DOCUMENT RESUME

ED 036 331 PS 002 832

AUTHOR NORTH, A. FREDERICK, JR.; AND OTHERS
TITLE RESEARCH ISSUES IN CHILD HEALTH, I-IV. PROCEEDINGS OF THE HEAD START RESEARCH SEMINARS: SEMINAR NO. 4, HEALTH AND NUTRITION IN EARLY CHILDHOOD (1ST, WASHINGTON, D.C., NOVEMBER 1, 1968).
INSTITUTION EDUCATIONAL TESTING SERVICE, PRINCETON, N.J.
SPONS AGENCY OFFICE OF ECONOMIC OPPORTUNITY, WASHINGTON, D.C.
REPORT NO OEO-4098-SEMINAR-4
PUB DATE 1 NOV 68
NOTE 82P.; THIS SEMINAR IS PART OF THE COMPLETE PROCEEDINGS: (ED 034 088) "CRITICAL ISSUES IN RESEARCH RELATED TO DISADVANTAGED CHILDREN," EDITED BY EDITH GROTBERG

EDRS PRICE EDRS PRICE MF-$0.50 HC-$4.20
DESCRIPTORS CULTURAL FACTORS, *EARLY CHILDHOOD, ECONOMIC FACTORS, FAMILY ROLE, HEALTH CONDITIONS, HEALTH NEEDS, *HEALTH SERVICES, MEDICAL TREATMENT, *NUTRITION, PRESCHOOL CHILDREN, RESEARCH, *SPECIAL HEALTH PROBLEMS
IDENTIFIERS *HEAD START

ABSTRACT

ONE OF A SERIES OF FOUR SYMPOSIUM PAPERS, THIS DOCUMENT DEALS WITH RESEARCH ISSUES IN EARLY CHILDHOOD HEALTH AND NUTRITION. DR. A. FREDERICK NORTH, JR., PRESENTS AN OVERVIEW OF RESEARCH AND EMPHASIZES THE IMPORTANCE OF IDENTIFYING CHILDREN'S HEALTH PROBLEMS, USING THE MOST EFFECTIVE TREATMENT AND INTERVENTION TECHNIQUES, AND UTILIZING RESOURCES TO IDENTIFY AND REMEDY PROBLEMS. THE MEDICAL AND ECONOMIC ISSUES OF PROVIDING BASIC MEDICAL CARE TO CHILDREN ARE DISCUSSED BY DR. ROBERT J. HAGGERTY, AND A MODEL FOR A HEALTH CARE SYSTEM WITHIN THE CONTEXT OF HEAD START IS PROPOSED. DR. MARSDEN G. WAGNER STRESSES THE CULTURAL AND SUBCULTURAL FACTORS AND ORGANIZATIONAL CONSIDERATIONS OF PROVIDING HEALTH SERVICES TO HEAD START CHILDREN. THE UNDERLYING PHILOSOPHY OF ESTABLISHING HEALTH CARE AND OTHER SERVICES FOR THE DISADVANTAGED IS GIVEN CONSIDERATION BY DR. HERBERT BIRCH. (DOCUMENT ED 034 088 HAS THE FULL TEXT OF THE PROCEEDINGS OF ALL SIX HEAD START SEMINARS IN THIS SERIES.) (DR)

Proceedings of Head Start Research

Seminar #4:

HEALTH AND NUTRITION IN EARLY CHILDHOOD

Washington, D.C.
November 1, 1968

RESEARCH ISSUES IN CHILD HEALTH I:

AN OVERVIEW

by

A. Frederick North, Jr., M.D.

Associate Professor of Pediatrics
George Washington University
School of Medicine

Associate Director
Children's Hospital of the D.C.

Senior Pediatrician, Project Head Start
Office of Economic Opportunity

Presented in part to the Head Start Research Seminar
Washington, D.C.
November 1, 1968

Address: 2125 - 13th Street, N.W.
Washington, D.C. 20009

RESEARCH ISSUES IN CHILD HEALTH I:

AN OVERVIEW

Ill health is one of the burdens that can keep a child from fully exploiting his environment, whether that environment be impoverished or enriched. For this reason, health, and its precursors such as nutrition, must be a major concern in any program aimed at augmenting child development.

But what should be the dimensions of such concern? A "physical" and a vitamin pill? Or perhaps a nurse or physician in every home or classroom? These extremes illustrate in caricature the type of question which must be addressed in defining research issues.

What do we really need to know about health and nutrition to assure that no infant, toddler, or pre-school child is impaired in his ability to fully exploit his environment? What parts of this necessary knowledge are now available for widespread application? What parts are still to be discovered or documented? On what parts of the unknown should we concentrate our investigative attention either because they are basic to our further understanding or because they appear ripe for rapid discovery?

Ideally, one wants to know everything about each problem. But we must have priorities. And, in determining what to consider as a research issue for this discussion, I have chosen a priority system based largely on social mandate.

To be "important" or an "issue" in this sense, the problem must have three characteristics. It must have a <u>significant impact on the real life function</u> of the child, it must affect a <u>significant number of children</u>, and there must be some <u>possibility of intervention</u> that will prevent, cure, or ameliorate it. By these criteria, many currently popular research problems don't qualify as "issues." Even if we allow a small number of affected children to be offset when a problem has a major impact, I would point out that I do not make a distinction between basic

and applied research, but between the importance, in a social sense, of the subject to be studied.

The "issues" in health and nutrition, as they apply to the pre-school child, can be categorized in the answers to four questions:

1. What <u>are</u> the functionally important health problems to be found with some frequency in a group of children?
2. What treatment or intervention techniques will be most effective in preventing or remedying these problems?
3. What techniques will efficiently identify the children who are in need of preventive or remedial services?
4. What resources--financial, manpower, administrative, organization--will be necessary to prevent, identify, and remedy these problems?

Each question can be approached in terms of what is already well enough known to be more widely applied, what still needs to be discovered, and which parts of the unknown have the highest priority for exploration in the immediate future.

"<u>What are the health problems to be found in a group of young children?</u>

We are concerned with: 1) the gross incidence or prevalence of health problems--medical, dental, and psychological--in young children, 2) the functional importance of the problems, 3) the distribution of these problems in various groups of young children--especially socio-economically defined groups, and 4) the amount and effectiveness of the care which the children with problems are already receiving and will require in the future.

We have reasonably adequate data about the gross prevalence in a population of pre-school children of the types of health problems that are traditionally identified through screening tests, medical histories, medical examinations, and

dental examinations.[1-5] For example, approximately 10% of pre-school children will fail a vision screening test and 1%-3% will require glasses. Seventy to 80% of the children in a community without fluoridated drinking water will have dental decay requiring treatment, while only 30 to 40% of pre-school children drinking fluoridated water will show such decay.[6] Congenital heart disease affects 2-5 children per 1,000,[7] but at least 10 times that many will have heart murmurs for which the examining physician may wish a specialist's evaluation. Such figures are extremely useful for program planning. They are well enough known to be more widely disseminated, and attempts have been made to do so.[1-5,8]

However, such data are not as useful as they might seem. For, while many medical abnormalities noted in interview, examination or by laboratory or functional test are clearly "health problems," there are many other medical conditions or findings which cannot be considered as "health problems" because they have no impact on the present or future function of the child. And, there are many other conditions about which we are uncertain.

We have enough data to state, rather categorically, that enlarged tonsils,[10] "intact foreskin," and the vast majority of umbilical hernias[12] are findings which are not problems. For such conditions, physician and parent pressure for unnecessary treatment rather than the condition itself must be considered to be the real problem.

The low hemoglobin concentration of iron-deficiency anemia is a frequent finding in poor infants and pre-school children. But we are not at all certain to what degree, if any, a child with mild anemia is handicapped or even how his anemia can be measured most meaningfully. At what level of hemoglobin is growth, disease resistance, or learning ability actually impaired? Or is serum iron or mean corpuscular hemoglobin concentration, not hemoglobin, really the salient variable? Is lowered hemoglobin the mechanism by which iron deficiency impairs function,

or just a convenient indicator of the iron-poor state of many enzyme systems, cells and organs? Is iron deficiency anemia a useful index of other nutritional deficiencies--vitamins, protein, other minerals--or a function largely independent of other nutritional variables? Is anemia or low serum iron in the pre-school child an indicator of inadequate concurrent dietary iron intake or really primarily a residuum of the widespread sub-marginal iron intake which is known to occur in the first year of life? Or is iron deficiency anemia merely an indicator of a complex socio-emotional relationship between mother and child that results in both overfeeding of milk and lack of cognitive social stimulation?[13]

Answers to such questions are both easy to obtain and of enormous practical importance. If the mild degrees of iron deficiency anemia, which are present in so many children, are causally related to poor health or function, as seems likely,[14] then simple and cheap preventive and curative intervention on a national scale through iron supplementation could have a tremendous impact. If such low hemoglobin and serum iron values are merely interesting laboratory findings with no functional importance, or are concomitant findings in a more complex matrix of child rearing variables, then such intervention is clearly unjustifiable.

While we know too little about the effects and interrelations of iron deficiency anemia, we know even less about deficiencies of other nutrients, except when these occur in their most gross states. When measured against such arbitrary standards as the Recommended Daily Allowances, the diets of a huge proportion of our child and adult populations are considered "inadequate." Are children and adults with such diets actually functionally impaired in some way? Or are such statistics merely a reflection of unrealistic Recommended Daily Allowances?

Biochemical measurements of nutritional status are currently being carried out on populations of children living

in the United States. Preliminary reports reveal very little measurable malnutrition, even in groups of children in the most abject poverty. But, of course, biochemical measurements of other nutrients have the same limitations as measurements of hemoglobin. At what level can a biochemical measurement be considered abnormal, in that it is associated frequently with abnormal function? Do biochemical measurements actually correlate with dietary intake? Does intervention with foodstuffs or with vitamin or mineral supplements actually affect the biochemical measurements or the functional abnormality? We can certainly justify nutritional programs on humanitarian and aesthetic grounds, but the very existence of functionally important malnutrition in populations in the United States remains an open question.

"Speech problems" are reported with high prevalence in groups of young children. But when is a speech problem functionally important and when does it become an issue--by our definition--because there is some possibility of useful intervention? Many pre-school children have immature articulation patterns which have been shown to change to normal speech between age 5 and age 7 without special intervention, and for which the special skills of the speech clinician have been shown to be unnecessary.[15] Is the remarkable diminution of such articulatory speech problems at these ages just a matter of passage of time? Or is it the new social setting of school, or perhaps the amount of attention payed in the first years of school to translating vocalized sounds to written symbols? It seems quite possible that children learn to articulate clearly as they learn to read, and this could have major implications for improving more serious speech disturbances at younger ages, for teaching children whose first years of school do not teach them to read, and for reconsidering the concept of "readiness" for either reading or speech training.

Besides such developmental articulatory speech problems, many children have speech and language patterns which conform to

sub-cultural pronunciations and usages rather than to standard English, while others have speech or language impaired by abnormalities of the hearing or speech apparatus or associated with abnormal central nervous system function. Does dialectal pronunciation interfere, per se, with function or learning? How frequent are the various structural impairments and which interventions work?

The incidence of "mental health problems" discovered in a group of pre-school children depends almost entirely upon the orientation of the examiner. Unfortunately, there are few normative data available about the behavior of poor pre-school children. Nor are there many data available to suggest which types of behavior in a pre-school child predict the behavior and learning problems which are so common in later school years. Intervention or treatment techniques with proven effectiveness are also lacking. Should an opinion, even that of an expert, that a child is "abnormal" be considered to represent a health problem when "normal" is undefined and there is no evidence that what is being called "abnormal" can be modified or even that it will cause any future problem?

There is widespread opinion that structural or functional abnormalities of the central nervous system, related to biological events in pregnancy, child birth, and early childhood ("brain damage," "brain dysfunction," "cerebral dysfunction," "organic"), are a major contributing cause of a substantial proportion of the behavior and learning disabilities manifested by school-age children. There is also widespread opinion that children with such neurologic abnormalities can be discovered in infancy or early childhood by various tests of neurologic function, and that specific types of educational intervention, or even drug treatment, can substantially decrease the later burden of learning and behavior problems. But, despite the proliferation of publicity and of institutionalized intervention programs, we do not yet have knowledge which clearly links learning and behavior disabilities with

insults to the central nervous system, we do not have tests which validly predict which groups of children will later show learning or behavior disabilities, and we do not have intervention techniques of proven effectiveness in improving the function of such children.

These examples show that the definition of what is a "health problem" is no easy task.

