Services. Opsearch 1:141-150, 1964.

Estimation of demand for hospital services can be done with a model which incorporates services gate information, in this case patient's age and number of diagnosis made by admitting physician.

380. Flagle, Charles D. and Lechat, Michel F., Statistical Decision Theory and the Selection of Diagnostic and Therapeutic Strategies in Public Health. In: Proceedings of the 3rd International Conference on Operational Research, 1963. London: English University Press and Paris: Dunod, 1964.

Some technical terms in decision theory have synonyms in public health; others do not. As an example, planning the screening and treatment programs for leprosy control is formulated in decision theory terms. Various disadvantages and advantages of this approach are discussed, and the way in which decision theory might be developed along these lines is outlined.

381. Colton, Theodore, A Model for Selecting One of Two Medical Treatments. Journal of the American Statistical Association 58:338-400, 1963.

Various approaches to the application of a sample cost function model are presented and its applicability to the design of optimal clinical trials is discussed. The one cost used in the model is the consequences of treating a patient with the superior or inferior of the two treatments.

382. Thompson, John D., Fetter, Robert, B., McIntosh, Clinton S. and Pelletier, Robert J., Use of Computer Simulation Techniques in Predicting Requirements for Maternity Facilities. Hospitals 37:45-49 and 132, 1962.  
Information about future occupancy and thus adequacy of a variety of maternity suite facilities can be provided by simulation techniques. One such program is described and its applicability is projected.
383. Miller, C.R., Sabagh, G. and Dingman, H.F., Latent Class Analysis and Differential Mortality. Journal of the American Statistical Association 57:430-438, 1962.  
Latent class analysis is applied to demographic data as an alternative standardization process for demographic analysis. Over 3,700 admissions to a hospital for the mentally retarded are analyzed on the basis of five variables, and the population is separated by this technique into two groups which are then analyzed in terms of mortality. Great differences were found in the mortality rate when length of hospital stay was held constant.
384. Flagle, Charles D., Operations Research in the Health Services. Operations Research 10:591-603, 1962.  
Problems in the field of medical care and organization are discussed in four categories: demand for health services; allocation of resources; collection and utilization of information; and medical care organization. Various projects are cited. Progress in the use of operations research in these areas is discussed.
385. Harano, Hidenaga, A Case Study on a Clinic. Management Science 5:104-113, 1962.  
Waiting times of patients were considerably reduced without an increase of doctors, partly through the implementation of policies designed to make arrival epochs of patients more regular.
386. Elling, R.H., Health Systems and Health Planning in International Perspective. Exchange Bibliography No. 265. Monticello, Illinois: Council of Planning Librarians, 1972.  
Annotated bibliographies that accompanied but were not printed with several articles published in Medical Care (May-June, 1971) from the Asilomar Workshop-Conference on Cross-National Studies of Medical Care are reprinted in this bibliography. Topics of the papers include social epidemiology in the study of medical care systems, health planning in international perspective, and comparative health service systems. Although concerned mostly with planning and the organization of medical care, articles cited in the individual bibliographies do in some cases present information or analysis of an economic nature. A useful collection.

387. Health Expenditure. World Health Statistics Report 24: 236-245, 1971.

Latest available data on annual government expenditures on health (national and subdivisions) are given for countries in Africa, Asia, North and South America, Europe, Australia and the USSR. A new table is also presented detailing private consumption expenditures on health for many of these same countries. Both sets of data are also given in terms of per capita health expenditure.

388. The Economics of Health and Disease. WHO Chronicle 25: 20-24, 1971.

Short essay on some aspects of health economics covered in a WHO seminar in 1968. Specifically noted were such topics as the economic benefits of disease control, cost-benefit and cost-effectiveness analysis, economics and health manpower planning, hospital costs and hospital size, and health economics in the training of health personnel.

389. Stewart, C.T., Allocation of Resources to Health. Journal of Human Resources 6:103-122, 1971.

Resources devoted to health can be classified into four groups: treatment, prevention, information, and research. The relationships between the first two and last two (and between the two pairs) are discussed, as well as differences in scale effects and temporal and spatial characteristics. The author has made an attempt to measure the significance of treatment, information (literacy) and prevention (potable water) for life expectancy for nations in the western hemisphere; the latter two proved highly significant but no treatment variable was significantly related to life expectancy. Implications for allocative decisions under these circumstances are briefly discussed.

390. Abel-Smith, B., Health Priorities in Developing Countries: The Economist's Contribution. International Journal of Health Services 2:5-12, 1972.

The author argues that cost-effectiveness studies constitute the best contribution of economics to health planning; the value of such studies far outweigh that of PPBS, PERT, or cost-benefit analysis. An example of cost-effectiveness is given by a study of the expansion of medical education in developing countries, and five aspects of this expansion are discussed.

391. Muhsam, H.V., Speculations on Population Growth, Education, and Economic Development in ECAFE Countries. In: International Union for the Scientific Study of Population. Contributed Papers of the Sydney Conference, August, 1967. Canberra: Australian University Press, 1967.

392. Inkeles, A., Making Men Modern: On the Causes and Consequences of Individual Change in Six Developing Countries. American Journal of Sociology 75:208-225, 1969.
393. Inkeles, A. and Smith, D.H., The Fate of Personal Adjustment in the Process of Modernization. International Journal of Comparative Sociology 11:81-114, 1970.
394. Smith, D.H. and Inkeles, A., The OM Scale: A Comparative Sociopsychological Measure of Individual Modernity. Sociometry 29:353-377, 1966.
395. McClelland, D.C. and Winter, D.G., Motivating Economic Achievement. New York: The Free Press, 1971.
396. Bauer, P.A., editor. Social Indicators. Cambridge: Massachusetts Institute of Technology Press, 1966.
397. Hagen, E., Planning Economic Development. Homewood, Illinois: Richard D. Irwin, Inc., 1962.  
One basic component of economic development is entrepreneurship, and the author attempts here to define its characteristics as a motivational force.
398. Inkeles, A., The Modernization of Man. In: Modernization. M. Weiner, editor. New York: Basic Books, Inc., 1966.  
An index of modernization is examined through nine "themes" in "the larger complex of attitudes, values, and ways of acting that we consider modern."
399. An Appraisal of the Population Project of the Rural Health Research Center at Narangwal, India: The Integration of Family Planning and Rural Health Services at the Village Level. Research Triangle Park, North Carolina: Research Triangle Institute, 1971.  
Data from this long-term project appear to suggest the hypothesis that expectations of increased survival of children represent almost a precondition for planning for family limitation.

The abstracts for references 401 to 457 have been taken from Health Planning and Health Economics in Countries of Eastern Europe. Abstracts of Books and Articles, 1965-1969. Copenhagen: Regional Office for Europe, World Health Organization, 1971.

401. Bogatyrev, I.D., O kriterijah effektivnosti dlja matematičeskogo modelirovanija različnyh vidov medicinskoj pomošči naseleniju. (Evaluation criteria for the mathematical modelling of various forms of medical care.) Sovetsk. Zdravoohr. 5:8-13, 1969.

The author explains the need to automate data processing for the planning and management of medical services and gives his views on the sequence of stages required to put this into effect taking into account the different areas of the country and also the need for different coverage of information and different times for its reception by the various health services. He proposed beginning by establishing simple models covering limited areas and, after testing the system on computers, gradually to develop more complicated models. As an example, the work done by the Semasko Institute of Social Hygiene and Public Health Administration is quoted. Its purpose was to establish a pilot automated system for managing the admission of patients requiring emergency in-patient care in Moscow. Emphasis is placed on the mathematical methods used in health planning and management and on the fulfillment and definition of evaluation criteria, i.e., of those parameters with the help of which it is possible to come to the best decisions, and lists as examples a number of such indices. Attention is focused on the need for evaluation criteria from the medical and economic standpoints. A mathematical model must be so constructed as to enable calculation of the degree of risk involved in attempting to secure economic advantage and to establish the cost of rejecting such a risk for the sake of medical indications.

405. Kleczkowski, B., Programowanie ochrony zdrowia społeczeństwa. Model ogólnej metody optymalizacyjnej. (Health programmes. Model of a general optimization method.) Zdrow. publ. 2 (supplement):3-45, 1968.

The purpose of the work is to draw up a health programme with the aid of a model, the so-called optimal method programme, for the organization of medical services. Construction of a logical model of the proposed method takes place in two phases: the theoretical phase, based on a definition of long-term aims and trends in the health services; and the practical phase based on working out specific tasks for the different medical services (a diagram of the two phases is given). A logical programming model in the form of a six-stage cyclic system is

proposed: (1) the evaluation of the health status of the population on the basis of the analysis of available data; (2) a forecast of the health status of the population and its future requirements; (3) the establishment of a general programme of activity for the health services; (4) selection of an optimal variant of the programme, taking into account its efficiency, economic impact and other criteria; (5) establishing the possibility of implementing the proposed plan in the different health sectors and (6) evaluation of the programme and amendment where necessary.

407. Popov, G.A., Voprosy teorii i metodiki planirovaniya zdravoohraneniya. (The theory and methods of health planning.) Moscow, 368 pp., 1967.

There are 10 chapters, the first 3 of which are theoretical. These deal with the place of health planning in the general system of national economic planning in the USSR, the scientific basis of health planning and health planning and programming in foreign countries. The fourth and fifth chapters give data on the provision of curative and preventive care and on the use of medical and other personnel in health establishments, often with comparisons from foreign countries. The sixth chapter gives examples of the establishment, in health planning, of targets for different branches of the health services: in the sanitation and epidemiological services, the preventive and curative services, the pharmaceutical services and so on. The seventh chapter explains the difference between "health norms" and "health standards" and discusses health care requirement standards and a number of methods of calculating them. The eighth chapter is devoted to planning the relations between different forms of preventive and curative care for various age-groups. Examples are given as well as methods of calculating suitable indices. The ninth and tenth chapters cover the planning of medical and paramedical manpower. There is a bibliography of 210 Soviet and other titles.

408. Stich, Z., Opieka zdrowotna i planowanie ekonomiczne. (The health services and economic planning.) Zdrow. publ. 12:1101-1108, 1967.

The interrelations between the health services, the health status of the population and the country's economy are discussed. The factors that need to be taken into consideration in health planning are considered and emphasis is placed on the importance of studying planning methods and the influence of industrial development on the health status of the population.

409. First International Symposium on Health Economics and Health Planning, Varna, Bulgaria. Zdravoohr (Bucharest) 3:345-347, 1968.

At the Symposium, which was held in June 1967, a broad range of questions relating to health economics and health planning was considered. In particular, the improvement of labour productivity in medical institutions was discussed. The participants defined three main ways of achieving the maximum results for the minimum expenditure in labour and financial resources: the rational use of manpower; the corrected allocation of different categories of medical staff to different typing work to be done; and the concentration and modernization of the equipment of curative facilities.

410. Žuk, A.P., Planirovanie zdavoohrenenija v SSSR. (Health planning in the USSR.) Moscow, 343 pp., 1968.

There are nine chapters: (1) The theory of health planning is set forth and present methods of health planning are described. (2) The system of indices, design of the plan, and how it is drawn up and implemented are described. (3) The methods of analyzing statistical data for the health plan are given. The chapter includes an analysis of vital statistics, morbidity statistics and statistical data on the work of the health services. (4) The general targets and trends in the decline in morbidity for a number of the most important diseases and types of injury in the USSR are set forth, mental diseases being dealt with separately. The chapter throws light on the methods and organizational problems involved in planning the reduction of morbidity. (5) Estimated requirements for the provision of urban curative and preventive care (in-patient and out-patient) are given. (6) Estimated requirements for rural curative and preventive care are given and the main phases in the planning of rural medical care, and data on the planning of rural in-patient and out-patient care, are described. (7) Data on existing health facilities in the USSR are given: nomenclature, siting and so on. (8) This chapter describes methods of defining estimated requirement indices, numbers of established posts, the structure of standard post establishments and their application. (9) Manpower planning for the health services system. A bibliography of 194 references is given, covering sources in the USSR.

411. Aczél, D., A tavlati egészségügy szakemberszükséglet terbezésének néhány problémája. (Some problems of long-term medical manpower planning.) Népegészségügy 2:65-69, 1967.

Three basic factors must be taken into account in medical manpower planning: the morbidity breakdown, hospitalization requirements and the possibility of introducing rational organization of the work of the medical staff. Examples are given of the estimation of doctor requirements for different specialties up to 1980.

417. Alihanov, N.S., Zavisimost' meždu vypolneniem mesjačnogo proizvodstvennogo plana i zaboлеваemost'ju rabočih. (Morbidity and fulfillment of monthly production plans.) Sovetsk. Zdravoohr. 5:43-45, 1967.

In 1965 a one-month study was made at five industrial undertakings in Tallin of the effect of morbidity among workers on the fulfillment of the production plan. Figures are given in tabular form illustrating the direct effect established. On the other hand, the author notes that an uneven workload has a negative effect on morbidity.

418. Anđelković, D., Sistem dohotka u zdravstvu. (The income system and the health services.) Narod. Zdrav. 9: 294-297, 1967.

The article is published as a contribution to discussion. A diagram is reproduced showing the role of the health services in creating national income. In this connexion, the nature of the medical workers' contribution is specified. The principles of the income system in relation to the health services in Yugoslavia are explained.

419. Bär, A.H. & Schwarz, W., Zu den Beziehungen zwischen Gesundheitswesen und Ökonomie. (The relationships between the health services and the economy.) Z. ges. Hyg. 8:624-630, 1968.

It is emphasized that while efficient health services call for considerable State investment as a result of treatment, they return to the national economy a productive force of appreciable economic significance. The tasks before health economics as a science are considered and the main theses of health economics set forth in the new edition of K. Vinter's book on Public Health are discussed.

420. Basov, V.I., Ob ekonomike zdravoohranjenja. (Health economics.) Sovetsk. Zdravoohr. 5:10-15, 1967.

The author considers it most important to define the efficiency of medical care from the standpoint of the national economy and its effect in increasing labour productivity. He suggests different ways of improving the efficiency of the health services and discusses certain problems of health economics such as the efficient use of budgetary allocations by individual health facilities, and of the health service budget as a whole.

421. Burcev, A.M., Ekonomičeskie poteri v svjazi s zaboлеваemost'ju sortirovščic celjulozy i bumagi. (Economic losses due to morbidity among female sorters in the cellulose and paper industry.) Sovetsk. Zdravoohr. 6: 31-32, 1966.

Figures are given for the economic losses incurred by undertakings through temporary sickness absenteeism. The

study was carried out in 1964 and in a specific example it was shown that the losses for 1964 owing to illness among female sorters amounted to 12.6 roubles a day. The total number of days lost in the year by the female sorters was 1370. Expenditure on medical care and on sickness benefits during their absence from work amounted to 17 264.3 roubles. In all, the economic loss by one workshop alone in the factory exceeded 90 000 roubles in a year, pointing to the need for careful study of this problem.

422. Gargov, K. et al, Ocenka ekonoičeskikh rezul'tatov zdravoohraneniĵa. (An evaluation of the economic effects of the health services.) Zdravoohr. (Bucharest) 3: 265-274, 1968.

The article contains two main sections: (1) on the interdependence of the health services and economics; (2) on methods of establishing the efficiency of the health services. The first part of the article discusses the role and relationships of the health services in the general system of production, the influence of the health services on production and on the distribution and redistribution and consumption of the national income. The second part, dealing with the efficiency of the health services, describes in more detail the main lines of research in this field, the difficulties encountered and the as yet unsolved theoretical and practical problems. Most of this section is devoted to methods of assessing the economic consequences of premature death, the economic effects of reducing morbidity and mortality, the cost of medical care and so on. In their conclusions, the authors emphasize the essential need for the economic justification of short-term and long-term plans for development of the health services.

424. Heede, G., Modellversuch zur ökonomischen Vergleich von Allgemeinpraxen mit einem Index aus dem Komplex Arbeitsunfähigkeit und Fallkosten. (An attempt to establish models for the economic evaluation of general practice by means of an index including data on incapacity for work and expenditure per case of illness.) Z. arztl. Fortbild. 8:454-459, 1969.

Any attempt at qualitative evaluation of the productivity of an out-patient treatment service will encounter difficulties owing to the large number of variables to be taken into account in expressing productivity. The author critically reviews the ways of defining health service productivity particularly the use of social insurance data, man-days lost by sickness absenteeism, percentage of cases with incapacity for work out of the total cases recorded, and average expenditure (in marks) on drugs per case. A formula is given for an index with the help of which it is possible to assess the current situation in the national health service (out-patient

treatment services) and economic trends. The possibility of using this formula for in-patient services as well is noted, though it would be necessary first of all to introduce standardized recording. The article contains several tables and diagrams illustrating the different ways of using this index. There is a bibliography with seven titles.

425. Izutkin, A.M., *Ekonomika i zdravoohranenie*. (Economics and health.) Sovetsk. Zdravoohr. 10:62-63, 1965.

The article is a contribution to discussion in which the author disputes with I.V. Pustovoj (Sovetsk. Zdravoohr. 11:1964). He considers that the relationship of economics to health should be viewed: (1) in the narrow sense of the economic problems of health administration; (2) in the broad sense, covering relationships between health services and the country's economy. The author develops these points and argues in favour of extensive research along the lines indicated.

426. Izutkin, A.M., *Zdorov'e trudjaščihsja - važnyj faktor razvitija promyšlennosti*. (The health of the workers - an important factor in the development of industry.) Sovetsk. Zdravoohr. 6:27-30, 1966.

The author discusses the broader interrelationship of the national economy and the health services, concluding that the latter express industry's need for a healthy labour force. Thus, the health services indirectly affect the rate of development of production. In fulfilling the function of producing a healthy labour force, the health services themselves constitute one of the productive forces of the community. An example is given of the economic loss due to temporary sickness absenteeism and injury among workers and employees in commodity production. In 1963, some five million man-days were lost in undertakings in the Gorki Region, which, in monetary terms amounted to 60 million roubles. The author discusses the economic analysis of loss of time due to sickness and industrial injuries. He stresses that, under socialist conditions, health promotion for specific economic aims is not an end in itself as in the final count the results are used for further development and for satisfying of the needs of the people.

427. Kotvald, T., *Příspěvek zdravotnictví k rozvoju ekonomických zdrojů*. (The contribution of the health services to the development of the Czechoslovak economy.) Čs. Zdrav. 11:539-542, 1965.

A short description is given of the role and tasks of the health services in a socialist economy. Comparing the economic effect of the reduction in mortality in Czechoslovakia and the rise in health service costs, the author shows that health costs are not merely an item of consumption, but also a form of capital investment in the development of the country's economy.

428. Kotvald, T., Rol' sovremennogo zdravooohranenija v ekonomike socialističeskogo obščestva. (The economic role of the health services in a socialist society.) Zdravoohr. (Bucharest) 3:221-230, 1967.

This is an abridged paper for the Berlin Symposium on Medicine and Sociology held in December 1964, devoted to the theory of health economics. It is shown that although socialist health services as a whole are classified as belonging to the unproductive sector of the national economy they are, in ever greater measure, contributing to the development of the community's productive forces and to expanding production. The author proves the need for priority to be given to development of health and public health services, since they directly affect the development of the community's productive forces.

429. Malov. N.I., K voprosu ob ekonomike zdravooohranenija. (Health economics.) Sovetsk. Zdravoohr. 5:91-93, 1965.

The article considers health economics in the light of Soviet conditions and its links with health planning. The author discusses a number of points made in an article on the same subject by I.V. Pustovoj (Sovetsk. Zdravoohr. 11: 1964).

430. Plaschka, R., Ökonomischer und sozial-humanistischer Nutzeffekt des sozialistischen Gesundheitsschutzes - eine Einheit. (The identity of social and human considerations with economic efficiency in socialist health services.) Heilberufe 11:325-327, 1968.

The author discusses the definition of health economics and the place of the health services in the national economy. The gain to the community from expenditure on health can be measured in a number of ways: expectation of life, mortality, morbidity, disability, and so on. However, many other factors independent of the health services affect these indices. It is emphasized that expenditure on health indirectly contributes to the growth of the national income by restoring the labour force and increasing its productivity. The work of the health services among those actively engaged in production can also have an appreciable economic effect in terms of reduced sickness absenteeism, disability, longer working life, and so on. These indices form the numerator and the different categories of national income expenditure the denominator in a ratio expressing the economic efficiency of the health services. Thus, for example, for every mark spent on tuberculosis control from 1961 to 1966, 1.85 marks was added to the national income by the labour acquired as a result. For every mark spent on BCG vaccination between 1955 and 1966, the national economy got back three marks. Exact knowledge of income and expenditure is essential for correct evaluation of the health services' contribution to the national economy. The economic efficiency of the health services cannot be divorced from its social and human significance.

431. Popov, G.A., Sravnitel'naja ocenka effektivnosti razlicnyh form medicinskoj pomošči naseleniju. (A comparative evaluation of the efficiency of various forms of medical care.) Sovetsk. Zdravoohr. 5:15-21, 1967.

The author reviews certain aspects of the use of health service requirement standards in studying the efficiency of medical care. He proposes distinguishing between the term "norm" and "requirement (estimating) standards" and illustrates the point with examples. Methods used in research to estimate curative and preventive care requirements are described. A definition is given of such terms as "standard (quality) of medical care", "adequacy", "productivity of labour". "Efficiency of medical care" is taken to mean the degree to which the aims set are attained taking into account standard (quality) of care, its adequacy and the productivity medical staff. The aims of research in assessing the efficiency of medical care are discussed.

432. Smolek, A., Vzťahy mezi výdaji na zdravotnictvi a rozvojem hospodářství. (The relationship between expenditure on health and the development of the national economy.) Čs. Zdrav. 11:542-546, 1965.

The author expounds the method used by him to study the development of the relationship between health expenditure and the development of the national economy. Special attention is devoted to a study of three complex problems: (1) the relation between the funds allocated to health in different countries and those countries' resources; (2) correspondence of the distribution of resources among different health services to theoretically established requirements; (3) methods of ensuring more effective and economic use of the funds allocated to health.

433. Štich, Z., Péče o zdraví a ekonomické plánování. (The health services and economic planning.) Čs. Zdrav. 12: 593-597, 1965.

The main aspects of the interdependence of health and economics are indicated. Human health is examined from the economic standpoint. In Czechoslovakia, the reduction in sickness absenteeism due to injuries has led to an increase of 1% in annual working days, an annual rise in the national income of 2000 million crowns and a saving in expenditure on health facilities of 600 million. The importance of preventive work is underlined.

434. Vălčev, A. et al, Ikonomičeskaja smetka v dejnostta na zdravnite zavedenija. (The economic approach to the work of the health services.) Hig. Zdraveop. (Sofija) 4:321-330, 1967.

The economic approach to the work of the health services

is expressed in the methods of organization and management that lead to optimum results with a minimum expenditure of labour and money. The following main problems are dealt with: (1) economic efficiency and basic problems of medical service management and organization; (2) the use of economic indices in the practical work of the curative services.

436. Bogatyrev, I.D., Rojzman, M.P. & Minakova, I.G., Izučenie ekonomičeskoj effektivnosti likvidacii poliomielita i rezkogo sniženija zaboлеваemosti difteriej v SSSR. (A study of the economic benefits from eliminating poliomyelitis and successfully controlling diphtheria in the USSR.) Sovetsk. Zdravoohr. 8:3-9, 1969.

Only by comparing expenditure on prevention with the loss prevented can the economic effect of eliminating disease or reducing its prevalence be evaluated. The authors consider that in estimating the economic benefit of health measures, the key considerations are: (1) the units to be adopted for measuring economic benefit and (2) the period of observation over which expenditure and results obtained should be compared. Criticizing other research workers, the authors describe their own methods of solving the problem and give examples of calculations for determining the economic gains from eliminating poliomyelitis and controlling diphtheria. In sum, they found that the difference between the cost of these two items in the USSR and the benefit from losses prevented was, for poliomyelitis, 3.9 milliard and for diphtheria, 2.1 milliard roubles. The cost/benefit ratio in the case of poliomyelitis is 1 : 42, i.e., for every rouble spent, an economic return of 42 roubles is secured. The cost/benefit ratio for diphtheria control is 1 : 44. Making a rough estimate of the future national income (per individual worker), they find that the cost/benefit ratio is, in fact, much higher (for poliomyelitis, 1 : 74 and for diphtheria, 1 : 78).

437. Bratovanov, D., Vrazka i zavisimost meždu zabolevaemostta ot tuberkuleza i nacionalnija dohod v NR Balgarija. (Tuberculosis morbidity and its effects on the Bulgarian national income.) Hig. Zdraveop. (Sofija) 2:105-115, 1966.

The mathematical relationship between the growth of national income and decline in tuberculosis morbidity in Bulgaria is established with the help of figures on the correlation and decline of the disease. Thus, for example, the fall in tuberculosis morbidity to one case per 100 000 population corresponds to an increase in national income of 12.79 million leva.

438. Cienziaĳa, T. Choroby reumatyczne jako zagadnienie ekonomicznospoĳeczne. (Rheumatism as a socio-economic problem.) Zdrow. publ. 11-12:739-741, 1966.

Rheumatism is discussed as a social and economic problem in the light of a study of the disease carried out over a period of 10 years at a rheumatism dispensary. In evaluating the results of the survey, the following were the main criteria selected: frequency of illness, sickness absenteeism, disablement and the possibility of medical rehabilitation.

439. Dorgov, A. Neke epidemiološke i socialno-medicinske karakteristike influence u Skopju i Makedoniji. (Some data on the epidemiology and medico-social consequences of the influenza epidemic at Skopje (Macedonia)). Narod. Zdrav. 6-7:197-200, 1968.

Statistics on influenza morbidity and mortality in the epidemic at Skopje in the Republic of Macedonia (Yugoslavia) in 1965 are quoted. Expenditure on sickness benefit for the 2.5% to 5% of industrial workers temporarily absent due to influenza was higher than the cost of immunization of the entire population of the city. These data once again confirm the economic value of expenditure on prevention. There is a bibliography with 21 titles.

441. Gorohover, I.A., Metodika opredelenija ekonomičeskoj effektivnosti sniženija zaboлеваemosti i travmatizma na otdel'nom promjušlennom predprijatii. (Methods of estimating the economic effects of reducing illness and injury in an industrial undertaking.) Zdravoohr. RSFSR 2:21-25, 1968.

An economic evaluation was made on the effects of reducing morbidity and injuries among workers and employees in two undertakings. It is proposed that the following formula be used to describe the general situation as regards temporary sickness absenteeism:  $N = P \times 100 / (O + P)$  where N = working capacity (as percentage); P = loss of working time due to sickness (in man-days); O = number of man-days worked in a year. In order to determine how a reduction in morbidity effects a saving in working time, it is necessary to compare the consolidated morbidity indices for separate years to work out the time saved, that is, the additional number of working days obtained and the proportion they constitute of the total time worked. For this, the following formula is proposed:  $S = (Itg - Ipg \times R \times 100) / 100 \times O = (Itg - Ipg \times R) / O$ . Where S = time saved; Itg = consolidated morbidity index per 100 staff working in current year (in days); Ipg = consolidated morbidity index per 100 staff working previous year; R = the average annual number of staff working in the undertaking; O = the number of man-days worked by them in a year. With these data available, it is possible to determine the additional production obtained by undertakings for two years as a result of the reduction in morbidity. Calculations are shown which allow the total saving in resources from reduced cost of

production and reduced expenditure on sick benefits to be determined. A summary table is given of the economic effect of the reduction in temporary sickness absenteeism for the two industrial undertakings.

442. Häublein, H.C., Einige Probleme der Epidemiologie des Arbeitsunfalls. (Some epidemiological problems relating to industrial injuries.) Z. ges. Hyg. 3:205-214, 1967.

As a rule, present methods of recording accidents for statistical purposes are incomplete and to some extent give an inaccurate picture of the situation. A selection of some of these methods is given. The economic aspect of industrial injuries is reviewed in detail. Average losses due to them amounted to 7 to 7.5 million working days per year for the country as a whole. While, in recent years, industrial injuries have shown a tendency to decline in number, working time lost not only has not diminished, but has even shown a tendency to increase. Methods for the epidemiological investigation of accidents and of recording their frequency and consequences are given in detail. The article contains a large number of tables and diagrams and there is a bibliography with 39 titles.