How are health problems distributed within the population of young children? The Negro-White differences in incidence so frequently noted in this country are presumably based largely on socio-economic status rather than race, per se. In Great Britain, where race is constant but socio-economic status is routinely recorded in health records, there is strong evidence that low socio-economic status is associated with a higher incidence and prevalence of many health problems.[3] Most dramatically, serious lower respiratory infection is ten times more common in children of the lowest socio-economic status than in children of the highest socio-economic status. What mechanisms mediate this difference? It is not simply exposure to infectious agents, for the same viruses are found with approximately the same incidence in all social groups; and it is not medical care, per se, because physicians have essentially no effective tools for preventing or modifying these viral lower respiratory infections. Is it nutritional status? Anemia? Physical activity? Child rearing practices? Or, is it combinations of many contributing factors? If the incidence of such serious lower respiratory disease in the entire population could be lowered to the incidence of the higher socio-economic class, a substantial proportion of infant and childhood mortality, and an even larger proportion of infant and childhood morbidity and hospitalization would be prevented. And if we understood the mechanisms by which social class exerts its influence, we might be in a better position to break the cycle of poverty.

The present utilization and future need for health care is an important consideration in program planning. In Head Start,

about 80% of the health problems found were newly discovered during the Head Start program; about 25% of these were not thought to require further care. Other studies have shown that about 40% of children with chronic handicapping illness were receiving no care or inadequate care.[2] Some investigations into the reasons for such lack of care will be discussed later in this paper.

Thus, to answer the question "What health problems will be found in a group of pre-school children?", we have adequate information on the gross incidence and definition of many problems. We are in need of much clearer information about the incidence and functional importance of anemia, poor nutrition, speech problems, and the precursors of behavior and learning problems. And we need vastly more knowledge of the mechanisms through which socio-economic status affects the incidence and severity of disease.

The questions about anemia and speech problems seem ripe for almost immediate solution because tools and concepts to provide the necessary answers are already at hand.

"What techniques will efficiently identify the children who have functionally important health problems?"

Once a "health problem" has been defined, there are several possible approaches to identifying which problems exist in which individual children. Among these approaches are the traditional medical evaluation or "history and physical" performed by a physician, screening tests performed by non-physician personnel, questionnaires completed by parents or children, interviews by non-physician personnel, and systematic observation by teachers or others who have prolonged contact with the child. Teachers may identify health problems either by completing standard questionnaires or check-lists or by noting and referring individual children with deviant behavior or parent health problems.

Examination by a physician, dentist, or other specialist traditionally has been considered the most certain way of identifying health problems, and it is usually the standard against which screening tests, questionnaires, or other identification techniques are judged. The physician's evaluation can be thought of as a series or a branched program of individual questionnaire and examination items, each of which is capable of discovering a certain proportion of certain types of health problems.

Which of these individual items and what combinations are most effective in identifying the presence of any health problem or the nature of a specific problem in children of any particular age group is largely unstudied, as is the reliability and validity of each item in the history and physical examination. Beginnings have been made in Wishik's[4] study of handicapping conditions, and analysis of multiphasic screening programs for children should provide further information which could improve the efficiency and effectiveness of the physician's interview and examination.

Screening tests are individual items or small groups of items of interview questions, observations, or laboratory procedures which are applied to groups of persons to identify individuals with a high risk of having some particular health problem. To be useful for screening, a procedure must be economical in time and material costs, reliable in the hands of non-professional personnel, and valid in predicting the presence or absence of a health problem. Even among the few screening tests currently used, few fully meet these criteria. The tuberculin test is an example of one that does. Tests for anemia can be technically reliable and valid, but we have yet to form an adequate definition of anemia. Routine urinalysis produces such a high yield of abnormal tests in relationship to the number of treatable medical problems finally discovered, that many doubt whether it has any usefulness whatsoever as a screening test, at least in childhood. Quantitative urine culture appears efficient and effective in discovering important urinary tract infections, but it requires

special equipment and skills that are not yet widely disseminated.

Even tests so widely used as the various screening tests of visual acuity, though quite reliable, are of unknown validity. While we know that 8%-10% of pre-school children will fail to pass the screening test, we do not know what proportion of the children found abnormal by the screening test will actually benefit from early discovery or treatment, nor how many children will be missed by such a test who actually might benefit from immediate treatment. It is possible that non-testability, or inability to learn the task presented to the child by the vision test, will predict learning or reading disabilities more validly than visual acuity as measured by the test predicts remediable eye problems.

The speech of a deaf child is different from that of a child with athetosis and different from that of children with so-called developmental articulation problems, or with dialectal pronunciation. There is substantial data about which errors and substitutions in speech are made by children with impaired speech due to different causes. This information, if systematized and disseminated, could allow physicians, teachers, and even speech clinicians to more accurately assess children's speech and could probably be the basis for screening tests applied by non-professionals.

Questions posed to parents on a printed questionnaire or by a non-professional interviewer can identify children at high risk of having health problems. One household survey[2] revealed that nearly 50% of children under age six were considered by their parents to have some handicapping condition. Clinical examination confirmed the presence of some abnormality in 80% of such children, while only 32% of the children considered normal by their parents showed any abnormality on examination. Most of the conditions found on examination would not be considered "health problems" by the criteria described in the introduction, but nearly 20% of the children

reported by their parents did have a condition which caused a moderate or severe functional handicap.

Teachers, with their prolonged opportunity to observe children in close proximity to other children of the same age and usually of the same social class, should be in a better position than parents, or even physicians, to identify children whose appearance or behavior deviates importantly from that of other children. The reliability and validity of such screening by teachers should be quantitatively evaluated.

Easily applied reliable criteria for identifying children with learning problems or behavior problems or with a high probability of developing such problems in the future would be of enormous usefulness. Screening tests for retarded or distorted behavioral development have been devised and used widely, but their predictive validity has not been established.

In summary, we appear to have adequate screening tests for identifying tuberculosis, anemia, urinary tract infection, and hearing loss. With current knowledge we are in an excellent position to develop much better tests for remediable speech defects and for vision problems.

The physician's history and examination, while pragmatically clearly extremely useful, can certainly be refined and made much more precise and efficient by systematic studies of what questions and what examinations yield what type of information about what kinds of health problems. Parent and teacher's questionnaires show great promise in identifying health problems but require scientific validation. Tests or examinations which validly identify or predict behavior or learning problems would be of the utmost usefulness.

"What treatment or intervention techniques will be most effective in remedying the problems as defined and discovered?"

Discovering health problems or defects is of only academic interest if no methods exist to treat or alleviate the conditions discovered. Treatment or alleviation need not imply complete

cure, for relief of concern or guilt may represent as great a gain in health as elimination of a pathogenic micro-organism. For example, careful explanation to a parent of the benign nature of a previously identified heart murmur does nothing for cardiac status of the child. But it may relieve a great deal of parental anxiety and may remove unrealistic inhibitions placed on the child's activities.

Rational therapy must be based on a careful weighing of the relative costs and risks of each possible treatment regime and of no treatment. For only a few medical conditions is data adequate for such a judgment. Primary tuberculosis is such a condition. Once a young child has been shown to have a positive tuberculin test, his chances of developing progressive pulmonary or extrapulmonary tuberculosis, though small, are quite real and predictable. Treatment with isoniazid reduces this risk by 75% to 80%.[16] The cost of isoniazid treatment is easily predictable, and the risks of treatment are both well known and extremely small in magnitude. When such knowledge is available, the cost and risks of treatment can be compared directly with the cost and risks of no treatment, and a rational decision can be reached.

But for most medical conditions, knowledge of the risks is not nearly so clear. Bronchial asthma is a frequent and distressing cause of disability in children. While immediate symptomatic treatment can always be justified, the justification for long-term treatment is not so clear. The course of the disease, when no long-term treatment is applied is not accurately known or predictable, even in a statistical sense. The effectiveness of each type of treatment--hyposensitization, environmental controls, dietary restrictions, medications--is not known, nor are the risks and costs of each type of treatment or combination of treatments known. The decision for or against any type of long-term treatment for bronchial asthma must, therefore, be based on much weaker evidence than that which is available for such conditions as tuberculosis.

For some widely used therapeutic techniques, the data available not only fail to support claims of efficacy, but go far towards indicating ineffectiveness. Tonsil and adenoidectomy and umbilical hernia repair have already been mentioned. Many studies have tried to establish the effectiveness of psychotherapy in relieving psychiatric or behavior disorders. The majority of such studies have not shown psychotherapy to be effective.[16] Special classes for children with various educational problems have become widespread phenomenon, yet there is very little evidence that segregating children with special learning problems from their peers results in more learning for either group. In the real world, decisions must be made even in the face of scientific uncertainty, and the full range of negative evidence is only rarely arrayed against tradition and anecdotal reports of success.

"What is effective treatment?" is a question that is constantly asked in current research, and we can expect answers that increasingly approximate the truth. But, as long as we lack precise data on the relative risks and benefits of intervention for many conditions, our most important need may be that every physician or other therapist systematically evaluate and re-evaluate the effects of his therapeutic interventions on the actual health and function of the children he serves. Such systematic "feedback" will go far toward eliminating both harmful and ineffective treatments.

<u>"What resources--financial, manpower, administrative, organizational--will be necessary to prevent, identify, and remedy important health problems as they exist in a group of children?"</u>

We know very little about the dollar cost of protecting and enhancing a child's health. Estimates have ranged from $15 or $20 per child per year to $300 or more per child per year. Project Head Start spends about $70 per child per year on medical and dental services, but this figure cannot be considered to

represent true costs. Some Head Start programs pay for health services almost entirely with funds available from other sources or obtain free services. Others must purchase nearly all services on the open market. Some actually succeed in providing all necessary care to all children, while others miss many children, thus lowering their average costs. Head Start medical and dental services usually must make up for a backlog of medical and dental care needs.

There are no published studies of the actual total costs of bringing all needed health services to all children in a defined community. Planners, legislators, insurance companies, and even parents are desperately in need of such information. It seems likely that a total annual cost would fall someplace between $100 and $200 per child, using current "private practice" charges and delivery methods.

How many health workers with what kind of training will be necessary to provide such services? A pediatrician in private practice supported by one or two ancillary workers usually cares for the children of approximately 1,000 families. Do the health needs of children seen in private practice require approximately the same amount of physician time as the health needs of children in other parts of our population? Could the pediatrician extend himself to care for more children by hiring more helpers or by delegating more parts of his job to his present helpers? Are helpers with new kinds of training needed? Current "standard wisdom" would answer each of these questions "yes," but current opinion is not based on any scientific evidence.

Prevention is nearly always both more humane and more efficient than treatment. A single dose of measles vaccine provides more than 96% certainty that the vaccinated person will not experience measles at any time in the future and, therefore, that he will not require physician care for measles, nursing care for measles, medication for measles, or any other services for measles.

The addition of fluoride to water supplies reduces the incidence and severity of dental decay to 50-70%, drastically revising the need for dental manpower and the cost of dental treatment. Clearly, every child health problem must be addressed, not only in terms of how can it best be treated but how circumstances can be arranged to obviate the need for care.

Will broad social programs in housing, income maintenance, employability assurance, and education actually bring the health care needs of all of our population down to the low level enjoyed by its present most affluent members? Can health education, which seeks to get parents and children to eat nutritious foods, seek preventive medical care and early treatment for health problems, prevent accidents, and promote personal cleanliness, toothbrushing, etc., actually improve health and reduce health care needs? Or can such educational programs actually have no impact on the way children and adults behave? Up to the present time we do not know, but traditional health educational approaches are not well supported by either measurements of their results nor by theoretical analysis of their techniques in the light of modern learning concepts.

We do know, from experience and research, that peoples' patterns of seeking health <u>care</u> can be changed. The attitude of parents of low socio-economic status toward health care appears to be similar to the attitude of people of more fortunate background.[18,19] Their participation in health care is lower because they have many other needs of higher immediate priority, and because the services offered the medially indigent population in most communities are inaccessible in terms of time and distance, expensive in terms of time and money, and often unacceptable in terms of human dignity. When health services are made convenient, available, and accessible, and are administered in a way to protect the time, money, and dignity of the recipients, they are avidly utilized by populations previously called "unreachable."

It seems likely that it is not the attitudes, expectations, and priorities of those who fail to obtain medical care that need to be changed so much as the attitudes, expectations, and priorities of the providers of medical care. We certainly know as little about effective techniques for provider education as we do about effective techniques for consumer education. But experience, which cannot yet be considered scientific evidence, does suggest that when the planners, providers, and organizers of medical care are advised by formally organized groups of consumers or recipients, the services provided are changed and become more widely utilized. And when providers are placed in an administrative setting which allows them, or forces them, to modify their activities experimentally, they accept and act on the results of the experiment. As an example, the cardiology clinic of a children's hospital instituted telephone reminders, personalized reception of patients, staggered appointments and continuity of patient-physician relationships and reduced its incidence of missed appointments from 50% to 10%, with more satisfaction of both patients and staff.

Many commentators, when faced with populations which do not practice all recommended nutritional, preventive medical or health care practices, state blandly that the problem is "educational." If they mean that the dissemination of information and the use of motivational tricks will make the people behave the way experts think they ought to behave, such commentators are clearly wrong. But, in another sense, the problem is one of education or learning. In its most global definition, education is the modification of behavior through experience--as such, it describes a feedback system in which results are evaluated against goals and behavior reinforced or extinguished accordingly. And such feedback systems, learning systems, or educational systems do, I believe, represent the real answers to our problems. The "experts" must <u>learn</u> to acquire and interpret the data about where the

real problems of health and health care lie. Each provider and recipient must learn to interpret his own successes and mistakes. Organizers and educators must learn to provide environments in which such feedback and behavior modification can take place, and we all must learn how to persuade both individuals and political bodies to act responsively to factual data.