443. Husar, T. & Todor, A., Issledovanie ekonomičeskikh posledstvij hroničeskoj bolezni dlja gosudarstva i sem'i. (A study of the economic consequences of chronic disease for State and family.) Zdravoohr. (Bucharest) 2:195-206, 1969.

The authors give detailed methods for analyzing the cost of chronic diseases in Romania. Ulcers, one of the most widespread, are taken as an example and it is shown that they involve heavy expenditure both for the State and the patient's family. The authors drew up a detailed questionnaire for collecting administrative, medical, social and economic information. Some of this information was obtained by questioning patients and some from case histories. In a group of 50 patients examined, the overall expenses for a year amounted to 8799 lei per patient, some two-thirds of the amount being met by the State. The State expenditure (5377 lei per patient per year) was made up as follows: sickness benefit - 39.4%, economic loss through absence from work - 30.3%, expenditure on hospital care - 21.8%. Expenditure by the patient's family (3422 lei per patient per year) was as follows: additional expenditure on food and dieting - 38.2%, reduction in family budget due to sickness absenteeism - 17.3%, and reduction due to transfer to other work - 9.8%.

444. Indul'ski, J., Udział grupy drugo i często chorujących w krztałtowaniu ogólnych wskaźników absencji chorobowej. (The effect of chronic and relapsing cases on overall statistics of sickness absenteeism.) Zdrow. publ. 10: 563-578, 1966.

The author proposes special observation of the group of chronic and relapsing cases as it has been established that as a group, these cases have a very big effect on expenditure arising from temporary sickness absenteeism. A number of tables are reproduced.

445. Indul'ski, J., Faktory, vlijajušćie na vremennuju utratu trudosposobnosti u ženšćin. (Factors affecting temporary loss of working capacity in women.) Zdravoohr. (Bucharest) 1:23-34, 1968.

The author makes a critical review of the literature on factors influencing temporary absenteeism among women. A survey conducted by him in a large textile factory at Lodz confirms the conclusion reached by other authors that there is a higher rate of temporary sickness absenteeism among women than among men, and among married as compared with unmarried women and also that the figures rise the more children there are in the family. The author has also studied the connexion between the frequency and length of sickness absenteeism and home circumstances and income. Interesting figures are given, showing that with an improvement in living conditions, in average wages and in wages per member of the family, the number of cases and total days of sickness absenteeism are reduced (there is a bibliography with 49 titles.)

446. Indul'ski, J., Nofer, E. & Romejko, A., Analiz častoty vremennoj netrudosposobnosti po bolezni v promyšlennosti. (An analysis of the frequency of temporary sickness absenteeism in industry.) Zdravoohr. (Bucharest) 3: 305-312, 1968.

A two-year study of the length of temporary sickness absenteeism in groups of long-term cases (above 40 days in the year) and short-term cases (less than 40 days in the year) in a large textile factory (with over 3000 workers) leads the authors to the following conclusions: a reduction in loss due to temporary sickness absenteeism should be sought in a more rational and objective assessment of the length of absence required in each case and, to a less extent, in trying to reduce the number of sickness certificates issued.

448. Mihejlescu, P., Finansovye pokazateli dlja ustanovlenija bjudžeta protivotuberkuleznyh meroprijatij. (Budgeting for a tuberculosis campaign.) Zdravoohr. (Bucharest) 4:361-366, 1967.

A study was made of the economic effectiveness of different forms of tuberculosis control among the urban and rural population of Romania. A survey was made in one of the larger districts of Bucharest (N. Belcosku) with a population of 220 000. It was shown that the measures taken against tuberculosis in the district in question involved an expenditure of 3.5 million lei per 100 000 population. The cost of in-patient treatment amounted to 56.5% of this sum and of out-patient care 32.8%, and of preventive measures 10.7%. It was

shown that early detection of the disease enabled effective out-patient treatment to be given at a fourth to a fifth of the in-patient cost.

450. Perebatova, M.A. & Malamud, M.I., Opyt opredelenija ekonomičeskikh poter' pri angine, hroničeskom tonzillite i ostrom katare verhnih dyhatel'nyh putej. (Estimating economic loss from tonsillitis, chronic tonsillitis and acute catarrh of the upper respiratory tract.) Sovetsk. Zdravoohr. 6:26, 1969.

The above diseases constitute an important factor among the causes of sickness absenteeism in industrial undertakings. The trend in these diseases was studied over a period of 10 years among workers in the main branches of industry in the Ukrainian SSR, taking as an example a pilot factory manufacturing automats at Kiev. For processing the data, 45-column punch cards were used, the borders of which were punched in dual series. In estimating the economic losses, the average daily output of each male and each female worker of the industrially productive staff was established. The amount paid out in social insurance and expenditure on medical care for the above diseases was also taken into account. The total expenditure at the factory for these diseases in 1967 amounted to 53 684 roubles. The authors show that this amount still does not fully reflect the economic loss, as it does not take into account time lost by members of the patients' families in looking after them, losses due to non-fulfillment of output norms in the first days after return to work, or expenditure on the maintenance of social security equipment and so on. The data obtained confirm the need for comprehensive preventive measures in industrial organizations to control the above diseases. Extensive figures and diagrams are used to illustrate the article.

451. Polánský, F., Dymel, O. & Hubáčková, F., Co stoi boj proti tuberkulóze? (What is the cost of tuberculosis control?) Čs. Zdrav. 10:543-549, 1968.

The cost of tuberculosis control is reviewed in the light of a survey conducted in a central region of Czechoslovakia. It was established that direct expenditure in this field amounted to 167 million crowns, one-fifth of it on out-patient care and four-fifths on in-patient care. The average expenditure on tuberculosis treatment amounted to 26.37 crowns per inhabitant, 5 crowns on out-patient treatment and 8.54 crowns on hospital tuberculosis departments and 12.83 crowns on tuberculosis sanatoria. Comparing the breakdown of expenditure, it can be seen that the amount spent on hospital is almost twice that on out-patient care. Current expenditure on in-patient care is almost six times as high as for out-patient care, one-third of it being spent on food. Tuberculosis control preparations in out-patient and in-patient

services amount to approximately four-tenths and one-tenth of general expenditure respectively. A number of tables are given concerning the above figures.

452. Šefer, L.B., K metodike isčislenija ekonomičeskogo učerba, nanosimogo tuberkulezom i drugimi zbolevanijami. (Methods of calculating economic loss caused by tuberculosis and other diseases.) Sovetsk. Zdravoohr. 6:33-38, 1969.

A number of foreign authors are criticized for their methods of calculating economic loss from disease. It is emphasized that in a socialist society, the funds spent on invalid pensions and sickness benefits could be used for other needs and therefore, it is essential to include them in the overall losses caused by disease. The author also considers that that part of the national income which could have been produced by the totally disabled or those who have died early (since, as distinct from wages, the national income includes both the essential and the surplus product), should be regarded as labour losses, and not the wages or income which could have been earned by the patient. This method of calculating economic loss due to tuberculosis morbidity, as used in the Kazak SSR, is set forth in detail. Data provided by the trade unions of the Republic on the number of days' absenteeism through tuberculosis per 100 workers were utilized. The number of days loss of working capacity was then converted into man-years by dividing the man-days lost into the number of working days in the year in question. To express these losses in monetary terms, the national income production per person per year was calculated and the amount was multiplied by the number of man-years absenteeism due to the disease. Expenditure on sickness benefit was estimated as 70% to 75% of the average earnings and was calculated directly on trade union data and also multiplied by the number of man-years incapacity. The economic losses due to tuberculosis were then established, taking into account the number of patient continuing to contribute to national production. The lower limit of the working age was conventionally taken as 20 years (after full completion of secondary education) and the upper, for men 60 years, and women 55 years. In estimating, the average age of those dying in each 10-year period was determined. In estimating the economic losses, it was assumed that the majority of the fit population of the Republic was working (on an average not less than 75%), the proportion of those working increasing each year. Annual consumption per person was then calculated, including social as well as individual consumption and expenditure on all aspects of curative and preventive care for tuberculosis patients. The table given shows that the proportion of labour losses due to tuberculosis considerably exceeds the proportion lost on treatment and prevention and payment of benefits. Hence, the further reduction of invalidity and morbidity from tuberculosis must bring undoubted economic advantages to the community. The author considers that the method described by him can be used for calculating

economic loss due to any disease and stresses that health economics should not be counterposed to medical ethics. There is a bibliography of 16 titles.

453. Strnad, L. & Kebort, J., Náklady na léčení u vybraných onemocnění léčených na interním a chirurgickém oddělení fakultní nemocnice. (The cost of treatment of certain diseases in hospital medical and surgical departments in Czechoslovakia.) Čs. Zdrav. 6:242-248, 1969.

An attempt is made to analyze expenditure on the treatment of different diseases and disease groups and to show how the results of such research can be used in analyzing the hospital service economy. The method of study and its results are described. The authors have established expenditure on the treatment of 24 kinds of disease in the medical and surgical departments of a teaching hospital. Besides overall expenditure, its breakdown was established. In the medical department, for instance, expenditure on diagnostic and related investigations was three times higher than in the surgical department. The cost of treating diseases requiring repeated blood transfusions and the use of hormonal preparations was equally high. The authors make a number of specific recommendations for reducing expenditure on treatment.

454. Teutsch, W., Appendizitisstatistik 1964. (Appendicitis statistics for 1964.) Dtsch. Gesundh.-Wes. 41:1853-1855, 1965.

The findings are given of a study on appendicitis statistics for 1964 at the Kotbus Surgical Clinic. The following questions were examined: (1) diagnostic problems, (2) severity of the course of the disease, (3) case fatality and hospital stay, (4) period of incapacity for work, (5) economic loss as a result of appendicitis. The findings of the study showed that the cost of one appendicitis case (without complications) amounts on an average to 3600 marks and the cost of a perforated appendicitis, 6620 marks.

455. Vasilev, V., Izvodi za smārtnostta u nas meždu periodite 1947-1950 i 1962-1965 ot njakoi hronični zaboljavanija na vāzrastnoto gradsko naselenie. (Mortality in Bulgaria from certain chronic disease in the adult urban population from 1947 to 1950 and 1962 to 1965.) Hig. Zdraveop. (Sofija) 3:207,217, 1969.

The proportion of deaths from cardiovascular diseases in Bulgaria and 22 other capitalist and socialist countries are compared. The lowest figure is that for Bulgaria, 26%. In the periods 1947 to 1950 and 1962 to 1965, the mortality rate for cardiovascular diseases and several other chronic diseases fell to 23.7%; these were mainly persons in the active working age-group. The author draws the conclusion that the data reflect an improvement in living conditions and the highly efficient health measures carried out.

457. Welcker, E.R., Arzt, Appendizitis und Okonomie. (The doctor, appendicitis and economics.) Dtsch. Gesundh.-Wes. 18:824-826, 1966.

The widespread idea that acute appendicitis is not dangerous in the first 48 hours is rejected. The economic aspect of the problem is discussed. Statistical and economic data are given on appendicitis in the German Democratic Republic for a period of five years (1958 to 1962): the number of days' sickness absenteeism, the cost of hospital care, expenditure on social insurance and so on (overall expenditure for one case of a perforated appendicitis amounts to 6065 marks and for a case without complications, 3000 marks.)

501. McDermott, W., Environmental Factors Bearing on Medical Education in the Developing Countries. A. Modern Medicine and the Demographic--Disease Pattern of Overly Traditional Societies--A Technologic Misfit. Journal of Medical Education 41: Supplement 137-162, September, 1966.

In developing societies with high birth rates and a large proportion of young children, these children are particularly vulnerable to disease and death, a situation reinforcing high fertility. In such societies, it may be that the reduction of infant and child mortality must precede fertility reduction.

502. Alers, J. Oscar, Population and Development in a Peruvian Community. Journal of Inter-American Studies 7:423-448, October, 1965.

A discussion of a case study of the interaction of population and economic development in a Highland Indian community. Topics include population growth and density, age and sex composition, mobility and migration, and education and economy.

503. Fletcher, T.W. and Sinha, R.P., Population Growth in a Developing Economy. Journal of Development Studies 2:2-18, October, 1965.

The author attempts to identify those factors in countries undergoing economic development which are associated with rising birth rates: 1) in 18th century England; 2) in Japan and other developed countries; and 3) in India and other developing countries. He concludes that there is no simple relationship between economic theory and population growth.

504. Krishnamurty, K., Economic Development and Population Growth in Low Income Countries: An Empirical Study for India. Economic Development and Cultural Change 15: 70-75, October, 1966.

An attempt to estimate the impact of economic development on birth and death rates in India for the period 1922-1960. The tentative conclusion is that both birth and death rates are negatively related to economic development, with the death rate having a stronger relationship at the present stage of development. It is suggested that these results need to be confirmed, especially with regard to the negative influence of economic development on the birth rate.

505. Hirschman, A.O., The Strategy of Economic Development. New Haven: Yale University Press, 1958.

A systematic presentation of a strategy for economic development stressing the human and organizational factors in such development. Population pressure is seen as a force for development.

507. Carney, David, The Economics of Health in Conditions of Low Population Growth: The Example of Sierra Leone. International Social Science Journal 17:277-283, No. 2, 1965.

A summary of the findings of a study of health expenditures in Sierra Leone. The conclusion was that, although investment in health is more expensive than investment in education or directly in production, it is a pre-requisite to profitable investment in either.

508. Boserup, Ester, The Conditions of Agricultural Growth: The Economics of Agrarian Changes Under Population Pressure. Chicago: Aldine, 1966.

Sustained population growth in an agricultural region is likely to result in profound changes in the lives of the people. As land is more intensively used, the amount of investment in land improvement required to achieve each additional unit of output increases, i.e., there are diminishing returns to labor. The changes accompanying more intensive land utilization frequently have feed-back effects upon fertility and mortality.

509. Hauser, Philip M., Population and Labor Force Resources as Factors in Economic Development. In: Science, Technology, and Development. Vol. XI: Human Resources, pp. 8-19, Washington, D.C.: Government Printing Office, 1962.

A discussion of population in relation to labor force and economic development. There are four aspects of population which are operating to slow the development process: 1) high rates of population growth; 2) a high youth dependency ratio; 3) unbalanced spatial distribution; and 4) untrained and inefficient labor force.

510. Easterlin, Richard A., Effects of Population Growth on the Economic Development of Developing Countries. Annals of the American Academy 369:98-108, January, 1967.

A summary of the then existing knowledge about the relationship between population growth and economic development. The author concludes that no generalization is possible.

511. Beckman, M., Income Growth and Population Growth: Or the Race is not Always to the Swift. European Economic Review (Brussels) 1 (4):546-552, Summer, 1970.

Discussion of a model in which population is a direct function of the growth of output.

512. Coale, Ansley J., Population and Economic Development. In: The Population Dilemma, Philip M. Hauser, editor. New York: The American Assembly, Columbia University, 1963.

An illustration of population growth and the dependency burden under different fertility assumptions.

513. Coale, A.J. and Hoover, E.M., Population Growth and Economic Development in Low-Income Countries: A Case Study of India's Prospects. Princeton, N.J.: Princeton University Press, 1958.  
A now classic discussion of the relationship between population growth and economic change. Although population increase may permit returns to scale, in the absence of increases in effective demand, rapid population growth tends to diminish capital available for increasing productivity. When mortality declines in high fertility areas, more children survive to work, but they in turn bear an even heavier dependency burden.
517. Czeizel, Endre, et al, The Effect of Influenza Epidemics on the Number of Live Births. Demografia (Budapest) 11:231-239, 1968. (In Hungarian)  
1,000 monthly cases of influenza led to a significant decrease in the monthly number of live births.
524. Bierman, J.M., Siegel, E., French, F.E., et al, Analysis of the Outcome of All Pregnancies in a Community. Kauai Pregnancy Study. American Journal of Obstetrics and Gynecology 91:37-45, 1 January 1965.  
Of 1,311 pregnancies of 4 weeks, 76 percent resulted in live births. Of these, 865 produced two-year-olds without recognizable abnormalities. Ten percent of the surviving infants had perinatal handicaps; another 10 percent had minor handicaps.
525. Henry, Louis, Some Data on Natural Fertility. Eugenics Quarterly 8, 1961.  
Comparative data on children ever born in non-contracepting societies are presented.
532. McKeown, T., Medicine and World Population. Journal of Chronic Diseases 18:1067-1077, November, 1965.  
Discusses the two-fold task of interpreting population growth: 1) to assess the relative roles of fertility and mortality in that growth, and 2) to account for major shifts in vital rates.
533. Newman, Peter, Malaria Control and Population Growth. Journal of Development Studies 6(2):133-158, January, 1970.  
Report of a method of estimating the effects of malaria control on births and deaths, comparing the results obtained by the application of this model to Ceylon with those obtained by an earlier method developed by the author. The author reviews methods proposed by others, focusing upon the problems of measuring both direct and indirect demographic effects of malaria control.

534. Hedberg, E., Holmdahl, K. and Pehrson, S., On the Relationship Between Maternal Health and Congenital Malformations. Acta Obstetricia et Gynecologica Scandinavica (Stockholm) 46:378-391, 1967.

Report of a study of the relationship between maternal health and fetal defects, including the effects of maternal age, previous abortion and/or malformed infants, and the incidence of prematurity, perinatal mortality and morbidity.

536. Davis, Kingsley and Blake, Judith, Social Structure and Fertility: An Analytic Framework. Economic Development and Cultural Change 4(3):211-235, April, 1956.

The analytical framework developed in this article has become the paradigm for research into differential human fertility. Fertility determinants are organized with respect to the critical stages in the reproductive process, being evaluated in terms of their effects upon the probabilities of coitus, of conception, of alternative pregnancy outcomes, and of infant and child survival.

537. Tarrarah, Riad B., Toward a Theory of Demographic Development. Economic Development and Cultural Change 19:257-276, 1971.

The difference between the maximum family size expected by couples and their desired family size is hypothesized as the critical determinant of fertility in the developing countries. Its probable course under economic development leads to a concept of three stages during the transition from pre-industrial to modern demographic patterns: 1) rising fertility when expected is less than desired family size; 2) constant fertility when expected is equal to desired family size; and 3) declining fertility when expected (in the absence of behavioral change) exceeds desired family size.

538. Simon, Julian L., The Per-Capita-Income Criteria and Natality Policies in Poor Countries. Demography 7:369-378, August, 1970.

Suggests that the per-capita-income criterion is meaningful only within a limited context, and should be employed with an explicit statement of the time period for which the criterion is appropriate.

541. Bryant, John, Health and the Developing World. Ithaca, N.Y.: Cornell University Press, 1969.

Noteworthy analysis and discussion of health as an investment and of the difficulties in providing adequate nationwide health care. Examples are drawn from Latin America, Africa, and Southeast Asia.

543. Myrdal, Gunnar, Asian Drama: An Inquiry into the Poverty of Nations. New York: Pantheon, 1968.

An exhaustive investigation into the problems of economic development in Asia, and a critique of theories and models which isolate economic variables from their social and institutional matrix. Discussion of the place of health in the development process and of the concept of investment in human capital constitute major portions of this work. The author calls for investigation into the incidence and effects of debility, especially in children, the effects of deficiencies on the amount and efficiency of labor, and the social changes needed to make health investments pay off in terms of economic development.

546. Rahimtoola, R.J., Mir, S. and Balock, S., Low Birth Weight, The "Small-for Dates" Syndrome and Perinatal Mortality in a Low Family Income Group. Acta Paediatrica Scandinavica 57:534-536, November, 1968.

Report of a study to evaluate the relative importance of family income and pre- and post-natal care on prematurity and neonatal complications in Karachi, West Pakistan. The quality of care was found to be more significant than family income.

549. Morley, David, A Medical Service for Children Under Five Years of Age in West Africa. Transactions of the Royal Society of Tropical Medicine and Hygiene 57: 79-88, 1963.

Illustrates the potential reduction in mortality rates of children under five, using limited resources of personnel.

550. Scrimshaw, Nevin S., Guzman, Miguel A., Flores, Marina and Gordon, John E., Nutrition and Infection Field Study in Guatemalan Villages, 1959-64. V. Disease Incidence among Pre-School Children under Natural Village Conditions, with Improved Diet with Medical and Public Health Services. Archives of Environmental Health 16:223-234, 1968.

Report of a study in three Guatemalan villages: control, "feeding," and "treatment." Disease incidence was found to be lowest in the "feeding" village. Despite these results, the experiment ended after five years because of decreasing family participation.

552. United Nations. The Mysore Population Study. New York: The United Nations, 1962.

Only 66 percent of children ever born were still alive at age 2, this underreports those failing to survive. Furthermore, the average number considered "ideal" was close to average number surviving.

554. Hendrickse, J.P. and Watson-Williams, E.J., The Influences of Hemoglobin-Opathies on Reproduction. American Journal of Obstetrics and Gynecology 94: 739-748, 1 March 1966.

Few women with these disorders survive to reproductive age. For those who do, fertility is lower and fetal wastage is higher, as are prematurity, perinatal and maternal mortality.

555. Kay, A. and Bach, F., Subfertility Before and After the Development of Rheumatoid Arthritis in Women. Annals of Rheumatic Disease 24:169-173, March, 1965.

Fertility is found to be lower before and after onset of disease. Moreover, menopause is shown to occur earlier in those who ultimately get disease.

559. Pearson, H.A. and Vaughn, E.O., Lack of Influence of Sickle Cell Trait on Fertility and Successful Pregnancy. American Journal of Obstetrics and Gynecology 105:203-205, 15 September 1969.

In the United States, sickle cell trait was found to be without significant effect on fertility or abortion.

561. Hoover, M. and Perlman, M., Measuring the Effects of Population Control on Economic Development: A Case Study of Pakistan. Pakistan Development Review 6: 545-566, Winter, 1966.

The effects of variations in the rate of population growth upon economic development are considered.

562. Gray, H. Peter, A Simple Graphical Model of the Interaction Between Rates of Population Growth, Capital Formation, and Per Capita Income Growth. In: Economic Development and Population Growth. A Conflict? II. Peter Gray and Shanti S. Tangri, editors. Lexington, Massachusetts: D.C. Heath and Co., 1970.

Discussion of the effect of population growth upon capital accumulation through changes in: 1) dependency burden, 2) rate of savings, and 3) capital-output ratio mix. The percent for human capital is likely to be significantly higher than that for capital goods because of long time lags, higher input wastage and high percentage of inputs to production of human capital, and increases with population growth.

563. Enke, S. and Zind, R.G., Effect of Fewer Births on Average Income. Journal of Biosocial Science 1:41-55, January, 1969.

Discussion of a model of the relationship between demographic and economic processes, illustrating the significance for economic development, under the assumptions of the model, of gradually declining birth rates.

564. Glick, Paul C. and Parke, R., Jr., New Approaches in Studying the Life Cycle of the Family. Demography 2: 187-202, 1965.

A revision of estimates of trends in the family life cycle in the U.S. during the 20th century, with a discussion of typical patterns of change in family composition and economic characteristics. The author also presents alternative methods of describing life cycle progression.

565. Schnaiberg, Allan, The Modernizing Impact of Urbanization: A Causal Analysis. Economic Development and Cultural Change 20:81-104, 1971.

The role of urban residence in development of "modern" attitudes and behavior is shown to be that of providing a locus of access to the causal factors of education and economic opportunity. The complete model includes early socialization factors (birthplace, residence before age 10), and late socialization factors (residence after marriage, current residence) plus socioeconomic attainment (male, female education, family income). Measures of dependent variable of "modernism": mass media exposure, importance of extended family ties, nuclear family roles, religiosity, environmental orientation, and production/consumption locus. Female education is most important in determining future socioeconomic attainment, which in turn is related to mass media, nuclear family role, and religiosity variables. Current residence is related to production/consumption locus. Extended family size and environmental orientation are unclear. A unitary theory of modernism is not supported.

566. Leibenstein, Harvey, Economic Backwardness and Economic Growth. New York: John Wiley and Sons, 1957.

An economic theory of population growth is stated within a framework of economic growth. Desired family size is explained in terms of child as a consumption good, child's productivity, and child's potential productivity in parental old age. These desires change in development due to income effects, survival effects, and occupational distribution effects upon costs and utility of an additional child. A threshold effect ("minimum critical effort") for a country to break out of a "low level equilibrium" is postulated.

570. Caldwell, J.C., Fertility Attitudes in Three Economically Contrasting Rural Regions of Ghana. Economic Development and Cultural Change 15:217-238, January, 1967.

Desired family sizes are very high (9-18). The author suggests that these are rational in a subsistence economy, where educational opportunities are not widely available, and argues that fertility norms are likely to decrease as education and a cash economy become more widespread.

571. Iutaka, S., Bock, E.W., and Varner, W.G., Factors Affecting Fertility of Natives and Migrants in Urban Brazil. Population Studies 25:55-62, March, 1971.

Report of a study of the relationship between migration and fertility, with particular attention to the effects of migration upon the fertility patterns in the urban areas of destination.

572. Heer, D.M. and Smith, D.O., Mortality Level, Desired Family Size and Population Increase. Demography 5: 104-121, 1968.

The effect of variance upon desired family size when mortality is high is to maintain large family norms.

573. Goldberg, David and Litton, Greer, Family Planning: Observations and an Interpretive Scheme. In: Turkish Demography: Proceedings of a Conference. Hacettepe University. Publication No. 7.

Low fertility expectations and family planning behavior are closely linked to individual "modernism" in Turkey.

574. Spontaneous and Induced Abortion: Report of a WHO Scientific Group. Technical Report Series No. 461. Geneva: World Health Organization, 1970.

Review of epidemiology of abortion and its consequences for maternal health.

575. Long, L.H., The Fertility of Migrants to and within North America. Milbank Memorial Fund Quarterly 48: 297-316, No. 3, July, 1970.

Comparison of the fertility of migrants within and between Canada and the United States. Migrant status is based on place of birth and place of current residence.

576. World Health Organization, Special Subject: Infant Mortality. World Health Statistics Report 23:777-837, 1970.

Summary report of recent levels and trends in infant mortality in 37 countries and territories.

578. Harman, Alvin J., Fertility and Economic Behavior of Families in the Philippines. RM-6385-AID. Santa Monica: Rand Corporation, 1970.  
Model of family formation and economic activity: marital status, fertility, labor force participation, income, and migration.
579. Nerlove, Marc and Schultz, T. Paul, Love and Life Between the Censuses: A Model of Family Decision-Making in Puerto Rico, 1950-1960. RM-6322-AID. Santa Monica: Rand Corporation, 1970.  
Presents a fertility model relating family formation behavior to economic change. Mortality rates, rate of employment by industry, educational levels, and unemployment rates are exogenous; fertility is jointly determined with female labor force participation, migration, income, marital status, and type of union.
580. Health Aspects of Family Planning: Report of a WHO Scientific Group. Technical Report Series No. 442. Geneva: World Health Organization, 1970.  
A review of family planning activities and their relation to activities in the health sector including direct effects upon health of methods of control, the administration of family planning programs, the use of health personnel in these programs, and the loci of these programs. Evaluation is stressed.
581. Meredith, H.V., Body Weight at Birth of Viable Human Infants: A Worldwide Comparative Treatise. Human Biology 42:217-264, May, 1970.  
Systematic presentation of data from a wide variety of studies made in different parts of the world between 1945 and 1965.
583. Schultz, T. Paul, Population Growth and Internal Migration in Columbia. RM-5765-RC/AID. Santa Monica: Rand Corporation, 1969.  
A report in two major sections: the first dealing with fertility determinants, the second with internal migration in Columbia. Fertility is found to be negatively associated with female labor force participation and with levels of education for both adults and children, but not with rural or urban residence, agricultural activity, growth of wages, and duration of residence in the community.
584. Schultz, T. Paul, Population Growth: Investigation of a Hypothesis. P-4056-1. Santa Monica: Rand Corporation, 1969.  
A model of differential fertility and family size goals, with empirical evaluation of portions of the model employing data from Columbia, Puerto Rico, and Taiwan.

586. May, D.A. and Heer, D.M., Son Survivorship Motivation and Family Size in India: A Computer Simulation. Population Studies 22:199-210, July, 1968.

Simulation to determine to what extent the desire for one or more surviving sons would require large family sizes in India.

587. Potter, R.G., Sakoda, J.M. and Feinberg, W.E., Variable Fecundability and the Timing of Births. Eugenics Quarterly 15:155-163, September, 1968.