SUMMARY

The answers to four questions one must ask in planning to meet the health needs of any group of children define some of the most important research issues in child health.

1. What are the functionally important health problems to be found with some frequency in a group of children? Many are well defined and easy to count, and for some of these we have relatively good counts. While we know that the prevalence of many health problems is related to socio-economic status, we know practically nothing about the mechanisms by which this relationship is mediated. There are certain health findings--for example anemia, poor dietary history, and certain deviations of behavior and speech--that we are reluctant to label as health problems until we have much more evidence about their actual functional consequences. There are certain health problems, especially the behavior and learning problems of school-aged children, that we would like to be able to define in terms of findings at a much earlier age.
2. What techniques will efficiently identify those children who have functionally important health problems? We have a handful of effective and efficient screening tests, as well as several that are widely used but need much further definition in terms of reliability and validity. The series of

tests and questionnaire items which are strung together in a physician's history and physical examination certainly falls into the category of tests whose reliability and validity needs vastly more study. All of the descriptive and predictive tests of behavior and learning, as well as of nutrition and speech, need much further validation before they can be recommended for widespread use.

3. What treatment or intervention techniques will be most effective in remedying these problems? This is the real of traditional medical research, and we know a great deal about many of the specific health problems which are to be found in children. However, rarely are we able to critically weigh costs and benefits of one form of treatment against the costs and benefits of another form of treatment or of no treatment at all. Much of the data we will need to make such logical decisions will come from studies of the natural history of illness and from double blind studies of various forms of intervention, rather than from the currently popular studies of molecular biology and pathophysiology. A continuing problem is the perpetuation of ineffective intervention techniques--bed rest, tonsillectomy, much psychotherapy--because of the humanistic urge to "do something to help," even when we don't know that what we do actually helps.

4. What resources--financial, manpower, administrative, organizational--will be necessary to prevent, identify, and remedy these problems in a population of children? Given current techniques and organizations, we seem to require one children's physician for every 1,000 families with children

> and between $100 and $200 a year for each child. The opportunity for reallocation of tasks between the doctor and his helpers and for new organizational and financial settings is enormous. The tools to measure the effectiveness and efficiency of such changes are weak and need much greater development. We do know that utilization of whatever services are available can be greatly enhanced by making these services responsive to the real needs of the recipients or clients.

The type of basic data necessary to plan a completely rational program for child health have been enumerated, and some of the gaps in existing knowledge have been pointed out. With such gaps in basic knowledge, it is hardly surprising that there is criticism and debate about which methods will best achieve better health and function for young children. But gaps in knowledge and a lack of organizational models of proven usefulness cannot prevent the need for pragmatic decisions about the content and organization of programs to meet the health needs of pre-school children.

Such imperfect knowledge does, however, dictate that practical decisions must be tentative and that diversity of program content and organization is highly desirable, both in adapting to local conditions and in testing and proving new methods. It also dictates that each of the many diverse patterns and programs which develop must build into themselves evaluation and monitoring systems that can lead both to program improvement and to more definite knowledge about the effectiveness of various treatment techniques and organizational plans.

Perhaps the greatest research need is for tools and motivational arrangements that will assure that every practitioner of child health and every organization involved in the promotion of child health can and does fully evaluate his own results in terms

which describe the real issues, and does modify his programs in terms of this evaluation.

John Gardner has described the self-renewing individual or institution as one who is constantly aware of his actual problems and operating results and is constantly developing new resources to deal with the ever-changing situation.

Perhaps the Gardner concept of Self Renewal is what we need most, both in providing today's services and in defining tomorrow's research issues in child health.

BIBLIOGRAPHY

1. Schiffer, C.G. and Hunt, E.P. Illness Among Children: Data from U.S. National Health Survey. Children's Bureau Publication No. 405, Dept. of Health, Education, & Welfare, Washington, 1967.

2. Richardson, W.P., Higgins, A.C., Ames, R.G. The Handicapped Children of Alamance County, North Carolina: A Medical and Sociological Study. Nemours Foundation, Wilmington, Delaware, 1965.

3. Miller, F.J.W., Court, S.D.M., Walton, W.S., Knox, F.G. Growing Up in Newcastle Upon Tyne. Oxford University Press, New York, 1960.

4. Wishik, S.M. Georgia Study of Handicapped Children. Georgia Department of Public Health, undated (Summary of Wishik, S.M. "Handicapped Children in Georgia: A Study of Prevalence, Disability, Needs, and Resources," Am. J. Pub. Health 46:195-203, 1956).

5. North, A.F., Pediatric Care in Project Head Start, in Hellmuth, J., ed. The Disadvantaged Child: Volume II, Head Start and Early Intervention, Special Child Publications, Seattle, 1969.

6. U.S. Public Health Service News Release.

7. Nadas, A., Pediatric Cardiology. J.B. Saunders Co., Philadelphia, 1963.

8. Project Head Start, 2: Health Services, A Guide for Project Directors and Health Personnel. Office of Economic Opportunity, Washington, D.C., 1967.

9. Bakwin, H. The tonsil adenoidectomy enigma. J. Pediatrics 52: 339-361, 1958.

10. McKee, W.J.E. A controlled study of the effects of tonsillectomy and adenoidectomy in children. Brit. J. Prev. Soc. Med. 17:49-69, 1963.

11. Gairdner, D. The fate of the foreskin, a study of circumcision. Brit. Med. J. 2:1433, 1949.

12. Halperin, L.J. Spontaneous healing of umbilical hernias. J.A.M.A. 182:851-852, 1962.

13. Werkman, S.L., Shifman, L. and Skelly, T. Psychosocial correlates of iron deficiency anemia in early childhood. Psychosomatic Med. 26:125-134, 1964.

14. Andelman, M.D. and Sered, B.R. Utilization of dietary iron by term infants. Am. J. Dis. Childh. 111:45-55, 1966.

15. Wepman, M.M. and Morency, A. "School Achievement as Related to Developmental Speech Inaccuracy," research report submitted to U.S. Dept. of Health, Education, and Welfare, Office of Education, Project #2225, 1967.

16. Davis, S.D., Wedgewood, R.J., TB, PPD, and INH. Pediatrics 39:809-810, 1967.

17. Levitt, E.E. Psychotherapy with children: a further evaluation. Behav. Res. Ther. 1:45-51, 1963.

18. Watts, D.D. Factors related to the acceptance of modern medicine. Am. J. Pub. Health 56:1205-1212, 1966.

19. Battistella, R.M. Limitations of the Concept of Psychological Readiness tc Initiate Health Care. Medical Care 6:308-319, 1968.

RESEARCH ISSUES IN CHILD HEALTH II:

SOME MEDICAL AND ECONOMIC ISSUES

by

Robert J. Haggerty, M.D.

Professor and Chairman
Department of Pediatrics
University of Rochester
School of Medicine and Dentistry

Presented to Head Start Research Seminar
Washington, D.C.
November 1, 1968

Another Address: 260 Crittenden Boulevard
Rochester, New York 14620

RESEARCH ISSUES IN CHILD HEALTH II:

Some Medical Care and Economic Issues

Dr. North has very ably summarized our present knowledge of health problems in preschool children and has quite properly emphasized the need in service programs to focus on those conditions which are frequent, cause significant dysfunction, and can be effectively treated by methods one can afford. He quite rightly comes to the conclusion that there are only a few conditions which meet these criteria. By implication he suggests that only these should be included in health care programs for the disadvantaged. I find that I must take a somewhat "forced" position to disagree, since I also believe that such a critical approach is proper. But I believe that we should separate those issues which are essentially social policy ones, such as provision of basic medical care -- a socially desirable service in its own right -- from specific research issues that could be tackled within Head Start programs. I will make the first part of my discussion an argument for using Head Start as the basis for developing a program of delivery of comprehensive health care to all children. Once this floor of basic care were ensured, then specific research projects could be designed on top of it. Without it specific research is likely to be irrelevant, for any findings, such as what screening program is most effective, may not be able to be applied. The contrast of the present, fragmented, permissive, and parsimonious Head Start medical program, subject so much to local option, to the bold, imaginative programs to cure the learning and cultural disadvantages of these children, is striking. We simply cannot wait for all the evidence to come in before acting on a basic health program, as I believe quite properly people did not wait on the basic educational program until all the evidence was in.

Medical care consists in large part of social psychological therapy -- the caring-comfort aspects -- and therefore, like religion, politics and many typical American attitudes such as perfectionism, is not entirely amenable to rational analysis. To expect to prove that all of medical care is beneficial before organizing a system to provide it is too much to ask. One of the major outcomes of medical therapy is patient satisfaction and relief of discomfort. This does not deny that death, disease and disability are also important targets of medical care. But we should also aim to provide a medical program to the disadvantaged, and indeed to all children, that meets needs for satisfaction and relief of discomfort even if we have difficulty with today's information in justifying such care on a cost-effectiveness basis.

I am aware of the purposeful diversity in Head Start health programs. Many of them have arranged for a floor of comprehensive care through local means but others do little but screening programs. This diversity is a weakness when many states have yet to implement Title XIX programs and welfare programs vary so enormously from state to state. I think Head Start could, like the Children's Bureau did a generation ago for their Crippled Children's Programs, establish minimum quality and quantity standards throughout the nation and insist that every child receive basic continuing medical care as a socially desirable human right. Local option could well be allowed for a variety of ways of organizing care and would lead to desirable differences -- i.e., solo fee-for-service or group prepaid service, etc. Such variation would also provide a basis for interesting comparative studies.

There is one other general difference I have with the stand taken in Dr. North's paper and that concerns care for rare diseases. Merely because a condition is rare in the population does not make us any less responsible as physicians to discover it and treat it. I would fully go along with the thesis that the conditions ought to cause significant functional

disturbance, either now or in the future, and be treatable to some degree to have high priority in today's era of shortages. There are several problems which are not common but which if undiagnosed may lead to decrease in function and if found early can be successfully treated. In so doing we will not significantly lower mortality or morbidity of the whole population because the condition is so uncommon, but for the individual child it may make a significant difference in his performance. While I am a constant supporter of the need for physicians to think of populations, there is also a need not to forget individuals. As examples: Some congenital heart disease, such as patent ductus arteriosus and coarctation of the aorta, are usually asymptomatic until complications of infection and heart failure arise later in life. If surgically corrected in childhood, results are usually onesof complete cure. To the individual child and his family these cures are important, even though the cost of finding each case is very high and on a cost-benefit analysis probably do not justify the expenditure. The research issue here is to devise new ways of screening children for these problems that do not require as expensive an instrument as a physician. Experiments with new screening methods is an important research issue for Head Start. Even in the case of conditions for which there is no cure, such as mental retardation, proper management of the family is probably of value to help them avoid guilt and the devastating effects on siblings and parents and should not be denied to a child and his family because such therapy is not yet proven to be of value.

To date we have put more of our resources into care of the complex, rare diseases than in ensuring that every child receive basic general care. In our desire to redress the balance, I trust that we will not give up programs for the individual, for we in America must maintain the value of health care for the individual even though his health may not contribute to the measurable improvement of health of the population. This, too, is a social policy type of issue that research in health services will not illuminate.

I would start with ensuring that all children receive a certain minimum of care. If this is not available nor fundable in any given community, Head Start should be prepared to underwrite, coordinate, or organize this care together with other sources of funds. To achieve medical care for all children will require, as all know, the restructuring of our child health services so that many services now provided by physicians can be given by others. There are clearly not enough physicians, nor will there be, to provide comprehensive pediatric care of the same type now given in our suburbs to all. Manpower shortages are the major barrier to implementation of a comprehensive care program for all children. Dr. North has rightly called attention to the fact that much of what the physician now does may not be useful. We certainly need to continue to carry out studies on what is useful, in part in order to save scarce manpower, at the same time providing what is thought to be optimal care by today's standards.

The basic elements of such care should include continuous, combined preventive-curative services in one location or at least coordination of these by competent, compassionate physicians and their allied health workers. Once this is provided we can proceed to certain research projects in health services for children.

A Model For Study Of Health Services

It may be useful before proceeding further with such potential research projects to describe a model or map of the health care system in order to help identify those issues that can most meaningfully be studied within the context of Head Start programs.