Using a model developed from the data of the Princeton Fertility Study, the authors seek to trace the family-building experience of a population with the model fecundability function if each couple were seeking a specified family size and spacing goal.

588. Whitehead, Laurence, Attitude, Fertility and Mortality in Andean Countries. Population Studies 22:335-346, November, 1968.

A critique of the hypothesis that decreased fertility is dependent upon a recognition of decreased infant mortality.

589. Adams, M.S., MacClean, C.J. and Niswander, J.D., Discrimination between Deviant and Ordinary Low Birth Weight - American Indian Infants. Growth 32:153-161, June, 1968.

Presents a method of differentiating premature and small-for-date infants in a population, illustrating with data from several American Indian tribes.

591. Tien, H. Yuan, The Intermediate Variables, Social Structure, and Fertility Change: A Critique. Demography 5:138-157, 1968.

A critique of the Davis and Blake paradigm for fertility analysis. The paper suggests that the fertility change may be hastened not only through institutional change, but also through change in the important demographic, technological, and information variables.

592. Immerwahr, George E., Survivorship of Sons under Conditions of Improving Mortality. Demography 4:710-720, 1967.

An examination, based on the United Nations Model Life Tables, of the probabilities that a father will be survived by at least one, two, or three sons. The author finds that, in most cases, the probability that a two-year-old son will survive his father is at least 80 percent.

593. Heer, D.M. and Smith, D.O., Mortality Level and Decreased Family Size. In: International Union for the Scientific Study of Population. Session 2. Demographic Transition Reexamined. Sydney: Australian National University Press, 1967.  
A discussion of the hypothesis that decreased family size is dependent upon increased child survival.
594. Schultz, T. Paul, A Family Planning Hypothesis: Some Empirical Evidence from Puerto Rico. RM-5405-RC/AID. Santa Monica: Rand Corporation, December, 1967.  
Presentation of a hypothesis that the average fertility of a society is a function of desired family size, expectations concerning child survival, and the degree of uncertainty in the family formation process. Some implications of this hypothesis are tested using Puerto Rican data.
596. Pakrasi, K. and Malaker, C., The Relationship Between Family Type and Fertility. Milbank Memorial Fund Quarterly 45:451-460, No. 4, October, 1967.  
A report of the findings from a study of the number of children ever born by marriage duration among 1,018 couples from Calcutta, representing three occupational groupings (professional and executive, white collar, blue collar) and two family types (nuclear and non-nuclear).
597. Buck, C. and Stavraký, K., The Relationship Between Age at Menarche and Age at Marriage among Childbearing Women. Human Biology 39:93-102, May, 1967.  
Report of a study of the relationship among age at menarche, age of marriage, and age at birth from the records of 51,490 women giving birth in the 10 teaching hospitals of Ontario Province, Canada, in 1960 and 1961.
599. Demeny, Paul, Investment Allocation and Population Control. Demography 2:203-232, 1965.  
An attempt to clarify some issues concerning investment to induce population change, either directly or indirectly. A model is presented showing the growth of per capita income under various assumptions concerning demographic and economic characteristics, and particularly under various assumptions about the magnitude of investment required to induce a given change in age structure and rate of population growth. The time pattern of different income flows generated by alternative investment policies are illustrated.

600. Kuznets, Simon, Economic Growth and Structure: Selected Essays. New York: W.W. Norton and Co., 1965.

A collection of essays on economic development and industrialization, including the essay entitled "Population Change and Aggregate Output" in which Kuznets hypothesizes that additions to knowledge will be more likely in a relatively large population, since these populations will have an absolutely larger stock of highly gifted individuals.

601. Hoover, Edgar M., Basic Approaches to the Study of Demographic Aspects of Economic Development: Economic-Demographic Models. Population Index 37:66-75, 1971.

Survey and evaluation of the main types of existing economic-demographic models, and a discussion of their applicability in the less developed countries. The relationships considered include: (1) population and labor input, (2) population and the supply of savings, (3) population growth, capital requirements, and the productivity of investment, (4) population growth and the adequacy of demand, (5) population size and scale economies, (6) population mobility and economic progress, (7) income and mortality, (8) income and fertility, (9) income and productivity, (10) income and labor-force participation, (11) economic conditions and migration, (12) evaluation of the costs and benefits of population control. The author concludes that the relatively primitive state of the art is probably due to the failure of economists and the demographers to be aware of what the other discipline has to contribute.

602. Weller, Robert H. and Macisco, John J., Jr., Fertility, Migration and Aspirations for Social Mobility in the Developing Countries: Suggestions for Research. Demografia y Economia (Mexico, D.F.) 5:56-76, 1971. (In Spanish)

Research should be directed toward clarifying the complex relationships among migration, fertility, urbanization, and individual modernization in Latin America.

603. Spengler, J.J., Values and Fertility Analysis. Demography 3:109-130, 1966.

A consideration the potential contribution of the analysis of values to fertility analysis and to the analysis of demographic behavior. The author discusses values, goals, and preferences and their relationship to price and income.

604. Potter, R.G., Jr., New, M.L., Wyon, J.B., et al, A Fertility Differential in Eleven Punjab Villages. Milbank Memorial Fund Quarterly 43:185-201, No. 1, Part 2, April, 1965.

Fertility differentials between members of two castes are found to be related to age at cohabitation, temporary separations, use of contraceptives, incidence of subfecundity, fetal wastage, and stillbirth. (See also references 623 and 653.)

608. Hauser, P.M., Population--More than Family Planning. Journal of Medical Education 44: Supplement 2:20-29, November, 1969.

Suggesting that contraception is not enough, Hauser stresses the importance of fertility control (abortions, family size norms, disincentives for childbearing) and of population control (balancing of births and deaths, and migration control) in slowing population growth.

611. Malaria and the Population Explosion. Lancet 1:899-900, 27 April 1968.

Editorial review of the two sides of the question whether malaria eradication in developing countries has contributed to a population explosion through rapidly falling mortality rates. (See also references 11, 223, 242, 243, 281, 283, 657, 658, and 659.)

620. Coale, A.J. and Tye, C., The Significance of Age-Patterns of Fertility in High Fertility Populations. Milbank Memorial Fund Quarterly 39:631-646, October, 1961.

Discusses the significance of age of marriage and of childbearing, especially in a population of high fertility, and examines the birthrate under hypothetical age patterns of fertility in certain areas of the world (Singapore, Hutterite community and Cocos Islands).

623. Potter, R.G., New, M.L., Wyon, J.B. and Gordon, J.E., Applications of Field Studies to Research on the Physiology of Human Reproduction. Lactation and its Effect upon Birth Intervals in Eleven Punjab Villages, India. Journal of Chronic Diseases 18:1125-1140, November, 1965.

Presents results from the Harvard-Ludhiana Population Study (Khanna) the field work for which took place in 11 villages of the Punjab (India) from 1953 to 1959. The study sought to decompose birth intervals into periods of gestation, postpartum amenorrhea, and menstruating interval. Use of a life table analysis of the probability of still being amenorrheic after a given interval was developed. Lactation was found to increase the duration of postpartum amenorrhea substantially. (See also references 604 and 653.)

626. Newcombe, H.B. and Rhynas, P.O., Child-Spacing Following Stillbirth and Infant Deaths. Eugenics Quarterly 9:25-35, March, 1962.

Reproductive compensation is apparent in the first year following stillbirth but is genetically ineffective. Stillbirth rates are lower over the first year after a live birth than would be expected. The risk of stillbirths is increased (about five fold) by previous stillbirth.

627. Marshall, C.L. and Paul, C.L., Reduced Population Growth as Related to the Urbanization Process--Medelin, Columbia. Clinical Pediatrics (Philadelphia) 9:736-741, December, 1970.

Migration patterns in urban areas are studied to identify variables which may be acting as checks to population growth.

632. Cravioto, J., Liscardie, E.R., Montiel R., et al, Motor and Adaptive Development of Premature Infants from a Preindustrial Setting during the First Year of Life. Biology of the Neonate 11:151-158, 1967.

Gesell schedules are used to examine both motor and adaptive development in premature infants in Guatemala City. Lags are demonstrated in development of both capacities.

633. Fish, M. and Thompson, A.A., The Determinants of Fertility: A Theoretical Forecasting Model. Behavioral Science 15:318-328, July, 1970.

A Markov fertility decision model is presented with transitional probabilities based upon decision processes of women of different characteristics (income, migration, etc.)

634. Ascoli, W., Guzman, M.A., Scrimshaw, N.S. and Gordon, J.E., Nutrition and Infection Field Study in Guatemalan Villages, 1959-1964. 4. Deaths of Infants and Preschool Children. Archives of Environmental Health 15:439-449, October, 1967.

Report of a study in three Guatemalan villages: a control, a "feeding," and a "treatment" village. Deaths among children of one to four years showed greatest decline in the treatment village. Major causes of infant deaths were respiratory infection and some diarrheal diseases. Major causes of deaths in one to four year olds were acute diarrheal disease, respiratory and communicable diseases, and kwashiorkor. Malnutrition was a contributing factor in deaths from specific infectious diseases.

636. Kuznets, Simon S., Population and Economic Growth. Proceedings of the American Philosophical Society 111: 170-193, June, 1967.

Although the shifting of limitations upon natural resources through technology could permit support of population growth now projected for the next two to three decades, this would require major inputs of investment into material and human capital. The higher the rate of growth of population and labor force, the greater the amount of capital investment required, and the less the per capita consumption. Rise in productivity may be explained by investment in human capital, despite the many difficulties in specifying what consumption should be treated as capital investment. However, political, social, organizational, and institutional arrangements must be modified in the developing world if they are to take advantage of the new technology.

637. Bourgeois-Pichat, Jean, Social and Biological Determinants of Human Fertility in Non-Industrial Societies. Proceedings of the American Philosophical Society 111: 160-163, June, 1967.

Age of marriage, subfecundity, duration of postpartum amenorrhea, delay in conception, and adult mortality are the determinants of fertility in non-industrial societies. Suggests that fertility in such societies is biologically and socially controlled, while under modernization, it comes into the decision structure of the couple.

638. Schultz, T. Paul, Factors Affecting Fertility and Statistical Inference: A Comment. P-4691-1. Santa Monica: Rand Corporation, 1971.

Stresses the distinction between two classes of variables "explaining" individual fertility: those that are exogenous and predetermined (age, sex, race, wage rates) and those that are endogenous and jointly determined (attitudes, labor force participation, age at marriage, contraception, migration). When the latter are included in a model, the simultaneous equation form is required.

639. Schultz, T. Paul, The Changing Balance of Births and Deaths: A Comment. P-4575. Santa Monica: Rand Corporation, 1971.

A strategy is suggested for fertility research which focuses on the family or small community, tracing variations in reproductive behavior under environmental conditions expected to influenced both desired and achieved fertility.

640. Hirshleifer, Jack, Disaster and Recovery: The Black Death in Western Europe. RM-4700-TAB. Santa Monica: Rand Corporation, 1966.

Historical evidence suggests an immediate increase in per capita income of laborers and "lower classes" during the decade following the 1348-50 visitation of the plague; the hypothesis is advanced that continuing outbreaks of the plague,

affecting children primarily, tended to decrease population and increase wages during the following century, although the economy on the whole was sluggish.

641. Freedman, Ronald, Norms for Family Size in Underdeveloped Areas. Proceedings of the Royal Society, B. 159:220-245, 1963.

Analysis of social norms leading to high fertility in societies with high mortality, and in which family and kinship relationships dominate social and economic interaction. Suggesting that all societies potentially have the means of controlling fertility, he concludes that in less developed nations, couples have many children because they want them. Progress in fertility reduction requires a change in social norms, accompanying a shift of functions from family to other institutions, as well as a reduction in mortality. Modernism is defined as "shift from major dependence on relatively self-contained local institutions, to dependence upon larger social, economic, and political units." New incentives must be embedded in the social framework.

642. Kahl, Joseph A., The Measurement of Modernism: A Study of Values in Brazil and Mexico. Austin: University of Texas Press, 1968.

A concept of the modernization process is developed in which both early and late socialization factors are operative. Modernism is found to be closely linked to low fertility expectations and family planning behavior.

643. Enke, S., Population and Development: A General Model. Quarterly Journal of Economics 77:55-70, 1963.

A general model for a society in which workers also save has the following elements: (1) The production function for the economy includes the influence of diminishing returns; (2) death rates and savings rates are dependent upon per capita income; and (3) technological change, change in propensity to save, and change in fertility are exogenous. Given a low fertility rate, with constant technology and frugality, the minimum per capita income will exceed subsistence level. The model avoids both Malthusian and Nelsonian "traps."

645. Spengler, J.J., Population Change: Cause, Effect, Indicator. Economic Development and Cultural Change 9: 249-266, 1961.

Systematic review of ways in which population change and economic growth are related: (1) population change as stimulus to economic growth; (2) response of mortality and fertility (through percent married, age at marriage, and contraception) to economic development; and (3) for pre-1800 Western population, growth of population as indicator of growth of income.

647. Eames, Edwin, Urban Migration and the Joint Family in a North Indian Village. Journal of Developing Areas 1:163-178, 1967.

Effect of urban migration, especially of married men along, may be to strengthen ties between members of the joint family left in the village. Even those who migrate as a nuclear family continue to send a significant portion of their wages home and to visit frequently.

648. Shapiro, S., Jones, E.W. and Densen, P.M., A Life Table of Pregnancy Terminations and Correlates of Fetal Loss. Milbank Memorial Fund Quarterly 40:7-45, No. 1, January, 1962.

Report of an investigation into the relationship between fetal wastage and maternal factors of age and prior pregnancies (a portion of a study of maternal morbidity and pregnancy outcome among persons enrolled in the Health Insurance Plan of Greater New York). Nearly half of the losses occur before 12 weeks. Fetal loss increases with maternal age. Women whose last pregnancy ended in a fetal death are more likely to lose the next conceptus; this is independent of age, parity, and year of last pregnancy.

649. Coale, Ansley J., The Decline of Fertility in Europe from the French Revolution to World War II. In: Fertility and Family Planning: A World View. Ann Arbor: University of Michigan, 1967.

Preliminary results from a systematic documentation of the decline in fertility in each of the provinces of Europe during the past two centuries. An index of total fertility is developed which, in cases where illegitimate fertility is negligible, can be factored into an index of proportion married and an index of marital fertility. Typical fertility experience: nearly constant or gradually varying marital fertility followed by a sustained decline through increasing use of birth control, followed more recently by an increase in proportions married. Nevertheless, there is no clear association between the beginning of fertility decline and any specific level of economic development.

650. Ryder, Norman B., The Emergence of a Modern Fertility Pattern: United States 1917-1966. In: Fertility and Family Planning: A World View. Ann Arbor: University of Michigan, 1967.

Examination of marriage rates and parity-specific fertility rates suggests the adoption of a strategy of family formation under economic constraint: (1) postponement of marriage, (2) wider spacing of marital fertility, and finally (3) smaller family size. Effects of changes in the tempo of fertility are stressed.

651. Kuznets, Simon S., Economic Aspects of Fertility Trends in the Less Developed Countries. In: Fertility and Family Planning: A World View. Ann Arbor: University of Michigan, 1967.

A review of fertility behavior and economic prospects of the developing countries which stresses the importance of social and institutional barriers to development. Emphasis upon the greater capital requirements called for by high rates of population increase, in the judgment of the author, oversimplifies the problem. A conservative view of the possible benefits of a lower rate of population growth is indicated.

652. Freedman, Deborah S., The Relationship of Family Planning to Savings and Consumption in Taiwan. Taiwan Population Studies. Working Papers No. 4. Ann Arbor: University of Michigan, 1970.

Among women who reported having all the children they want, those who also follow modern consumption patterns (i.e., who save and/or who have purchased one or more modern durable consumer goods) tend to have used contraception and to have been successful in avoiding further childbirth. The author reports that these differences cannot be explained by income, female education, female age, or marriage duration.

653. Potter, R.G., Wyon, J.B., New, M.L. and Gordon, J.E., Fetal Wastage in Eleven Punjab Villages. Human Biology 37:262-273, September, 1965.

Rates for spontaneous abortion and stillbirth are based on a study of 1765 pregnancies in Khanna Study villages. (See also references 604 and 623.)

657. Bruce-Chwatt, L.J. and Meade, T.W., Malaria and the Population Explosion. Lancet 2:568, 7 September 1968.

Brief reaction to the contention of other authors that malaria eradication per se had little effect on mortality rates in Ceylon after World War II. Negative effects of population growth resulting from falling mortality are mentioned.

658. Frederiksen, H., Malaria and the Population Explosion. Lancet 2:346-347, August, 1968.

Restatement of the author's contention that improved economic conditions and increased food supply - not malaria eradication - played the greatest part in lowering the mortality rate in post-war Ceylon. Possible ramifications for population growth are noted.

659. Williams, C.D., Malaria and Population Explosion. Lancet 2:868-869, 19 October 1968.

Increased supply of food and medical care contributed more to reduced mortality in post-war Ceylon than malaria control, but in addition contributed indirectly to population explosion in-so-far as survival was encouraged but birth rates did not fall.

660. Abramowicz, M. and Kass, E.H., Pathogenesis and Prognosis of Prematurity. New England Journal of Medicine 275:878-885, 938-943, and 1053-1058, 1966.

A lengthy discussion of factors which might possibly account for low birth weight and their relation to infant morbidity and mortality. Biologic variables of pregnancy or the prepregnant state are of greatest interest in this regard. 251 references are given.

670. Samuel, T.J., The Effect of Population Growth on Consumption and Labor Supply in Underdeveloped Countries. Indian Journal of Economics 44:377-382, April, 1964.

675. Schultz, T. Paul, Effectiveness of Family Planning in Taiwan: A Methodology for Program Evaluation. P-4253. Santa Monica: Rand Corporation, 1969.

A predictive model of human fertility is developed from which the effectiveness of family planning programs might be inferred. As an example, the cost-effectiveness of family planning activities in Taiwan is evaluated.

676. Harman, A.J., Interrelationships between Procreation and other Family Decisionmaking. P-4267-1. Santa Monica: Rand Corporation, 1970.

A model is developed for studying decision-making about family size in terms of the interrelationships between fertility, employment, income, length of marriage, and migration. Alternative uses of the wife's time is a significant influence on the family size goal. Data from the Philippines are used in the analysis.

677. Port, S.C., A Multitype Stochastic Population Model: An Extended Version. RM-5659-PR. Santa Monica: Rand Corporation, 1968.

"Introduction and analysis of an extended version of the multitype stochastic population model considered in RM-5407-PR. (See reference 682.) The new model is the same as the previous one except that the input process is an arbitrary renewal process instead of a Poisson process. The main advantage of the input process modification is that it allows far greater flexibility although no attempt to do so is made in the present study."

678. Measures, Policies and Programmes Affecting Fertility, With Particular Reference to National Family Planning Programmes. ST/SOA/Series A/51. New York: United Nations, 1972.

Comprehensive review of the literature on fertility, family planning, and population policy. Points up the outstanding problems, and suggests broad areas for research.

679. Demeny, Paul, The Economics of Population Control. Reprint No. 11. Honolulu: East-West Population Institute, 1971.

Discussion of the importance of externalities and the relative economic contexts of family fertility decisions and governmental population policies.

680. Keyfitz, Nathan, How Birth Control Affects Births. Working Paper No. 4. Honolulu: East-West Population Institute, November, 1970.

Review and discussion of work in the modeling of the pregnancy history as a series of additive renewal processes.

681. Crouch, Robert L., Neoclassical Growth Models and the Optimum Rate of Population Growth (with Applications to Underdeveloped Countries). Working Paper No. 5. Honolulu: East-West Population Institute, November, 1970.

Extension of the theory of a population optimum and neoclassical growth models to accommodate growth in resources and technological development.

682. Port, S.C., A Multitype Stochastic Population Model. RM-5407-PR. Santa Monica: Rand Corporation, 1967.

"This study introduces a simple multitype population model and analyzes some of its mathematical properties. The model incorporates several key features of more complicated real situations arising in the theory of inventories, maintenance, health, and personnel selection. The approach is purely theoretical: mathematical proofs and consequences of the model are given but no attempt has been made to fit real data to the model." (See also reference 677.)

683. Spengler, J.J., Economic Growth in a Stationary Population. PRB Selection No. 38. Washington, D.C.: The Population Reference Bureau, July, 1971

Advantages to be gained from a zero rate of population growth are discussed under six categories: output per capita, stable demand, family stability, pollution, quality of life values, and spatial distribution of the population. Problems likely to emerge or be enhanced by a stationary population are examined under seven headings: age structure, advancement in income and occupational status, labor force, discretionary time and money, inflation, markets, and objective and subjective expectations.

684. Haavelmo, T., The Race Between Population and Economic Progress. Statokonomisk Tidsskrift 75:237-243, 1961.
685. Strauss, C.B., Population Growth and Economic Development. South African Journal of Economics 31:138-148, 1963.
686. Robinson, J., Population and Development. Philippine Economic Journal 10:1-7, 1960.
687. Pettengill, R.B., Population Control to Accelerate Economic Progress in the Middle East. Middle East Economic Papers 8:79-97, 1961.
688. Singer, H.W., Population and Economic Development. In: International Development: Growth and Change. New York: McGraw-Hill Book Co., 1964.
689. Minami, R., A Model of Economic and Demographic Development. Hitosubashi Journal of Economics 4:51-61, No. 1-2, February, 1964.
690. Kuznets, S.S., Population Change and Aggregate Output. In: Kuznets, S.S. Economic Growth and Structure: Selected Essays. New York: W.W. Norton and Co., 1965.
691. Hirschman, A.O., Population Pressures as a Force for Development. In: The Strategy of Economic Development. New Haven: Yale University Press, 1958.
692. Hosain, K.T., Population Size, Population Growth and Economic Development. Philippine Economic Journal 13: 54-79, 1963.
693. Novack, David E. and Lekachman, Robert, editors, Development and Society: The Dynamics of Economic Change. New York: St. Martin's Press, 1964.
694. Singer, S.F., editor, Is There an Optimum Level of Population? New York: McGraw-Hill Book Co., 1971.  
 Indicators of the quality of life must include values other than those exclusively concerned with material goods, such as the cost of environmental pollution, and thus play a role in determining optimum population levels for industrial societies.

695. Pollack, H. and Sheldon, D.R., The Factor of Disease in the World Food Problems. Journal of the American Medical Association 212:598-603, 1970.

The interrelationship between infectious diseases and nutrition is a major health problem in developing world today. To estimate quantitatively the magnitude of the problem the authors evaluated dysentery, malaria, and tuberculosis in terms of the caloric energy losses resulting from both increased metabolism in disease and lost productivity and concluded that "the value of present nutritional losses occasioned by a population's disease burden is not trivial."

696. Development of a Methodology for Economic Assessment of Parasitic Disease Control Programmes. Geneva: World Health Organization, 1971.

A short description of a programme of investigations recommended by an informal working group, with a discussion of two models: (1) a simulation model of the vector/host transmission and infection system and (2) a simulation model of the relationships between onchocerciasis and economic and social life.

697. Assessment of the Economic Impact of Parasitic Diseases With Special Reference to Onchocerciasis. Report of an Informal Meeting of WHO Advisers. (ONCHO/WP/68.8) Geneva: World Health Organization, 1968.

698. Kelley, A.C., Demographic Change and Economic Growth: Australia, 1861-1911. Explorations in Entrepreneurial History, Spring/Summer, pp. 207-277, 1968.

699. Kelley, A.C., Demographic Cycles and Economic Growth: The Long Swing Reconsidered. Journal of Economic History, December, pp. 633-656, 1969.

700. Costa, D., The Importance of Health in Plans for Economic Development. Revista Brasileira de Malariologia e Doencas Tropicais 15:131-136, January-March, 1963. (In Portuguese)

A discussion of health as a factor leading to development and health as a goal of development. Refers to the major endemic diseases and the opportunity to eradicate or control them at low cost. Considerable space is devoted to the relationship of malnutrition to increased disease and thus to lower productivity and underdevelopment. No references are cited.

701. Coutinho, J. de O., Alencar, J.E. and de Freitas, C.A., Medical and Sanitary Problems in Underdeveloped Areas. Revista Brasileira de Malariologia e Doencas Tropicais 15:157-189, January-March, 1963. (In Portuguese)

A factual article giving information on levels of development, medical problems, and medical resources within Brazil and the various states of Brazil. Attention is called to the wide variations of development between the industrialized, developed South and the less-developed, agrarian North and Northeast. Thirty-one references are cited.

702. Bravo, A.L., Moya, H., de Viado, M. and Cordoba, R.A., Socio-Economic Development and Health Planning. Revista Brasileira de Malariologia e Doencas Tropicais 15:299-309, April-June, 1963. (In Portuguese)

Presents the importance of relating overall development planning with health planning. Reviews the effect of chronic starvation, poor sanitation, and high mortality on lowering the productivity of the population. Stresses the importance of health measures to improve these factors as a part of development and as a goal of development. Presents a review of some of the main health problems in Chile. No references cited.

703. Michael, A., Priorities in Health Service Planning in Developing Countries. Revista Brasileira de Malariologia e Doencas Tropicais 15:311-316, April-June, 1963. (In Portuguese)

Stresses the importance of health planning as a part of national and regional planning. Points out the dangers of starting large scale health programs without projecting the consequences of these programs. Stresses the importance of setting up a regionalized network of health units as a prerequisite for massive control programs. Ten references are cited.

704. Athias, S.P. and Gueiros, Z.M., Cost of an Anti-Culex Campaign in Belem Using Only a Larvicide. Revista Brasileira de Malariologia e Doencas Tropicais 16:69-72, January-March, 1964. (In Portuguese)

705. Hilario, J., The Economic Value of Health. Revista Brasileira de Malariologia e Doencas Tropicais 18: 189-198, January-March, 1966. (In Portuguese)

This article points out the effect of poor health in decreasing productivity. It also links the problems of malnutrition and health to underdevelopment. The potential role of the National Health Council in Brazil in improving economic development is discussed. No references are cited.

706. de Mello, J.B., Latin American and Brazilian Panoramic Plans in Nutrition. Importance of the Trilogy of Education, Health, and Economy for the National Security and Economic Development. Hospital (Rio) 71:1639-1643, June, 1967. (In Portuguese)

707. Azurdia, R.R., Paredes Lopez, R. and Menendez, O., Health as a Fundamental Necessity for Economic Development. Salud Publica Mexicana 5:517-521, July-August, 1963. (In Spanish)

The economic repercussions of health problems are discussed, and the need to resolve them in order to promote optimum development is stressed. The authors emphasize that the circle of sickness, poverty and ignorance must be broken, preferably by attacking each of the components simultaneously.

708. Flores Talavera, R. and Bustamante, M.E., Public Health and Social and Economic Development. Salud Publica Mexicana 5:777-791, September-October, 1963. (In Spanish)

Human resources play a major role in the production process, and within this complex framework health and economic development interact directly. These interrelationships are examined in some detail in terms of demographic factors (e.g., population growth), health factors (e.g., mortality and morbidity), and economic factors (e.g., labor force participation in agriculture).

709. Daniel Martinez, P., Planning of Public Health as a Factor in National Development. Salud Publica Mexicana 5:621-626, July-August, 1963. (In Spanish)

An address before the First National Meeting of the Partido Revolucionario Institucional. The author reviews the various health problems confronting Mexico in particular, particularly as they have economic ramifications (such as the productivity of labor). He argues that the fundamental problem from the point of view of human resources and well-being is that of the organization of society, especially programs designed to promote the development of rural communities.