Figure 1 is essentially an economic flow type of model with patient needs and demands on the left hand side and resources and services offered on the right side and utilization of health services as the meeting ground between these two. One can also make a model of the social, psychological,

Model for the Analysis of a Community Health System

(Adapted from an economic model for the "market" of health services)

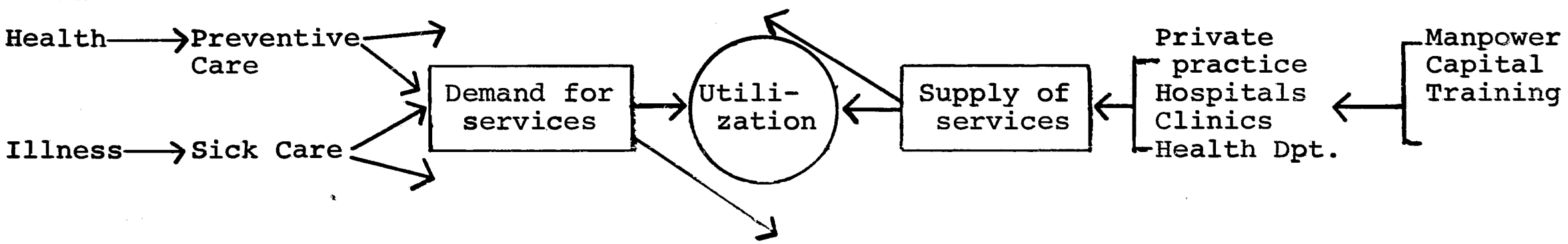


Figure 1

ecological and cultural factors that influence either side of this system. After the introduction of new programs of care one can measure changes in patient needs that result from use of these new services. This would be the outcome variable Dr. North and all of us would like to have.

Now how can we use this model in Head Start programs? The evaluation currently in progress in Head Start is essentially a count of utilization with certain social and demographic data on those who do use the services together with assessment of need as measured by morbidity at time of entry into the system. This is a very good start. This data should be summarized and published periodically for internal review and for secondary analysis by others. The purpose of this seminar is to suggest how we can go further.

First let us take the resources, providers and financing of medical care (the right hand side of the model). In any given community Head Start or any other health care program will face the problem of determining what resources (manpower, facilities and money) are available to provide basic health services for children, how they are currently being used, whether they can be expanded or not, etc. As an example of what can be done I will present some data from our own studies.

We have taken Monroe County -- an upstate New York area of about 700,000 people with 200,000 children -- as our defined population. From a random sample household survey of 1,000 families (1) with children in the County we have determined that 50% of all physician services for children are provided by pediatricians (Sampling procedures, home interviews, coding, and analysis of data have followed standard methods) (2-9).

In addition, a random sample of all pediatricians in the County were selected and their work load analyzed to determine their current activities (10). Table 1 shows the mean time per week spent by these pediatricians compared to other studies of

pediatricians and to internists and family physicians. Table 2 shows that 56% of the office time of these pediatricians is spent in health education, preventive services and presymptomatic screening tests. This is one type of way of determining for a given community whether one can add new programs such as Head Start screening or basic comprehensive care for children not now receiving it without altering the organization of care. We believe that we cannot do so in our community, for pediatricians--the major source of child care in the area--are working as many hours as can be expected of them already. But they could perform additional services if some of the work they now do were done by others. We are now engaged in a study of the acceptability and effectiveness of nurses working in the pediatrician's office and doing much of the preventive work and screening tests--the part of the pediatrician's work day that now occupies so much of his time. I believe that this same problem exists in most communities and not all need to duplicate our research program. A fairly simple assessment will determine if there are similar manpower shortages.

Head Start will then usually need to offer incentives for experimentation in altering the pattern of who provides care if they are to get such services performed. One incentive could be to pay the physician a bonus above his usual and customary fee for presymptomatic screening, preventive services, and health education if he would have these activities done by less expensive personnel and if he would agree to take on additional children for continuing basic pediatric care including his availability for acute illness care. He might be encouraged by the economic gain to shift his organization of practice to care for more children, especially adding some of the disadvantaged from Head Start through the mechanism of having others do some of the things that he now does. The bonus is well justified, for the care of the disadvantaged will probably require more time and energy than care of children in the suburbs. I would hope that in some places such experiments could be carefully evaluated and questions asked such as:

PHYSICIAN ACTIVITY

	Rochester Pediatricians	NDTI Pediatricians	Bergman Pediatricians	Altman Internists	Rochester Family Physicians
Office Visits/week	117 ± 53	100	102	55	140
House Calls/week	15 ± 12	2	ND	5	7
Hospital Visits/week	9 ± 5	16	13	24	26
Hours/week	43 ± 18	ND	46	35	48
Telephone Calls/day	23 ± 11	ND	22	ND	10

Table 1

PEDIATRICIANS' TIME EXPENDITURE

Minutes	Well-Child	Sick-Child
0- 3.9	1 (1%)	40 (26%)
4- 6.9	29 (23%)	54 (35%)
7- 9.9	36 (29%)	39 (25%)
10-12.9	33 (27%)	14 (9%)
13-15.9	16 (13%)	4 (3%)
16-18.9	3 (2%)	0 (0%)
19-21.9	4 (3%)	2 (1%)
22-24.9	2 (2%)	0 (0%)
Total Patients	124	153
Median Duration of visit (minutes)	7-9.9	4-6.9
Percent of total M.D. time	56%	44%

Table 2

What in fact happened when such incentives were given? Did the physician see more children? Were the families of Head Start children accepted and did they use his services? Were they satisfied with his services? I would hope that Head Start would be able to build such experiments of manpower utilization into their health care programs. There are now several examples of such manpower expansions in the literature (11-15). They need to be implemented in Head Start medical programs.

If we now look at the other side of the model (Fig. 1) at the health needs and demands, we can get another fix on the problems. The data already being collected from the records of children enrolled in Head Start should provide pretty good data on medical care needs for those who get into the program. What is needed is to compare these needs with those who do not get in and to see how often professionally perceived needs are converted into demands for service for both groups, for it is likely that those with greater needs and less demands may not get into the program. To do this one needs to sample children not in Head Start. This could be done most inexpensively by identifying the children the following years when they enter first grade and determine if children equally eligible for Head Start who did not use Head Start had greater or lesser health needs than those who had been in Head Start and determine their current use of health services. This would give some data on whether the various health programs of Head Start changed patterns of care. Better still would be a prospective study in which a representative sample of children from the same area of the community as those enrolled in Head Start were identified, their needs assessed, and they were then followed prospectively to determine differences that might be attributed to the health care provided Head Start children. One of the key issues in health care today is how to convert medical need into utilization, especially among the disadvantaged. This would be a high priority research issue in Head Start.

Another type of research within Head Start programs is the measurement of health attitudes, knowledge and demographic characteristics of families of children enrolled in Head Start compared to a representative sample of children from the same area and eligibility not so enrolled. It has been alleged that children in Head Start do not represent the most disadvantaged. This point could be and should be studied. Changes in attitudes to preventive services for instance could be measured before and after Head Start participation and in families of children not enrolled. Questionnaires that measure this type of attitude with reasonable reliability have been developed* and could be used without too great expense but would require special project money to be available for such studies to pay for interviewers, data analysis, and a field supervisor of such studies. I would very much like to see such evaluation funds made available through Head Start. Indeed, I believe that in any care program a certain percent of total funds should be set aside for research and evaluation.

Screening programs themselves could be studied within Head Start. There are four general areas of possible evaluation or types of studies of screening programs: (1) Technical--i.e., reliability and validity of different methods; (2) Social and Behavioral--i.e., who uses screening, why, their attitudes toward, and whether screening programs serve as entries to health care system; (3) Economic--i.e., cost in money, time, anxiety of screening programs, etc.: and (4) Outcome or Effectiveness--i.e., does a particular screening test result in diagnosis of a disease that if treated improves the function of those children discovered?

Obviously the last area is the one to which most people want to have answers; but it seems likely that this is the area where answers are least likely to come out of Head Start, for it would take years in most instances to measure such outcomes. Over the

---

* Available from the author.

short run it would be quite possible to study some of the social, behavioral, and economic aspects of screening in Head Start if not the final outcome. Such problems as bacteriuria, behavior disturbances, developmental problems, etc., would lend themselves to such studies. I believe that it would be a mistake to do nothing because we cannot see our way clear to obtaining the final answer we want on effectiveness.

The need is to set priorities among the various conditions and screening tests and stimulate and initiate some research on screening procedures within this captive population of children, especially if it is combined with a study of those children who do not use Head Start and who could serve as a control population.

Screening programs generally detect chronic disease. This could be a virtue of Head Start programs, for, while general pediatric care can often be found in most communities if incentives are offered, competent screening for chronic disorders and especially evaluation of these is less likely to be available in most communities. Head Start could marry these two components of health care and in the process gather some very useful data on aspects of screening, behavioral and economic aspects of pediatric care.

Prevalence data are another research area that would be useful to study within Head Start. It may be helpful to indicate the actual prevalence data of chronic health problems in children. Dr. North indicates that they are pretty well known. Refreshing our memory may be useful, however, especially since the data are not in all areas as solid as we might wish. Table 3 shows the results of three of the best population surveys among children. They indicate considerable variation in prevalence. One effort of considerable research value in a national Head Start health program would be to develop standardized methods for collection of morbidity data and especially to do so in a way to allow for correlation of such data with social and environmental data. This should be a requirement of any Head Start health care program and has already been incorporated I believe in current

reporting forms.

By morbidity data I do not restrict the term to the usual listings of findings to which Dr. North rightly objects--enlarged tonsils, bow legs, enlarged lymph nodes, etc. A very high research priority should be to develop reliable functional morbidity data. In our Rochester Child Health Study, a random sample of children in one county, we have used a simple three-point rating scale of parental perception of illness--serious, moderately serious, and not very serious--to rate all conditions reported by the mother on home interview. We believe this is a useful beginning because it appears that if the parent perceives a problem as serious, whether it is or not in objective medical terms, such as innocent heart murmur, it is likely to be functionally important to the child.

But the current prevalence data do not demonstrate some of the relatively unrecognized serious and potentially treatable conditions such as lead poisoning, a special problem in many ghettos. In surveys in Chicago as well as in Rochester it appears that about five percent of preschool children have pica and coproporphyrinuria and are very likely to have a total body lead burden that could be toxic under stress. I would make mandatory screening for this condition, as well as the traditional vision, hearing, and heart disease, a requisite for a comprehensive care program. Others will undoubtedly add pet screening tests of their own choosing.

Another type of problem that hits to the core of Head Start is learning troubles. Clearly not strictly either a medical or an educational problem, it is one requiring many disciplines and one requiring a great deal more research to understand. The prevalence, however, is astounding. In the Rochester Child Health Survey 25 percent of all school age children were said by the parents to have had serious or moderately serious trouble with schooling. That this is a real finding is indicated by the fact that 22 out of each of these 25 children had actually dropped back at least one grade level. As Dr. North indicates, we don't know

TABLE 3

PREVALENCE OF CHRONIC CONDITIONS IN CHILDHOOD

(Conditions per 1000 - Both Sexes)

Condition	U.S.N.H.S. (1959-61)	North Carolina	Isle of Wight
Hay Fever, asthma & other allergies	74.3(32.8%)	29.0(17.9)	16.4(30.3)
Sinusitis, bronchitis & other resp.	34.2(15.1)		
Paralysis, orthopedic & other impairments	26.3(11.6)	31.0(19.1)	17.8(33.0)
Sensory (Visual, auditory, speech)	19.4(8.6)	48.0(29.6)	3.0(5.5)
Gastrointestinal	10.2(4.5)	----	0.3(0.5)
Cardiovascular	8.3(3.7)	4.0(2.4)	2.4(4.4)
Dermatologic	8.2(3.6)	11.0(6.7)	6.3(11.7)
Genitourinary	4.8(2.1)	----	1.2(2.2)
Hematologic	2.9(1.3)	----	----
Infective & Parasitic	2.5(1.1)	----	----
All other conditions	35.1(15.6)	39.0(24.0)	6.6(12.2)
(Mental Subnormality)	----	(77)	(27)
(Behavioural Disturbances)	----	(52)	(57)
Total	226.1 100%	162 99.7	54 99.8

TABLE 4

Illness as reported by mothers: Children age 0 to 17

Monroe County, New York, 1967

	Rochester City Nonwhite	Rochester City White	Suburbs	Total County
Days lost due to illness* (per child per year)				
Restricted activity	6.9	15.8	9.0	11.0
Bed disability	2.4	5.1	4.0	4.2
10 selected symptoms* (incidence per 1000, last 12 months)				
Frequent earache	138	87	95	96
Frequent headache	165	105	103	109
Stammering	46	35	17	25
Lisping	41	35	22	27
Hard to understand	115	72	44	59
Difficulty seeing	69	119	75	88
Major tooth troubles	234	142	104	127
Hayfever	55	40	87	69
Other allergies	101	153	180	165
Sinus troubles	41	40	65	55

* Significant below p=0.01

TABLE 5

Place and frequency of medical care: Children age 0 to 17

Monroe County, New York, 1967

	Rochester City Nonwhite	Rochester City White	Suburbs	Total County
Hospitalizations	5.5%	6.3%	5.2%	5.6%
Frequency of doctor visits (visits per child per yr.)				
Private doctors	.7	4.5	4.2	4.0
Hospitals, clinics	2.4	1.8	.3	1.0
Total visits	3.1	6.3	4.5	5.0
Phone calls	.2	2.3	1.1	1.4
Total consultations	3.4	8.6	5.6	6.4
Place of last contact, last year				
Private physician	31%	63%	76%	68%
Hospital, clinic	40	15	5	12
School	7	8	13	11
No visit in last year	21	14	6	9
				100

TABLE 6

Immunization Status of Children age 1 to 5

Monroe County, New York, 1967

	Rochester City Nonwhite	Rochester City White	Suburbs	Total
DPT*				
Immunized	87%	94%	85%	88%
Not immunized	13	6	15	12
Polio*				
Immunized	76%	94%	84%	87%
Not immunized	24	6	16	13
Smallpox				
Immunized	74%	83%	81%	81%
Not immunized	26	17	19	19
Measles*				
Immunized	45%	72%	67%	67%
Not immunized	55	28	33	33

* Significant below p=0.01

how permanent such problems are or what is the best method of therapy. But we need to determine the antecedents of this problem in the preschool Head Start population and initiate follow-up programs to correlate early developmental problems with later school problems.