710. Alvarez Amezquita, J., Health and Economic Development. Salud Publica Mexicana 5:535-536, July-August, 1963. (In Spanish)  
 A short essay on the way in which health activities should be focused on improving the well-being of the population in a very wide sense, as a means of promoting social and economic progress.
711. Schlenker, R., Health Improvements and Economic Growth: Neoclassical Theory and Puerto Rican Experience. Ph.D. Thesis, University of Michigan, 1968. University Microfilms
712. Knowles, J., The Economic Effects of Health and Disease in an Underdeveloped Country. Ph.D. Thesis, University of Wisconsin, 1969. University Microfilms  
 An attempt to frame a set of simultaneous equations for health and economic-demographic variables after having developed a set of theoretical relationships postulating the causal connections between the two. The author builds a model of household behavior which explicitly includes health variables. The household model is estimated with Chilean data and seemingly predicts quite well the relationship between health and income per head.
713. Measurement of the Public Health Importance of Bilharziasis. Technical Report Series No. 349. Geneva: World Health Organization, 1967.
714. Buttner, A., Bilharziasis in Mauritania: Influence of the Traditional Economy on the Epidemiological Cycle and on Resistance to Infection. In: Proceedings of the Sixth International Congress of Tropical Medicine and Malaria. Lisbon, 1959.
715. Watson, J.R., Schistosomiasis in the Tigris-Euphrates Valley with Special Reference to its Economic Consequences. In: Proceedings of the Sixth International Congress of Tropical Medicine and Malaria. Lisbon, 1959.
716. Arbona, G. and Trussell, R.E., Medical and Hospital Care in Puerto Rico. New York: Columbia University and San Juan, Puerto Rico: Department of Health, 1962.  
 The bulk of this book is devoted to expenditures and financing. One chapter deals with costs of inpatient and dispensary services. Another chapter and an appendix presents results of a household survey of 3,000 families with special emphasis on health expenditures and income losses from disease.

717. Wilson, S.G., Morris, K.R.S., Lewis, I.J. and Krog, E., The Effects of Trypanosomiasis on Rural Economy with Special References to the Sudan, Bechuanaland, and West Africa. Bulletin of the World Health Organization 28: 595-613, 1963.

718. Hagen, E., Population and Economic Growth. American Economic Review 49:310- , 1959. Cited by N. Holly.

719. The Contribution of Health Programmes to Socio-Economic Development. Technical Discussions, Twenty-fifth World Health Assembly, Denmark, 12-13 May 1972. Geneva: World Health Organization, 1972. (Mimeo)

A brief report of the group and plenary discussions, which focused on the interrelations between health and other factors in socio-economic development. Topics include: "health planning and health programmes in relation to developmental policy;" "quantification, indicators and analytical methods;" and "contributions of various health programmes to socio-economic development." Material accompanying the actual report includes a background document based on summary reports from various participating governments and an annotated bibliography.

720. Banerji, D., Health Economics in Developing Countries. Journal of the Indian Medical Association 49:417-421, November, 1967.

Health activities should contribute to, not interfere with, general economic development. Health economists can assist in this through the following: (1) develop tools to measure social phenomena; (2) identify areas of health where given resources can have maximum impact; and (3) help improve the management of health services.

721. Bogatyrev, I.D. and Rojzman, M.P., Methods of Studying the Economic Benefits of Disease Control. Copenhagen: Regional Office for Europe, World Health Organization, 1968.

Part of a report on a Symposium on Health Economics held in Moscow in which cost-benefit analysis is used to evaluate an anti-poliomyelitis program in the USSR. Direct and indirect costs are taken into account; the latter include losses due to working incapacity and due to death assessed on the basis of national income per worker.

722. Brunet-Jailly, J., Essai sur L'Economie Generale de la Sante. Paris, 1967.

A very lengthy thesis in which the author analyzes the health sector in France. The structure and function of the various parts of the health sector are examined, and the ways in which they are interrelated are analyzed in terms of input (work and capital) and output (medical consumption). Two aspects of health economics are considered in detail: the cost to the public of conditions of economic activity and the

cost to the nation of disease.

723. Destanne de Bernis, G., How to Integrate Health Planning into the Planning of Economic Development as a Whole. Geneva: World Health Organization, 1966.

An analysis in an economic framework of the nature of health expenditures, which are neither pure consumption nor pure investment. Measurement of the economic benefits - direct and indirect - of health expenditures is examined, and the methodologic difficulties are discussed.

724. Drewnowski, J. and Scott, W., The Level of Living Index. Report No. 4. Geneva: United Nations Research Institute for Social Development, 1966.

An index of levels of living is devised, reflecting several weighted components (such as nutrition, shelter, health, education, leisure, and security). The authors attempt to apply this index to 20 countries with differing levels of socioeconomic development.

Other reports of interest in this UNRISD series include the following: No. 1 - Aspects of Social and Economic Growth - A Statistical Study; No. 2 - Methods to Induce Change at the Local Level; No. 3 - Social and Economic Factors in Development (reference No. 736); and No. 7 - Cost-Benefit Analysis of Social Projects (reference No. 735).

725. Langer, A. and Henshaw, P.S., The Interacting Effects of Public Health, Fertility Behavior, and General Economy on Standards of Living. American Journal of the Medical Sciences 231:407-425, 1956.

An index of standards of living is constructed, based in part on such factors as fertility, mortality, nutrition, and per capita earnings. The authors argue that it can be used to classify countries as a means of discovering what factors stimulate or block economic development. Calculations are then made to determine ways to maintain or improve the levels of living in countries with different economic levels.

726. Logan, John, The Quantitative Relationships Between Community Water Supplies and Economic Development. International Review of Tropical Medicine 2:27-39, 1963.

Water supply contributes to economic development through a number of mechanisms (including agriculture, industry and power), but its role insofar as health is concerned, although significant, is difficult to assess. The author cites some work in the area of estimating the economic effectiveness of water supply.

727. Muhsam, H.V., Sur les Relations entre la Croissance de la Population et le Developpement Economique. Population: pp. 347-362, March-April, 1970.

An examination of one set of theories which hold that

the effect of population growth is to lower per capita income. These theories have been criticized, but the author argues that only a more thorough analysis will show whether they are valid or not. He feels that the present poor state of knowledge, especially with regard to demographic transition, may preclude such detailed analysis.

728. Navarro, V., Systems Analysis in the Health Field. Socio-Economic Planning Sciences 13:179-189, 1969.

The use of systems analysis, particularly certain planning models, in the field of health service planning is examined. The place of health in global development models is discussed, as well as the use of health status as an indicator of social development levels.

729. Robertson, R.L., Issues in Measuring the Economic Effects of Personal Health Services. Medical Care 5: 362-368, 1967.

The economic effects of personal health services are measured in terms of work time gained through a fall in morbidity (sickness and accidents). The concepts (inputs and outputs) are defined and the difficulties in employing them are noted.

730. Seale, J., Economic Benefits of Medical Care. British Medical Journal: No. 5356: Supplement:115-117, August, 1963.

The author presents arguments against the theory that health expenditures will have negative economic benefits (by increasing the proportion of dependent persons in the population or by failing to help increase national income). He emphasizes that health expenditures have both an investment and a consumption function and that the economic benefits of such expenses are not the only rationale for decision-making in this area.

731. Macchiavello, A., La Evaluacion del Impacto Economico de Las Actividades Sanitarias. Boletin de la Oficina Sanitaria Panamericana 52:25-39, 1962.

The author describes the state of health and the economy in Latin America and indicates what data are necessary to begin to assess the impact of health activities on the economy. Evaluation of past and present programs in the health sector is particularly important.

732. Backett, E.M., Nomenclature and Concepts in Studies on the "Efficiency" of Medical Care. In: The Efficiency of Medical Care. Copenhagen: World Health Organization, 1967.

A paper written for a 1966 Symposium in which the author presents a sequence of concepts which might be used to

medical care: (1) How well does the system achieve stated objectives; (2) How administratively cost-efficient is it; (3) How competent is the system to meet local needs; and (4) If the system is judged to be competent, is it in fact meeting local needs and demands and if not, why not? (See reference 731.)

733. Popov, G.A., Some Aspects of the Use of Norms and Standards in Studying the Efficiency of Medical Care. In: The Efficiency of Medical Care. Copenhagen: World Health Organization, 1967.

Paper prepared for a 1966 Symposium in which the author defines in some detail the public health norms and public health estimating standards which might be used in future studies. Comparative evaluations should be made along the following lines: quality of medical care, adequacy of medical care, productivity of health resources, and efficiency. (See reference 731.)

734. Feldstein, M.S., Measuring the Costs and Benefits of Health Services. In: The Efficiency of Medical Care. Copenhagen: World Health Organization, 1967.

A background paper prepared for a 1966 Symposium in which the author analyzes the use of the cost-benefit approach in project evaluation. A distinction is made between medical (technical) efficiency and economic efficiency. The author notes that the "social opportunity cost" of health service inputs must be borne in mind in measuring costs. Benefits, in this type of analysis, can be divided into three areas: "indirect economic benefits of increased production," "savings in future medical care costs," and "direct health benefits," and these are discussed. Finally, three problems in evaluating health service costs and benefits are noted: uncertainty, the value of future health benefits, and communicable diseases. (See reference 731.)

735. Cost-Benefit Analysis of Social Projects. Report No. 7. Geneva: United Nations Research Institute for Social Development, 1966.

736. Drewnowski, J., Social and Economic Factors in Development. Report No. 3. Geneva: United Nations Research Institute for Social Development, 1966.

Part of a series of monographs examining variables related to levels of living and development. (See reference 724.)

737. Baster, N. and Scott, W., Levels of Living and Economic Growth: A Comparative Study of Six Countries 1950-1965. Geneva: United Nations Research Institute for Social Development, 1969.

Six countries (Chile, Mexico, Jamaica, Morocco, Malaysia, and Ceylon) are compared on a wide variety of economic and social indicators, and detailed tables are given in the Appendix. The discussion focuses on influences arising from the social structure, distribution of income, the structure of production and related economic aspects, and the characteristics of the social factors.

738. Demeny, P., The Economics of Government Payments to Limit Population: A Comment. Economic Development and Cultural Change 9:641-644, 1961.

Some objectives are raised to the proposal that governments consider a money reward to men who undergo vasectomy and to women who avoid pregnancy for a given period of time. The present comment is restricted to the questions of the economic efficiency of such a scheme. (See references 739 and 740.)

739. Enke, S., A Rejoinder to Comments on the Superior Effectiveness of Vasectomy-Bonus Schemes. Economic Development and Cultural Change 9:645-647, 1961.

The author rebuts some criticisms of his original paper on the economic benefits of government payments to limit population growth. (See reference 737.)

740. Enke, S., The Economics of Government Payments to Limit Population. Economic Development and Cultural Change 8:339-348, 1960.

Two money-incentive schemes are proposed which the author feels would be effective in helping to reduce the birth rate in underdeveloped countries. These involve a payment to men who present themselves for vasectomy and to women who avoid pregnancy for a given period of time. (See references 354, 737, and 739.)

741. Wiseman, J., Cost-Benefit Analysis and the Health Service Policy. Scottish Journal of Political Economy 10:128-145, 1963.

The application of cost-benefit analysis on a "global" basis (to determine the over-all size of the health sector) and on a more restricted basis (to guide resource allocation within the health sector) is discussed. Deficiencies in such studies are noted, particularly as they stem from a failure to consider adequately the institutional structure through which the resource allocation takes place.

742. Gish, Oscar, Health Planning in Developing Countries. Journal of Development Studies 6:67-76, July, 1970.  
Health planning in developed and developing countries must be radically different, in order to take account of such variables as relative scarcity of health manpower and facilities (and the resources needed to acquire them); differences in population structure, location, and growth; and different disease patterns.
743. Towards Full Employment. A Programme for Colombia. Geneva: International Labour Office, 1970.  
One chapter is devoted to the place of health in promoting employment, particularly through improved water and sanitation, maternal and child care, and other measures.
744. Hedrick, J.L., The Economic Costs of Cigarette Smoking. HSMHA Health Reports 86:179-182, 1971.  
The magnitude of economic losses from cigarette smoking is estimated in terms of direct and indirect costs of mortality, morbidity, and fires. Figures from a Canadian study are applied to the United States, and the health cost is shown to be 20 percent greater than the total consumer expenditures (excluding taxes) for cigarettes in 1966.
745. The Efficiency of Medical Care. Report of a Symposium. Copenhagen: Regional Office for Europe, World Health Organization, 1967.  
A report of a 1966 Symposium convened to examine the development and application of methods for the assessment of the efficiency of medical care services. Topics included: consumption of medical care; indices, norms, and standards in studying the efficiency of medical care; operational efficiency in health services; and cost-benefit measurement of health services. (See references 732, 733, 734.)
746. Callin, A.E., The Economic Repercussions of Venereal Diseases. Boletín de la Oficina Sanitaria Panamericana 70:95-102, 1971. (In Spanish; English Summary)  
Benefits from controlling venereal disease (specifically syphilis) derive mainly from preventing mental disability and premature death and thereby avoiding direct costs (such as hospital and treatment expenses) and indirect costs (such as revenue losses). In addition to these, human values beyond the purely economic are met by programs to control venereal disease, and these should not be overlooked.

747. The Economic Benefits from Public Health Services.  
U.S.P.H.S. Publication No. 1178. Washington, D.C.:  
Government Printing Office, 1964.

This monograph is a report of a 1963 symposium on the need to identify economic benefits of local public health programs. The first chapter considers the measurement of economic benefits; the second chapter deals with lessons from Latin America. Other chapters discuss dental neglect and vocational rehabilitation of the mentally disabled. A fifth chapter discusses accounting in health. The final chapter presents a very general examination of points raised in the first five chapters.

748. de Mello, C.G., Health and Economic Development. Revista Brasileira de Malariologia e Doencas Tropicais 19:311-342, 1967. (In Portuguese; English Summary)

This fairly extensive paper states that health planning is more important in less developed countries where resources are scarce. The priority of programs to control mass disease is discussed. The need for training physicians to meet the problems of their own countries rather than for some idealized international standard is discussed. The inevitability of budgetary constraints of health programs is clearly pointed out. Other key points in the rational planning of delivery of health services in less developed countries are presented. Thirty-five references are cited.

749. de Mello, C.G., Economic Development, Health, and Population Growth. Brasil Medico 80:31-35, 1966. (In Portuguese)

This article presents a philosophical discussion of the interrelations between economic development, health, and population increase. The author calls attention to the problems of dependency ratio but also points out that there are both empty spaces and untapped resources in Brazil. His final conclusion is that economic development is the most effective method of reducing birth rates. No references are cited.

750. Tameirao, H.P. and de Carvalho e Castro, P., Public Health as a Component of Economic and Social Development in the Parana Basin. Arquivos de Higiene e Saude Publica 27:287-301, 1962. (In Portuguese; English Summary)

This paper presents information on health problems and health resources in the southern and western regions of Brazil. The recommendations of the article deal more with health planning and regional planning than the effect of health on development.

751. de Mello, C.G., Health in the Context of the Economic System. A Patologia Geral 52:73-80, 1967.

This review article discusses some philosophical aspects of the effect of health on economic development and the effect of economic development on health. General figures on infant mortality, tuberculosis and population increase are given but not analyzed. Thirty-two references are listed, the majority in Brazilian journals.

752. Gouveia, Almeida, Health for Development. Bahia: Imprensa Oficial, 1964.

This textbook is divided into three parts: the sociology of health, implications of development in health, and evaluation of development for health. The **first** part stresses maternal and child health. The second section deals with occupational health, basic sanitation, and what is called epidemiologic implications of health for development, although this chapter does not develop clear relationships between disease conditions and levels of development. The third part covers the mutual relationships between health and development correlating indices of health and indices of development, e.g., major causes of death. The second chapter of Part III deals with human relations. The author concludes that excessive population growth is not a problem, but that the problem is merely maldistribution of foods and goods and sluggish exploitation of resources. Many readers might disagree with this conclusion and with many other parts of the book.

753. Santos, A., The Labor Market for Health Personnel. Revista Brasileira de Malariologia e Doencas Tropicais 19:479-497, 1967. (In Portuguese; English Summary)

This article deals with the problems of planning for health manpower in Brazil and its role in development of health services. Special problems concerning the employment of middle level and higher level health personnel are discussed.

754. de Mello, C.G., Medical Care and Economic Development. Revista Brasileira de Malariologia e Doencas Tropicais 15:291-297, 1963. (In Portuguese; English Summary)

This article summarizes reference 748 (by the same author). It cites the problems of inadequate resources to develop medical assistance plans and the extreme limitation of resources in less developed countries. It stresses the need for planning programs to provide low cost services. It discusses the importance of the use of middle and lower level health personnel as a means of providing more services for the same budget.

755. Andre, R., The Cost of Sickness and the Price of Health: Methodologic Approach. Acta Tuberculosea et Pneumologica Belgica 61:453-464, 1970.
756. Szameitat, K., What is the Cost of Health? Numbers and Critical Aspects. Oeffentliche Gesundheitswesen 32:672-690, 1970. (In German)
757. Kuhn, E., Economic Aspects of Women's Health Care. Zeitschrift fur die Gesamte Hygiene 16:295-298, 1970. (In German; English Abstract)
758. Weigl, E., Social Medicine and Economic Studies of Rheumatologic Diseases in the Frankfurt (Oder) District. Deutsche Gesundheitswesen 26:1332-1335, 1971. (In German; English Abstract)
759. Baldi, G.M., On the Value (Even Economic) of Man. Zacchia 5:1-36, 1969. (In Italian)
760. Malamud, M.I., Method of Determining the Economic Effectiveness of National Public Health. Sovetskaia Zdravookhranenie 29:20-24, 1970. (In Russian)  
(See Reference 761.)
761. Rodov, IaI., Reply to M.M. Malamud. (Sovetskaia Zdravookhranenie 29:20-24, 1970.) Sovetskaia Zdravookhranenie 30:42-43, 1971. (In Russian)  
(See Reference 760.)
762. Tsipershtein, M.I., et al, The Economic Loss from Measles. Zhurnal Mikrobiologii, Epidemiologii, i Immunobiologii 47:137-138, 1970. (In Russian)
763. Paranina, L.A., et al, Social-Economic Significance of Infectious Diseases. II. Economic Characteristics of Anti-Epidemic Measures in Diphtheria. Zhurnal Mikrobiologii, Epidemiologii, i Immunobiologii 48:12-18, 1971. (In Russian; English Abstract)
764. Economic Aspects of Communicable Diseases Control Programme. Indian Journal of Public Health 11:28-31, 1967.
765. Datta, S.P., et al, A Study on Morbidity and Drug Costs in a Primary Health Center. Indian Journal of Medical Science 25:690-695, 1971.
766. Pole, J.D., The Cost-Effectiveness of Screening. Proceedings of the Royal Society of Medicine 64:1256-1257, 1971.

767. Behm, H., Gutierrez, H., and Requena, M., Demographic Trends, Health, and Medical Care in Latin America. International Journal of Health Services 2:13-22, 1972.

Health status and medical care and their relationships to various demographic trends in Latin America are explored. The demographic trends include population growth, fertility and mortality, and age structure and geographical distribution of the population. Recent figures on a number of health and demographic indicators for 20 countries are given.

768. Howard, Lee M., Key Problems Impeding Modernization of Developing Countries: The Health Issues. Washington, D.C.: Office of Health, Technical Assistance Bureau, Agency for International Development, 1970.

The components of modernization are outlined, and their relationship to an improved quality of life are discussed. Health and disease are defined within this context, and the key categories of health problems which impede development are examined. Biological barriers include the high burden of disease, rapid population growth, malnutrition, and environmental pollution. Administrative barriers include organizational arrangements and capabilities and manpower problems. Social and cultural barriers center on inhibiting attitudes such as inefficiency, indifference, and lack of cooperation. A final barrier is the research gap.

769. Denison, E.F., Welfare Measurement and the GNP. Survey of Current Business 51: No. 1, January, 1971.

The author argues that any attempt to convert Gross National Product into an index of welfare or quality of life cannot successfully be done. He then goes on to indicate what components such a measure would have to include and the problems that would be encountered in constructing such an index.

770. Toward a Social Report. A Report of the Panel of Social Indicators. Washington, D.C.: Government Printing Office, 1969.

This report represents a beginning attempt to develop a regular system of social reporting and deals with a variety of health and social aspects of the quality of American life, including illness, social mobility and education, pollution, income and poverty, crime, the sciences and the arts, and participation and alienation. An appendix discusses the next steps needed in evolving a more complete set of indicators and policy accounts.

771. Sloan, F., Survival of Progeny in Developing Countries: An Analysis of Evidence from Costa Rica, Mexico, East Pakistan, and Puerto Rico. R-773-AID. Santa Monica: Rand Corporation, 1971.

Regression analysis is used to examine the sources of geographic variation in infant and preschool child mortality for four countries at widely varying stages of development. Implications of the present findings and of future research are discussed. A lengthy bibliography is included.

772. Financing of the Health Sector. Scientific Publication No. 208. Washington, D.C.: Pan American Health Organization, 1970.

This is the final report of the Technical Discussions of the 19th Meeting of the Directing Council of PAHO. Topics covered include: institutional problems of financing; integration of health sector financing into the development process, and mobilizing resources for health sector financing. Twenty-two countries in the Americas are classified by a series of indicators: health level and structure, health sector resources, educational and other social factors, economic factors, and demographic factors.

773. Forrester, Jay W., World Dynamics. Cambridge: Wright-Allen, 1972.

A highly controversial treatise which presents a mathematical world model involving five variables: population, natural resources, capital investment, proportion of investment in agriculture, and pollution. One major conclusion appears to be that depletion of natural resources is the limiting factor on population and economic growth and that eventually population falls, pollution rises, and the quality of life declines.

774. Human Development and Public Health. Technical Report Series No. 485. Geneva: World Health Organization, 1972.

A report of a Scientific Group which attempted to develop a synthesis of the priority needs for development and the role of health services in meeting those needs. Phases and transitional events in human development are classified, and the various factors that impinge on these events are discussed. The latter include the environment, various economic and social factors, genetic and perinatal factors, family planning, nutrition, and infectious disease. The report concludes with a discussion of the implications for public health programs and recommendations for further research.

775. Wharton, Clifton, R., editor, Subsistence Agriculture and Economic Development. London: Frank Cass and Company Limited, 1970.

Report of a 1965 conference on the problems of developing subsistence agriculture. Topics are covered in five parts: the subsistence farmer, agrarian cultures, and peasant societies; the economic behavior of subsistence farmers; theories of change and growth; transforming subsistence agriculture; and research priorities. Several case studies are presented in conjunction with the first four parts.

776. CEDA Study Series Seminar Paper No. 2. Seminar on Population and Development. Kathmandu, Nepal: Center for Economic Development and Administration, Tribhuvan University Campus, 1971.

A series of papers exploring various aspects of population growth and economic change in Nepal. Nepal is experiencing rapid population growth (2 percent per annum or more) and the hilly areas of the country are already overpopulated when resources are considered. The most rapidly developing region is the Terai, where malaria has been controlled and agricultural activity has expanded.

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779. Rochac, A., Economic Aspects of Health Services in Rural Areas. Boletin de la Oficina Sanitaria Panamericana 64:52-68, 1968. (In Spanish)
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782. Gargov, K., Konyarov, D., Katsarov, I. and Popov, M., Evaluation of the Economic Effects of Public Health. Sante Publique (Bucur) 11:275-284, 1968. (In English)  
(See Reference No. 422.)
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786. Fuchs, V.R., The Contribution of Health Services to the American Economy. Milbank Memorial Fund Quarterly 44:65-103, No. 4, Part 2, October, 1966.
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793. Baker, Timothy D. and Perlman, Mark, Health Manpower in a Developing Economy. Taiwan: A Case Study in Planning. Baltimore, Maryland: The Johns Hopkins Press, 1967.

Techniques for projecting manpower supply and demand in developing countries are developed. Use of multivariate analysis (multisort) is explained in an appendix.

794. Takulia, Harbans S., Taylor, Carl E., Sangal, S. Prakash and Alter, Joseph D., The Health Center Doctor in India. Baltimore, Maryland: The Johns Hopkins Press, 1967.

Examination of the organization of rural health services in India and the attitudes and perceptions of doctors, administrators, medical educators, and legislators concerned with the development of primary health centers.

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Methods of measuring present demand for health manpower and medical care by sector are discussed, and data on the supply and distribution of health personnel are presented. The concept of technically feasible demand is explored.

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Health manpower requirements, including analysis of current and future demand are examined, followed by a detailed look at manpower resources. The third section of the book is devoted to issues in health manpower planning and promoting a balance between supply and demand.

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Multidisciplinary volume on health planning concepts and techniques, covering both the United States, other developed countries, and the developing world. Particular attention is given to health economics and information gathering, and special methods of analyzing and synthesizing such component data. Extensive reading lists and bibliography are included.

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805. Chenery, H.B. and Taylor, I.J., Development Patterns: Among Countries and Over Time. Review of Economics and Statistics 50:391-416, November, 1968.  
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808. Curtain, T.R.C., The Economics of Population Growth and Control in Developing Countries. Review of Social Economy 27:139-153, September, 1969.  
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Lengthy examination of employing surplus labor in developing countries for capital formation, using a two-sector model.

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817. Kelley, A.C., Demand Patterns, Demographic Change, and Economic Growth. Quarterly Journal of Economics 83:110-126, February, 1969.  
A model for examining the relationship between various demographic factors (such as family size, population growth, and migration) and the level and composition of demand is presented. Data from the Philippines in the 1960's are used to illustrate its application.
818. Knight, J.B., Earnings, Employment, Education, and Income Distribution in Uganda. Bulletin of the Oxford University Institute of Economics and Statistics 30: 266-297, November, 1968.  
The effects of wage and salary behavior on economic development in Uganda are examined, especially in regard to using the earnings structure to measure the social benefits of public services (in this case education). It is concluded that this will not provide "helpful criteria for educational expenditure."
819. Lieberman, S., A Review of Three "Non-Gradualist" Theories of the Process of Industrialization. L'Industria, No. 3, pp. 338-356, July/September, 1968. (In English)  
Three distinct interpretations of modern industrialization rest on the idea of an early capital intensive push during which population growth is a significant factor. Other writers disagree with this proposition and take a more "gradualist" approach.

820. Miklos, A. and Zhukova, L., Experiences in Economic Growth in Certain CMEA Countries. Acta Oeconomica 3: 419-439, 1968.

The authors examine the growth of the Bulgarian, Czechoslovakian, German Democratic Republic and Soviet economies through the development of material processes to find the factors which led to a change in the rate of economic growth. Slowing down of growth of production was concluded to have resulted more from lowered productivity than from quantitative changes in inputs.

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A model of economic growth is developed in which the quality of the labor force is related to education. The author examines the problem of resource allocation under the circumstances assumed by the model.

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The place of the chronically poor in the process of development is examined especially in-so-far as the traditional refuge of subsistence agriculture becomes more and more inadequate. Political, economic, and social ramifications are considered.

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825. Robinson, W.C., Types of Disguised Rural Unemployment and Some Policy Implications. Oxford Economic Papers 21:373-386, November, 1969.

Discussion of several types of disguised unemployment which have different economic or social causes (such as low health or nutritional levels, technological advances in agriculture, seasonal agriculture, or low labor productivity).

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"This paper examines critically the two main policy axioms of much of the current literature on economic development, namely, that comprehensive central planning and foreign aid as indispensable for the economic development of poor countries. Examples are presented of the view that these policies are necessary or even sufficient for material progress. It is argued that comprehensive central planning, in the sense of attempted or actual state control of the composition of economic activity outside subsistence agriculture, does not augment resources but only centralizes power; and that there is no reason why such a policy should increase the flow of income. Examination of the determinants of development, especially personal motivations, attitudes, and social institutions, suggests strongly that comprehensive central planning will retard and not promote material progress. Nor is foreign aid in the sense of government to government grants or subsidized loans either a necessary or a sufficient condition of material progress. This conclusion can be established firmly. Whether foreign aid is more likely to promote or retard material progress cannot be established so clearly. It is suggested, however, that the operation of aid since the Second World War has probably more often retarded rather than promoted economic advance in the recipient countries. It is recognized that this conclusion is paradoxical, but arguments are adduced in its support."

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Because of the high rate of female employment in Czechoslovakia, maternal absenteeism is a major economic consequence of measles in children, over and above the costs represented by the morbidity and mortality in children contracting the disease.

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This book examines the relationship between measures of health, education and labor productivity from the standpoint of investment in human capital. The interface between nutritional status and work capacity is examined closely and an educational planning model with application to less developed countries is presented.

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A summary of the literature regarding malnutrition and subsequent intellectual capacity. Argues that nutritional programs will accelerate economic development by improving the intellectual capacity of the population.

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Effect of increased calorie intake on productive capacity of labor force is estimated for 18 Latin American and European countries and the U.S.A. For the less developed countries, increased calorie consumption had a notable effect on economic growth, nearly as great as the effect of education.

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