The distribution of illness by socioeconomic group is not random. For most health problems there are higher rates for children living in the ghettos. In our Rochester study this is shown in Table 4 where restricted activity and chronic disorders were both more frequent in the children living in the city than in the more affluent suburbs. As shown by Table 5, medical care is not distributed very rationally in regard to need either. Lest we think this is entirely a Negro problem, our Rochester study also shows that whites living in the ghetto areas have more health problems than the Negro but also use more medical care for acute illness. On the other hand, preventive services are especially poorly distributed among the Negro (Table 6). Our programs should not be organized only for the black, although they are generally in greatest need, but for all who have unmet needs.

Another problem with a high prevalence is anemia, mostly nutritional in type. In contrast to learning problems which parents usually define as serious, anemia is rarely noted by parents. As Dr. North has suggested, this is a problem about which we know very little. What is the level of hemoglobin needed for optimal health? This could be explored in an epidemiological and experimental framework; that is, various supplements could be offered and health consequences studied. Head Start would be a good laboratory for such a study. If basic comprehensive care were to be provided to all children in Head Start such experiments could be carried out on top of or in addition to the basic services without the ethical problem of controlled studies that would exist otherwise.

Comprehensive Care Versus Fragmented Care

There are many logistic and ethical questions in conducting controlled experimental studies such as supplemental diets. I believe such studies would be morally and politically feasible only if they were combined with provision of comprehensive health care as a basic service. There would then be an underpinning of care that would meet families' expectations and wishes. If combined with high standards and requirements, such as combined curative and preventive services in one location, use of physician assistants, cost controls and scheduled screening procedures, there could then be superimposed a well-controlled research program to study the effectiveness of such things as dietary supplements of iron without serious ethical problems or the introduction of new screening programs.

To provide only diagnostic services within Head Start and then refer children on with detected disorders is generally poor care. For the disadvantaged especially, present oriented as they must be to survive, access to medical care at the time of acute illness is likely to be much more positively received than referral for care of an asymptomatic problem scarcely perceived as a problem by the parent. In addition, we fail in the present program to give full weight to the burden that acute illness makes on the child in achieving the benefits of the Head Start Program. More days will be lost from acute illness than all chronic disease together. While medical care can do little for many of these acute conditions, it can effectively treat some--streptococcal infections, diarrhea, and otitis media--and reduce absences and occasionally late sequellae and relieve symtoms and anxiety in others; and, perhaps most important, it can serve as the point of entry for the disadvantaged into the medical care system.

Another aspect of the need for comprehensive care is for maternal care. It has been estimated that one-quarter of all handicapping conditions in childhood arise from perinatal problems. Dr. North has pointed out how little we know about some

of these associations, but it is clear that the increase in prematurity in lower social class women and subsequent poor intellectual function of these children are both related to the poor environment. To really improve the health of preschool children we are going to need to provide better prenatal care which should include nutritional supplements and improvement of social environment. This is one more argument to me for making the health component of Head Start part of comprehensive health care for mothers and children, not merely an isolated case finding of chronic disease in children. We should use the child as the stimulus for entree of the family into the medical care stream. The child is much more likely to be an effective agent of change than the mother herself.

Since rising cost is a major problem in medical care today and implementation of a comprehensive medical care program for all children would cost more than the $70 per year per child now spent by Head Start, anyone who suggests this must have some ways of controlling cost. If I had a clear answer I would line up for a Nobel prize. But I have some data which suggest that comprehensive care might not be as expensive as is the currently provided fragmented care, for we must recognize that Head Start children also receive a good deal of other care, albeit poorly coordinated, which adds to the total cost. I do not have any total cost figures, but it must be high. As one evidence of this, in our random sample survey of all children in our County we have found the use of prescribed drugs fantastically high. In this study we asked, for each child interviewed, whether he had received a prescribed medicine in the previous forty-eight hours. Nearly 20 percent had! There is a further interesting social class and religious difference shown in Table 7. With such marked differences it seems unlikely that these medications are all needed. Some savings with comprehensive care provided by the same doctor should accrue by reducing unnecessary drug costs, although I recognize that certain audit procedures may be necessary to ensure this.

TABLE 7

ROCHESTER CHILD HEALTH STUDY

Child Use of Prescribed and Non-Prescribed Medicine

In Previous Forty-Eight Hours

S.E.A.	Prescribed	Non-Prescribed
	Percent	
I	14.8	23.8
II	30.1*	[illegible].1
III	17.1	26.9
IV	14.2	25.0
White - Protestant	23.1*	22.0
White - Catholic		35.1
Non-White - Protestant	12.6*	7.2*
Non-White - Catholic		38.8*

* = Statistically significant

Perhaps the largest source of cost is hospital care. Here, too, there is some data that suggests great savings may occur from comprehensive care. In a study in Boston (16) in which comprehensive care was offered to a group of families and a randomly selected control group was allowed to continue using fragmented services in the Emergency Room, there was a significant decline in the number of surgical procedures and hospitalizations in those children who received comprehensive care (Table 8).

For these and other more emotional reasons I believe that it is more costly and less effective to provide medical care, as has been done in Head Start; that is, to provide funds for physician screening exams and payment for follow-up care in another location. I believe the money would be better spent in adding it to existing programs for comprehensive care and using them as a lever in other places to stimulate the development of such types of care. Where facilities and manpower were not sufficient it would be possible, through development of comprehensive maternal and child health care centers, to provide comprehensive services and to conduct the really important experiment on the feasibility, cost, and effectiveness of new ways of delivering total care. Until such experiments with careful cost and effectiveness studies are carried out we really cannot answer the question of what is the best way to deliver medical care to children in our country. Therefore, I can speculate as much as anyone without fear of being proven wrong. I believe that it is likely that screening procedures and payment only for care of handicapping conditions found may turn out to be a less cost-effective and less satisfying way to provide medical care for disadvantaged children than complete comprehensive care, however.

It is estimated that for $200 per child per year total comprehensive care can be provided, including hospitalization. It is probably higher for the disadvantaged. It would be interesting to try the experiment of attempting to control costs by offering this sum to physicians for care on a per capita basis. After all, a pediatrician can care for at least 1,000 children. With

TABLE 8

RATES OF HOSPITALIZATIONS AND OPERATIONS AT SIX-MONTH PERIODS

Time Period (months)	Hospitalization Rate per 100 Children		Operation Rate per 100 Children	
	Experimental	Control	Experimental	Control
6	4.26	2.04	1.6	0.5
12	2.99	3.74	0.8	1.6
18	1.82	3.27	0.8	1.2
24	1.93	3.64	1.0	2.0
30	3.08	3.87	1.3	1.9

$150,000 to $200,000 per year that would then accrue for the care of 1,000 children he would have a large sum to use to organize care most efficiently and an incentive to keep costs down. The total cost, if such incentives were successful, would then be less than currently spent on fragmented services and the physician might even make more. Head Start is already paying nearly half this much. With Title XIX, OEO and other funds we should be able to find the funds for the remainder while at the same time controlling costs and improving quality. Such incentive experiments should be a required experimental part of any comprehensive care program for Head Start Programs.

Summary

I have in this discussion advanced the notion that we should combine our humanitarian principles with our critical research questions and carry out the bold medical care experiment characteristic of Head Start's educational goals. We should ensure that children receive a basic comprehensive medical care program and then combine it with controlled experiments to answer some of the high priority questions about which we have so little data, such as manpower innovations, medical needs, screening tests, attitudes, utilization, prevalence data and costs.

The solution, as in so much of life, is not a rigid adherence to a limited, parsimonious program or a totally uncritical and wasteful approach but a middle ground. The middle is always hard to find and even more difficult to maintain. A comprehensive care program with certain guidelines, requirements of quality, and restrictions on unnecessary procedures is my middle ground with simultaneous stimulation through incentives to carry out specific research projects on top of this.

REFERENCES

1. Haggerty, R. J. and Roghmann, K. The Rochester Child Health Survey I: Methodological Aspects (mimeographed). Presented at the International Epidemiological Association Meeting, Primosten, Yugoslavia; September, 1968.

2. Elinson, J. "Methods of Sociomedical Research" in HANDBOOK OF MEDICAL SOCIOLOGY. Freeman, H., Levine, S., and Reeder, L., eds.; Prentice-Hall, Inc., Englewood Cliffs, N.J., 1963, pp. 449-471.

3. Kish, L. SURVEY SAMPLING. John Wiley and Sons, Inc., New York, 1963, 643 pp.

4. Nisselson, H. and Woolsey, D. Some Problems of the Household Interview Design for the National Health Survey. Jour. Amer. Statistical Assoc. 54:69, 1959.

5. National Center for Health and Statistics, "Origin, Program, and Operation of the U.S. National Health Survey", Series 1, Number 1, April, 1965.

6. National Center for Health Statistics, "Replication--An Approach to the Analysis of Data from Complex Surveys", Series 2, Number 14, April, 1966.

7. National Center for Health Statistics, "Health Survey Procedure--Concepts, Questionnaire Development, and Definitions in the Health Interview Survey", Series 1, Number 2, May, 1964.

8. National Center for Health Statistics, "Conceptual Problems in Developing an Index of Health", Series 2, Number 17, May, 1966.

9. Hyman, H. H., Cobb, W. J., Feldman, J. J., Hart, C. W. and Stember, C. H., INTERVIEWING IN SOCIAL RESEARCH. The Univ. of Chicago Press, Chicago, 1954.

10. Hessel, S. J. and Haggerty, R. J. General Pediatrics: A Study of Practice in the Mid-1960's. Jour. Pediatrics 73:271, 1968.

11. Austin, G., Foster, W., and Richards, J. Pediatric Screening Examinations in Private Practice. Pediatrics 41:115, 1968.

12. Ford, P., Seacat, M. and Silver, G. The Relative Roles of the Public Health Nurse and the Physician in Prenatal and Infant Supervision. A.J.P.H. 56:1097, 1966.

13. Lewis, C. E., and Resnik, B. Nurse Clinics and Progressive Ambulatory Care. New Eng. Jour. Med. 277:1236, 1967.

14. Silver, H., Ford, L., and Stearly, S. A Program to Increase Health Care for Children: The Pediatric Nurse Practitioner Program. Pediatrics 39: 756, 1967.

15. Stanfield, B. and Sharp, E. Ambulatory Pediatric Care: The Role of the Nurse. Medical Care 6:507, 1968.

16. Alpert, J., Heagarty, M., Robertson, L., Kosa, J., and Haggerty, R. Effective Use of Comprehensive Pediatric Care: Utilization of Health Resources. A.J.D.C. 116: 529, 1968.

RESEARCH ISSUES IN CHILD HEALTH III: SOME SOCIO-ANTHROPOLOGIC AND ORGANIZATIONAL ISSUES

Marsden G. Wagner, M.D., M.S.P.H.

It has been stated that a health problem, to be of importance to Project Head Start, must have a definite impact on the day-to-day functioning of the child. Perhaps this criteria applies equally to any aspect of the health program of Project Head Start. Is there research data or can we obtain data to answer questions such as, "What does Head Start mean to the family?", "Can a health program in Head Start be so integrated into the family subculture as to initiate desirable change in family health behavior?" This family health behavior, including nutritional habits, sleeping habits, traditional health remedies, child care arrangements, etc., is, of course, infinitely more important to the health of the young child than those rare visits to a doctor or clinic which is most likely far removed from their own milieu. The field of medical anthropology provides a number of documented examples of attempts to superimpose an outside system of health care onto groups.[1-8] The subsequent failure of most of these attempts has been due to a failure to consider such questions as those just raised concerning Head Start. Many current comprehensive health programs in the United States today are experiencing similar difficulties because of problems in integrating the programs into the cultural context of those they wish to serve. Instead of asking, "How can we educate (i.e., change) the patients to accept our program?", we might ask, "How can we change the program so that it is readily acceptable to them?" There is relevant research which is applicable here. There are methods for determining what present indigenous health practices are and how to fit a health program into such health practices so that the program is easily assimilated into their day-to-day functioning.[1,9,10,11]

I would like to address myself to each of four main issues concerning child health as it relates to Project Head Start. The

first question is, "What are the functionally important health problems in young children?" The answer to this question is dependent on the way the person asking the question sees health. In spite of living with the World Health Organization's definition of health for twenty years, we physicians are still trained to see health as absence of disease, leading to a dichotomy of health or sickness. This is probably the result of the history of medicine which developed as a descriptive science spearheaded by pathology which is essentially abnormal anatomy. Thus, an organ (or person) is diseased (i.e., not healthy) if one can see the disease process. This approach has serious disadvantages. At best, it sees health as a continuum from normal to abnormal.

It is of considerably more than academic interest to consider an alternate approach to health. We know now that an individual's ability to "fully exploit his environment" is the result of a dynamic equilibrium of thousands of factors (biochemical, psychological, anatomical, environmental, etc.); and the functional level of this individual (which cannot be seen through a microscope) has, as a result, a wide range. This range does not have a normal and abnormal end but an optimal and sub-optimal end.

Such a positive, functional type of theoretical construct of health would change the original question to: Which of the thousands of factors in the child's total internal and external environment are most commonly found at sub-optimal levels and may therefore be interfering with the child's optimal functioning? It is apparent that one cannot expect to take a single physiological or biochemical variable such as hemoglobin and compare it with a single functional variable such as academic performance and expect a significant correlation unless the hemoglobin is far down the sub-optimal end of the range. An attempt was made recently in California to correlate, in a large group of school children, a volume of data from physical examinations and laboratory studies with school performance

with predictable lack of significant results.[12] On the other hand, when dealing with single variables such as hemoglobin, one could search for levels which appear to provide optimal functioning hopefully studied through positive tests of functioning such as exercise tolerance, tolerance to anoxia, etc., rather than negative tests of loss of functioning such as disease states. Likewise, in service programs, one could attempt to provide these theoretically predetermined optimal levels of hemoglobin, realizing there could very well be a significant gap between the optimal level of hemoglobin and the level of hemoglobin at which the dynamic equilibrium of these thousands of factors would be so altered as to produce measurable decrease in functioning and, ultimately, disease.

The same shift in approach to health from absence of disease to optimal functioning could be applied to the question of "mental health problems." The question, instead of "Is the individual abnormal mentally?", becomes "Is the child's behavioral function optimal?" A study in California of pre-school children revealed that, according to the mothers, 91% of the children had at least one problem with behavior with an average of 6.3 problems per child of which 4 were mild, 1.7 per child were reported to be of intermediate concern, and 0.6 of a problem per child the mother felt to be of serious concern. These problems included stubbornness, disobedience, temper tantrums, easily hurt feelings, etc.[13] Within the context of the child's immediate environment, then, optimal behavioral function is rare in the pre-school child.

While we are not overwhelmed as yet with data on the emotional and social behavior of pre-school children in poverty areas, such information is beginning to accumulate and certainly should be made available for wide application since it fulfills the criteria for an important issue. As one example, Schaefer, while providing a program of systematic cognitive stimulation to children 18-36 months of age in a culturally deprived area of Washington, D.C., found one group of children resistant to the possible benefits of this program who were suffering from a

syndrome which included increased frequency of infections, increased frequency of child abuse, decreased maternal interest in the child, and marked irregularity of meals provided to the child.[14]

The literature in the area of emotional and social behavior of the pre-school child is extensive enough to warrant a review by Ervin-Tripp, who notes that "The environment of the infant may be significant well before the ages heretofore thought important and, if considerable early sensory stimulation is indeed necessary, lowering the age of availability of skilled nursery school care radically is implied.... The point of these early programs is that divergencies between the social classes increase with age, so that the longer the delay in taking action, the more difficult it becomes to reverse the early deficits."[15] Several programs involving enrichment at a pre-Head Start age have been initiated, and some preliminary data are available.[16,17,18] All such data indicate that the cycle of poverty, including how it affects parental health behavior, language development, nutritional preferences, etc., is well established by Head Start age seriously reducing any possible effectiveness of Project Head Start.

A second question is: What techniques will efficiently identify the children who have functionally significant health problems? The technique to be used will depend on the type of problem defined and will therefore be of necessity self-fulfilling prophecy--that is--you discover what you look for. A traditional physical examination will discover traditional diseases--in fact, screening tests, teacher observation, parent history forms are all similar in that in each case you get answers only to those questions you choose to ask. It may well be that with culturally deprived children we are not asking the most important questions. If we ask different questions, we will need to develop new techniques to secure the answers. Perhaps, for example, for every culturally deprived child with functionally significant organic heart disease,

there are 100 children suffering from a syndrome of increased abuse, increased infections, decreased maternal attention, and decreased nutrition such as that described by Schaefer.[14] If this is true, then, instead of cardiac auscultation by a highly trained physician in a setting foreign to the child and parent, higher priority be given to successive observations in the child's own home of parental health behavior, nutritional practices, etc., by a trained indigenous para-professional. With regard to the health of culturally deprived children, I wonder if the physician's history and physical examination is "pragmatically, clearly, extremely useful." The physician's traditional approach is totally inadequate to the assessment of nutritional patterns, quantity and quality of maternal attention, child abuse (except for that small part of the iceberg which is visible--profound physical abuse), language development, and almost every major problem which the literature suggests may be important to the culturally deprived pre-school child.

Perhaps, however, the second question should be combined with other questions concerning identification techniques, treatment techniques, and resources into a single, larger question: What is the most effective system of health care for culturally deprived pre-school children? There is little practical value in the mere identification of health problems if intervention is not possible, and neither process should be attempted until the necessary resources are available. It is important to recognize that we are talking about systems of health care. We should, as has been pointed out, put what is known to good use, and there is a considerable body of knowledge concerning various patterns of health care in children and their respective advantages and disadvantages. There are, further, valid tools for measuring the effectiveness and efficiency of such systems.

This point can be illustrated with an example. In a recent Bulletin of Pediatric Practice, published by the American Academy of Pediatrics,[19] one of the regional Head Start consultants pointed out that Head Start health programs frequently were

modeled after already established school health programs in that area. This certainly seems logical, since many of the Head Start programs were set up in schools, and school health programs are an attempt to establish a system of health care in a school setting. Is this particular system of health care a good one for Head Start to adopt? Turning to what is known about health care systems, we find at least four highly desirable criteria: They should combine all aspects of health care for the individual, preventive, diagnostic, and curative (i.e., comprehensive); they should be part of the general system of health care for that community; they should be tailored to the particular health needs of the individuals they serve; and they must be capable of acceptance by the individuals such that the health care system becomes a meaningful part of their life patterns. Studies of school health services have demonstrated clearly that this system of health care fails at all these criteria. School health service programs are not comprehensive and, in fact, create a serious iatrogenic problem of follow-up failure; that is, they identify problems without any effective means to insure intervention.[20,21] School health service programs are not in the mainstream of health care in their communities, and in one study just completed it was demonstrated that they relate very little to the rest of the community.[22,23] School health service programs are not tailored to the needs of the individuals served; and, in another recent study, even the physicians who willingly served in a school health service program agreed that their program was not meeting what they themselves considered to be the important health needs of the children in their schools.[24] The fragmented, intermittent nature of this system of health care mitigates against any reasonable expectation that it could have any lasting significance to the health behavior of the child. The most insidious factor of all, however, may be that the very existence of this system of health care breeds contentment on the part of those responsible for the health of the

child involved such that effective alternatives are not considered.

This example was chosen not only because of the fear of the high risk of Head Start health programs falling into a pattern of health care which has already been shown to be ineffective, but also because many of the fallacious arguments which have been used in the past to support school health service programs such as "a captive population" and many of the dilemmas which the school health service programs have faced are applicable to Project Head Start. School health service programs have not responded to available knowledge or new knowledge: neither with regard to the health needs of the children they serve nor with regard to the effectiveness of their services. Project Head Start can respond to available knowledge, if it will, before a tradition is established.

In applying present knowledge of health care systems to Project Head Start, the same criteria, including comprehensiveness, relationship to the community health care system, tailoring to the patient's needs, and acceptability, need to be applied. It appears that the present patterns of health services in Project Head Start fall short of these criteria. Can Head Start health services be comprehensive when they serve only one member of a family? While the recommendations from the federal level have included integration of the Head Start health program into already existing medical services, there is great local variation and many Head Start health programs are superimposed on already existent community health services leading to further fragmentation. As has already been indicated, present methods of diagnosis used in Project Head Start, such as physical examinations by physicians, are not designed, in many instances, to identify the health problems which available data suggest are the most important for the Head Start child. And finally, there appears to be little or no evidence of an attempt at the local level to integrate the Head Start health program into the cultural milieu of the Head Start child. Could the application of knowledge of

health care systems result in alternatives to the present system of health care in Head Start? Could diagnostic services be carried out to a great extent in the home using nurses and/or trained indigenous workers? Can the treatment services for some health problems be integrated into the family health patterns in the home or into the daily routine of Project Head Start? Could the diagnostic and treatment services for the more traditional health problems be, to every extent possible, provided by the same resources used by the rest of the family with the Project Head Start health coordinator serving to insure adequate standards of health services? Does the Head Start nurse always need to be an R.N. or even a nurse? Should such an individual spend more time in the Head Start unit or in the homes of the Head Start children? Could more "pediatric nurse assistants" be trained and used extensively and effectively in Project Head Start?

Such changes in Project Head Start health services could then be studied using the available tools to determine if they are effective in meeting the criteria. These tools which can be used include behavioral science methodology, the epidemiological approach and statistical analysis. These are the same tools used in the studies cited involving school health service programs and are the same tools used very widely and effectively in many other studies of systems of health care.

In conclusion, Project Head Start is a new program to enhance child development. Ideally, this program should be conducted as an experiment in itself, including an experiment in the application of health care to young children. Such research should include a study of the sub-culture served by Project Head Start and the mechanism of cultural change in this group. It should include the investigation of the possibility of earlier intervention based on present and rapidly accumulating research data. It should include studies of the techniques of intervention in the health behavior of young children and their families--that is, patterns of health care.

By so doing, Project Head Start will use all available research in the health of early childhood and at the same time be a most important experiment in advancing health care to this group.

REFERENCES

1. Van Amelsvoort, V. Culture, Stone Age and Modern Medicine. Assen: 1964. Van Gorcum & Co. 241 pages.

2. Wellin, E. Water boiling in a Peruvian town. Health, Culture and Community (edited by B.D. Paul), pages 71-103, New York 1955, Russell Sage Foundation.

3. O'Berg, K., and Rios, J. A community improvement project in Brazil. Health, Culture and Community (edited by B.D. Paul), pages 349-376. New York 1955, Russell Sage Foundation.

4. Adams, R. La antropologia aplicada en los programmas de salud publica de la America Latina. Boletin de la Oficina Sanitaria Pan-americana, 33:298, 1952.

5. Lewis, O. Medicine and politics in a Mexican village. Health, Culture and Community (edited by B.D. Paul), pages 403-434. New York 1955, Russell Sage Foundation.

6. Saunders, L. Healing ways in the Spanish southwest. Patients, Physicians and Illness (edited by E. Jaco), pages 189-206, Glencoe 1958, Free Press.

7. Miner, H. Cultural change under pressure. Human Organization, 19:164, 1960.

8. Freedman, M. Health education and self education. Health Education Journal, 15:78, 1957.

9. Jelliffe, D. Child Health in the Tropics. Arnold. London 1964, 148 pages.

10. Foster, G. Problems in intercultural health practice. Social Science Research Council, Pamphlet #12. New York 1958, 49 pages.

11. Roney, J. The place of anthropology in a technical assistance program. Scientific Monthly, 78:159, 1954.

12. Cobb, O. Personal communication.

13. Health supervision of young children in California. Publication of the California State Department of Public Health, 1960.

14. Schaefer, E. Personal communication.

15. Ervin-Tripp, S. Language development. Child Development Research: Vol. 2, (edited by Lois & Martin Hoffman, page 60). New York 1966, Russell Sage Foundation.

16. Schaefer, E. Intellectual stimulation of culturally deprived infants. National Institutes of Mental Health, 1968, Mental Health Grant Proposal No. MH-09224-01.

17. Gordon, I., and Lally, R. Intellectual stimulation for infants and toddlers. Institute for the Development of Human Resources, University of Florida, Florida, 1967.

18. Caldwell, B. Personal communication.

19. American Academy of Pediatrics. Bulletin of Pediatric Practice, Vol. 2, No. 3, September 1968.

20. Cauffman, J., Warburton, E., and Schultz, C. Health care of school children: effective referral patterns. American J. of Pub. Health, 59, 1:86-91, January 1969.

21. Cauffman, J., Peterson, E., and Emrick, J. Medical care of school children: factors influencing outcome of referral from a school health program. Am. J. of Public Health, 47, 1:60-73, January 1967.

22. Wagner, M., et al. The school physician views the community: a study of the relationship between the school physician and the medical and non-medical community. Submitted for publication.

23. Wagner, M., et al. A study of school physician behavior. Am. J. of Public Health, 58, 3:517-27, March 1968.

24. Wagner, M., et al. The school physician: a study of satisfaction with his role. Pediatrics, Vol. 40, No. 6, pp. 1009-1018. December 1967.

RESEARCH ISSUES IN CHILD HEALTH IV:

SOME PHILOSOPHIC AND METHODOLOGIC ISSUES

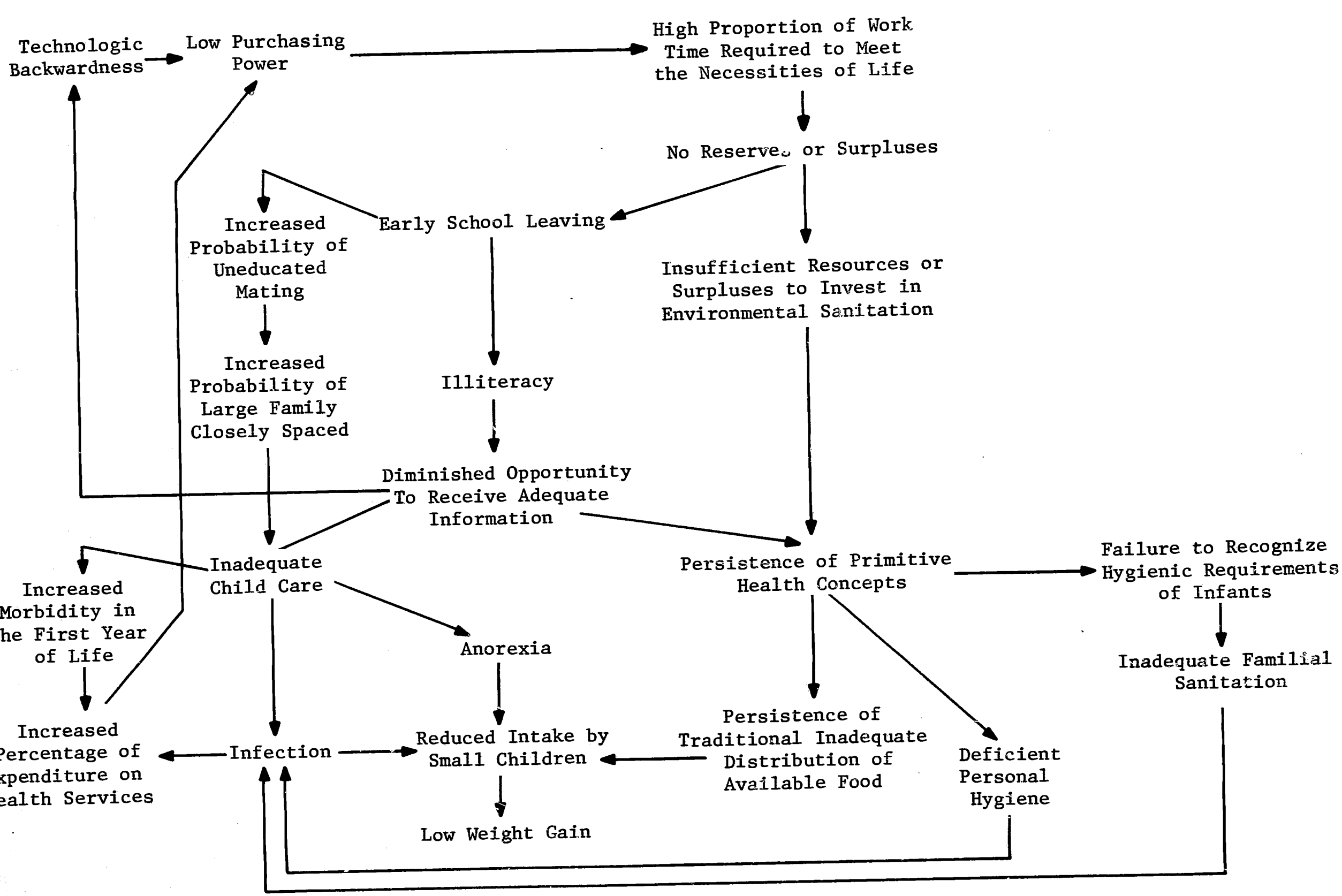
by

Herbert Birch, M.D., Ph.D.

Research Professor of Pediatrics
Albert Einstein Cclllege of Medicine

Presented in part to the Head Start Research Seminar
Washington, D.C.
November 1, 1968

INTERRELATION AMONG BIOSOCIAL FACTORS AND LOW WEIGHT GAIN



RESEARCH ISSUES IN CHILD HEALTH IV:

Some Philosophic and Methodologic Issues

The discussion of research issues in child health and nutrition at this symposium has centered around what are really two different types of questions. One type of question is a question of political imperatives: imperatives for social and economic change, imperatives for change in the circumstances of whole segments of population, and imperatives for the expression of dignity and for the expression of self determination on the part of these segments of the population. The second type of question, which has been confused with rather than integrated with the first, concerns research issues and research problems that may be confronted in the area of health, education and development, particularly as it affects certain segments of the population which are called "socially disadvantaged."

This "disadvantaged" population has not merely been culturally deprived. Its members have been exploited. They have been segregated in the community. They have been subjected to the excessive and unbearable patterns of insult for centuries. They have been deprived of housing, of health, of educational and economic opportunities and of a variety of other things. So our discussion takes place in an atmosphere in which a significant segment of the American population is expressing itself in various and heterogeneous ways, in many different voices, but with a message--namely, "We wish to be heard. We wish to be determiners of our own destinies. We wish to define the kinds of problems we have and the ways in which the problems we have are to be approached. We do not want the cold

cup of charity. We want the warm hand of justice." This is a very different kind of atmosphere from any in which concerns about welfare, health, or education, or disadvantaged segments of populations, have been considered in the past. This is a new period in American history, a new atmosphere in the arena of social functioning and of social change.

We may well ask the question, "Does research, or does science have anything to do with this area or with this question. Or would it be presumptious on the part of science, upon the part of researchers, to think that they could answer questions of this importance and of this complexity?"

I agree with Peter Medawar when he says that science is the art of the soluble, that is the art of investigating issues for which we have the appropriate technology, and in connection with which we may ask the appropriately defined questions which may be answered by our investigative activities. I have grave doubts and misgivings as to whether we can ask, as a specific scientific question, "What is the best form in which health services may be delivered to a community?" Because to answer that question requires an answer to an auxilliary question which is "The best form for whom, in whose terms, and in connection with what objectives?" Thus, while one form of delivery of clinical services to the community may appear superior from the point of view of specific pilot studies, and of cost benefit analysis, if such a system of delivery is not acceptable to the individuals who are to utilize the services, it will be rejected. It will not be utilized. It will constitute but another arena for increased social tension and increased social conflict. It will not represent a service, but a disservice. And, it will not necessarily be either helpful, healthful, or contributive to an understanding of health and education in children.

On the basis of my own prejudices, for example, I would argue that a university hospital health service provides to the clinic patient a level of medical care and a level of technical concern with his health problems (we will forget for the moment about the humanism and the warmth of the relationship) that is rarely, if ever, met in other settings or forms of the practice of medicine. But this high level of technical quality will not determine whether this is the form or type of medical service that the members of the community want or will accept or will choose. Rather, the choice will be determined by answers to questions such as "Is this the form of organization of one facet of community life that the people who live in this community and who wish to control this community and its functions wish to have at this stage of their own historic development and at this level in their own expression of their aspirations, desires and hopes?"

These are very very important questions. They are as important as questions of war and peace, of the supernatural, of the deity, and of everything else. They are such important questions that we trivial scientists don't have the answers to them. They do not represent, in my view, questions that are going to be solved on the basis of whether or not a given pilot project gives a greater cost benefit ratio, or whether or not a given method has a higher level of technologic skill, or whether or not a given disease entity is, in fact, treated better by one form of service or another. Rather, these questions are going to be decided by social forces, by political pressures, by the struggles of a social kind that are occurring in the community. If we don't want to recognize this, and if we want to play at the game of scientific resolution of these types of problems, it is a game in which I will pick up my money and walk out. That is one of the advantages of games; you can quit.

This change in the social atmosphere has been increasingly recognized, and we who are concerned with research must recognize it too. Moynihan, in a penetrating and detailed analysis of the history of welfare programs and welfare concepts, which appeared in "Public Interest" analyzes one aspect of this shift. Welfare is no longer something which is given to a small number of people who are suddenly left without income as a result of a specific accident or set of inadvertent circumstances, but has changed to a form of life--a condition of existence--for a large segment of the population on a relatively permanent basis. This shift from the crisis model of welfare, as exemplified by Aid for Dependent Children payments to the widow of a miner trapped in a mine catastrophe, to a chronic state of affairs in which 30% of children in an entire community receive Aid for Dependent Children over a considerable portion of their lives and an even greater proportion receives aid at some point in the course of their lives, because of a fundamental dislocation in the distribution of goods (or of "virtues," to use an old medical term) within the society, forces us not merely to increase the amount of aid provided, but to make a fundamental change in our concept of the welfare process.

When welfare is a way of life rather than a temporary crisis, welfare programs must involve recipients--their attitudes, aspirations and desires--at the strategic level of planning. Welfare services will and can only be effective within the framework of social integration in the process of welfare of the individuals whose social dislocations--not as a result of their own capacities but as a result of the social structure--place them in a position of being recipients of welfare funds. This concept of social involvement affects education, welfare, and health services in all of their aspects. It represents the first steps by which the poor seek to control their own lives and opportunities, and it is the procedure through which the poor are seeking to be full citizens with full control of their own lives and existences.

We must consider the research issues against this background rather than confuse the research issues with issues of political and social imperative. Among the research issues--those that can be solved by application of the scientific method--there are four groups which seem to me particularly provocative. The first asks how can we meaningfully assess the current health status of pre-school children. The second asks what are the important antecedent events in the history of a pre-school child which may not affect his currently measurable status, but may be important in determining his future function. The third asks what are the interrelations of nutritional and other insults to the central nervous system, and the mental processes of learning. The fourth asks whether certain events which have no effect in some circumstances may have important and lasting effects on children in other circumstances. These questions all interrelate one to the other, and must often be asked simultaneously.

Let me give you several examples from our own research. In one group of studies we posed the question of whether infants who were subjected to asphyxic episodes at birth, reflected by low Apgar ratings, represent children who are at any special risk of distorted development at a later point in time. We studied not those infants who continued to exhibit disturbed function throughout the newborn period, but only those who had low Apgar ratings at birth and who, within two days of birth, were regarded as entirely normal by the pediatricians caring for them and were receiving no special care. Their "current status" at age 3 days, using standard medical pediatric appraisals, was regarded as being excellent.

When you sound a tone near one or the other ear of a normal 3 day infant, he will turn his eyes in the direction of that tone in a beautiful, confined, conjoined movement. He is not looking at the tone, because he does it just as well when he is asleep or when his eyes are tightly closed. It is

a beautiful, reproducible, ocular-motor reflex to the lateralized presentation of auditory stimuli. Now, infants who have Apgar scores of 8 or more at the time of delivery exhibited this beautiful, coordinated, oriented eye movement whenever the stimulus was presented. What about the children who had low Apgar scores, but who at age 3 days had "recovered" and were in excellent clinical condition? Examined by this sensitive technique, these children were markedly defective in their conjoined ocular motor responsiveness to tone. They are children who are not orienting themselves reflexly to a localized sound in their environment.

If you now translate this lack of reflex behavior into their responsiveness in a social situation at this age, it is clear that such infants won't turn their eyes and fixate upon the person feeding them, talking to them or approaching them. In other words, these children, by standard measures of "current status" were perfectly normal. Yet, using an appropriately sensitive test they were found to have defective function, and this disturbance in function was intimately related to a prior condition of risk to which these children had been exposed. Looking at current functions alone, one learns only where the child is at a given moment in time. One has little notion of where he was before that or how he got to be where he is.

Anemia in a preschool child may be important not because a low hemoglobin level affects his current health, but because it is a marker of exposure to antecedent conditions of risk. If we take this view of low hemoglobin levels, small stature or a number of other signs that reflect immaturity or mal-development, then our research problem is a quite different one. To what extent are the children who exhibit these findings at age three, children who were at particular risk in their developmental course prior to age 3? Were they, for example, exposed

to severe nutritional deprivation which, though not a current problem, has left an indelible mark on their potential for future function? In studies which my colleagues and I have conducted in Mexico and Guatamala, children of school age who have been subjected to continuous chronic circumstances of sub-nutrition (though only rarely to acute episodes of serious malnutrition) are distinguished from their colleagues not by the fact that they have different globulin levels, or different serum albumin levels or different hemoglobin levels, but because they are shorter in stature and lighter in weight. And when we study them we find that they exhibit a profound difference in their capacity to learn and in their abilities to process environmental information. Their small size is not a current handicap, but it indicates an antecedent malnutrition that had important consequences which are a current handicap. Such questions about what antecedent conditions are important for the future and how one can use current findings as a potential indicator of such antecedents represent a set of problems which I think is critical with respect to developing and planning health programs for children who are exposed to particular conditions of risk.

Let me cite another condition of risk that has been treated in various ways over the years. Children of low birth weight are known to have, on the average, lower intelligence and achievement test scores than children of normal birth weight. In my city, in yours, or anywhere else, when low birth weight and perinatal mortality, maternal mortality, and similar statistics indicating risk to the child are examined, the non-white segments of the population are excessively represented to a very significant degree. Thus, it can be argued that low birth weight in itself need not result in any faulty developmental outcomes, but that the high risk of low birth weight is a statistical distortion caused by the excessive representation of lower social class children in the low birth weight group.

Checking further, if white middle class children weighing between 4 and 5 pounds are compared with children of normal birth weight, their intellectual status at a later point in time is not significantly different. It has then been argued, with a great sign of relief, that low birth weight is an overestimated problem, or an overestimated condition of risk.

Such a conclusion is, of course, truly premature. While such studies further define the research question they do not answer it. What are the logical alternatives? It may well be that low birth weight does produce dysfunction and disturbance but, if the child is able to live in a middle class environment he develops compensatory mechanisms or substitutive skills that contribute to normal functioning at a later point. However, if he is low birth weight and lives in a further disadvantaged environment, does the low birth weight represent a cumulative insult to his opportunities for development? Over the last several years some colleagues and I have been studying children in an ethnically homogeneous community of 200,000 in Aberdeen, Scotland. Studying 15,000 children, who represent 99.85% of all children surviving in 5 birth years in this community, we were able to relate reading tests, other educational tests, I.Q. tests, and other data at the time of school entry to completely recorded birth data.

Some of the relationships we found are pertinent to the point at issue. In social classes I through III-A, all of the non-manual occupations, the I.Q. at age 5 for low birth weight babies is the same as that for full weight babies, provided there was no obvious pathology in connection with the low birth weight. In the skilled manual working group (social class III-B and III-C) the low birth weight babies show a slight disadvantage, one that is not statistically significant even with these large numbers. In social class IV, semi-skilled workers, the disadvantage of low birth weight infants becomes statistically significant, and in

social class V (unskilled and casual workers) the low birth weight infants are at a profound disadvantage. Previous studies have analyzed the data using designs which ignore the fact that the interactive effects among variables may be far more important than the specific effects of the variables themselves. But using the technique of analysis of variance one sees clearly the interaction between social position and the antecedent condition of risk, low birth weight. Low birth weight becomes a risk condition only for otherwise disadvantaged children. For one part of the population low birth weight seems to be a condition that can push an individual over the brink, whereas for many other parts of the population, not under additional conditions of stress, it appears to be a trivial event.

So we must be cautious in the degree to which we transport our experiences with preeminently middle class patients in which there are no such significant interactions except in a positive sense, to individuals, societies, and subcultures in which there are, indeed, such interactions resulting in potentially disasterous effects.

At this moment, as a physician, I don't know whether I should be concerned in a different way about a low hemoglobin level in a child who is in social class V and a child who is in social class I. I would like to know whether his hemoglobin level is related to other features of his responsiveness. I would like to know the degree to which it places him at an additional handicap above and beyond the handicap with which he is confronted by his defective or deprived opportunities. I cannot answer my question as to whether I should be concerned until I develop a research design that, in fact, takes interaction into consideration, and that, in fact, pursues this issue in a systematic way. The same is true for many of the conditions and antecedent events which have been discussed in other papers during this seminar.

One of the problems frequently alluded to in this seminar is the problem of using what could be called a "medical examination" to identify children who are at risk of having difficulty in learning. My own original position was that the medical examination is not pertinent to learning. The medical examination and diagnosis are a definition and a path to effective action for medical problems. It has not been designed with effective educational action as its goal. Is there any reason to think that such a tool, developed for medical action, should be pertinent to learning? Well, despite my early opinion--there are a number of areas that can be included in the medical examination that are pertinent both to medical care and to learning. Among these are features of attitude, features of style on the part of the child in response to demand, and other aspects of "temperament" that my colleagues and I have written about at length. But there is also a much more distinctively neurologic strategy which is pertinent to both learning and the standard medical situation.

The traditional medical-neurologic examination was designed to describe the location of a lesion in the nervous system, not its nature or consequences. In seeking to describe processes rather than localize lesions quite a different strategy was necessary. One such strategy derives from a consideration of the evolution of adaptive capacity. The strategy of evolution in increasing the capacity of the nervous system has been, as Sherrington puts it, not to increase the number of sense systems, but to increase the intimacy with which the sense systems may interrelate. Many of the learning tasks with which we are concerned, especially reading, require an elaborate organization of interrelationships between the various sensory systems.

So for many years we have studied the degree to which antecedent conditions of risk disturb the normal developmental course of relationships among the sense systems, and how these disturbances affect functional activities and adaptations on the part of the child. There are many ways in which to test a child's

ability to relate information from one sensory system to another. For example, he could be asked to identify dot-dash patterns on a piece of paper with sounds presented in analagous patterns. Or he can be asked to feel a shaped object out of his sight and then identify the shape of the object from among those presented to him on a piece of paper. We find that many children with learning problems do, indeed, have massive problems in trying to integrate information between sense systems. We can relate these disturbances to antecedent conditions of risk. And through these disturbances we can relate antecedent risks to current or future malfunctioning.

You must recognize that this is a slow process. First, appropriate test methods must be devised. The normal developmental course of the skills represented by these tests must be studied, the pertinence of the functions measured by the tests to learning function and to antecedent conditions must be evaluated. But when such studies have been completed, tests of intersensory integration may prove to be among the most relevant tests for both neurology and education.

In all nutritional activities, both scientific and political, the fundamental doctrine must be primum non nocere, first do no harm. It is an immoral scientific or political experiment to intervene by modifying a food supply without guaranteeing that there will be a perpetuation of this modification for the future. I have seen too many communities in which profound dislocations in the ecology of nutrition and feeding have occurred because someone who has provided supplementation for 2 years in order to study its affects. The normal ecology of food gathering, food utilization and economics have occurred and the people have been left with new and more serious difficulties when the supplementation ended.

Making snacks and lunches available in the school or a Head Start program is fine; it saves money for the family, provides some food for the child, and can be integrated into the rest of the learning situation. But to regard a Head Start or school lunch program as though it were going to modify the nutritional circumstance of the family is to be self deluded. The nutritional circumstances of the family can be changed only by a fundamental social modification of food practices, coupled with food availability, coupled with understanding on the part of the community.

Malnutrition in all societies is but one aspect of social and economic deprivation (In only one society is under-nutrition separated from social deprivation. The Jains of India engage in very restricted dietary program, even though they are of a high social and economic caste, and so represent an interesting group for potential study). Patterns of nutrition are not separable from the patterns of mental stimulation or from the patterns of social, economic, housing and educational conditions. The complexity of some of these interrelationships is partially illustrated in Figure I.

Once the principle of "no harm" has been fulfilled there are at least 3 ways in which more adequate nutrition can improve learning. The first is through its direct effect on the developing central nervous system. Many studies have demonstrated that when the young mammalian organism is deprived of nutrients during the prenatal or immediate postnatal and weening periods, during the periods of most rapid growth and myelination of the nervous system, the growth and differentiation of the nervous system is disturbed, in a way that is not corrected by feeding at later ages. Winnick has shown that at the cellular level there is a decrease not only in cell size, which may be subject to later correction, but also in cell number, which appears to be a permanent deficit. One of the most important research problems is to define, for man, the circumstances under

which such early malnutrition takes place, and for how long and to what extent such changes may be reversible.

For example, myelin continues to develop throughout childhood and adolescence. If the important effect of malnutrition is to interfere with myelination, it is possible that the changes may be reversible over a prolonged period of time. However, the deposition of myelin may be merely an event which takes place simultaneously with cellular differentiation, dendritic formation and arborization, and it is interference with these processes, not with the concurrent myelination, which is important. In this instance, the ability to achieve later myelination will have no effect on later function. Certainly our present knowledge does not allow us to say to what extent nutritional insults to the nervous system that may have occurred at an early age will be corrected by feeding at a later date, and the problem is worthy of scientific investigation.

A second way in which nutrition may affect the child's learning is by making him more or less susceptible to infection. Children who are relatively malnourished become sick more frequently and when they become sick they may become more severely ill, with greater possibilities of central nervous system damage, than children in better nutritional status.

Thirdly, malnutrition may affect learning by interfering with the energy levels, the level of attention, or, at the simplest level, by interfering with the number of days of school attended. Again, the consequences may be different for different groups of children.

In a study of the epidemiology of reading ability in relation to the amount of instruction, Guyernberg and I found that for most children there is a systematic position relation-

ship between the amount of reading instruction received and reading competence achieved. But, for bright and superior children, those who learn easily, there is no such relationship. The relationship is exaggerated for children who have any difficulty in learning. Thus, interference with school attendance, with attentiveness, or with energy level might be expected to have its greatest effects in the same group of children that is likely to be malnourished.

I would like to point out, too, that it is criminal to consider malnutrition as an individual's problem, not just socially criminal, but criminal in the area of ideas. Because malnutrition does not start with the child. As early as 1932 John Boyder, Isabella Leach and other workers, examined the interaction between social position and conditions of health, such as stature. They learned that lower social class groupings contained individuals in whom there was a constellation of disturbances that were not limited to a single generation, but were inter-generational in character. Some attributed these effects to the mother's diet during pregnancy, others wondered whether the mother's growth during her own childhood represented the most crucial factor affecting the conditions she would pass on to her children. The data that has come forth suggests very strongly that the mother's opportunity to grow during her own childhood is perhaps the single strongest determining factor for her obstetrical and reproductive performance, and that this influence exerts a greater affect than her contemporary social class position at the time of pregnancy.

It seems likely that malnutrition and other conditions of health represent such inter-generational problems. The degree to which a child is at risk must be considered not only in terms of the contemporary circumstances in which he is living and the details of his own history, but within the

context of his mother's physical status and her developmental history. Pediatrics, as the developmental branch of medicine, must be concerned not merely with change in a given generation, but with the inter-generational influences on growth and health.

As you look at the stature of the different speakers who addressed you today, I would remind you that you could define the social class antecedents and perhaps the number of generations which our ancestors have spent in this country, rather than a ghetto in another country, on the basis of the differences in our stature. I would remind you, also, of Boaz's study of the growth differences between American born generations of Jewish immigrants' children and the stature of their parents. The American born boys are now playing basketball; their fathers couldn't play volleyball! There have been , indeed, significant interactive affects which are intergenerational and which are, in fact, transmitted in social descent.

To consider nutrition outside of this context, to consider it merely as a transient episode, is to think that malnutrition only occurs in India when there is a famine. Malnutrition is not a crisis phenomenon; it is a condition of life. It is stable and persistent and pervasive in the life course of individuals. I am, therefore, concerned that studies in Syracuse show that 10% of white children but 40% of black children come to school without breakfast. I am concerned that lunch consisted of a meat or cheese or egg sandwich plus fruit and dessert for one group of children but a chocolate bar and a soft drink for a considerable portion of the other group. I am concerned that nutrition, as a way of life, has other aspects as well. Feeding is not independent of the structure of an individual's program of existence, meals represent temporal modal points in the course of a day. Gleaning and casual eating produce attitudes with respect to the organization of one's behavior and function which are antithetical to normal functioning in the usual school situations. What is the importance of time? What is the importance

of sequence? What is the importance of order? These, as much as whether or not there is a given hemoglobin level or serum albumin level are aspects of a developmental relationship between nutritional circumstances and growth that can be, must be studied.

It is within this framework, then, that it becomes productive to consider a number of problems that, indeed, can be explored. But in considering them, we must beware that we do not spread illusions that a hot lunch is an educational panacea or, for that matter, that desegregation is an educational panacea or that local control is a social and governmental panacea.

These may be human and political imperatives, but whether or not they are technically contributive to a given end function is an open and studiable question. So, neither the leaders of people nor those of us who are their servants should take the position that we can solve these intergenerational problems at one fell swoop, that we can, with any trick or gimmick, solve the health problems of our people. What we must develop is a concern with all facets of health as it goes across the generations, so that if, indeed, this present one cannot be brought to optimal levels of function, subsequent ones may be.

With all these problems, and the problems of choice and decision that attach to them, with the opportunity to select from positive alternatives of all kinds for the development of programs, I think that we as scholars will often be upset by the waste with which such programs, such opportunities for research and advancement, will be modified in the political, social and human arena of the real life community.

I have been seeking for solace in this atmosphere. I found it in an old hero--Woodrow Wilson, who was both a

scholar and a practical politician. I can think of no better way of ending my remarks than by reading you something Wilson wrote:

"The men who act stand nearer to the mass of men than do the men who write, and it is at their hands that new thought gets its translation into the crude language of deeds.

The very crudity of that language of deeds exasperates the sense of authors. The men who write love proportion. The men who act must strike out practical lines of action and often neglect proportion. The great stream of freedom which 'broadens down from precedent to precedent,' as Mr. Holmes put it, is not a clear mountain torrent, such as the fastidious men of chastened thought like to drink from. It is polluted with a few of the coarse elements of the gross world on its banks. It is happy with the drainage of a very material universe."