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ABSTRACT

This inventory summarizes information for each of 52 research projects supported by the Maternal Child Health Research Program in 1988, a number of which focus specifically on children with special education needs. Projects are divided into new and continuation projects and are listed alphabetically by state. The entry for each project contains investigator contact information, grant award information, study objectives, research questions and hypotheses, methodology, and a brief evaluation of the study's significance. (PB)

MATERNAL AND CHILD HEALTH RESEARCH PROGRAM

I. ACTIVE PROJECTS

1988

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
HEALTH RESOURCES AND SERVICES ADMINISTRATION
BUREAU OF MATERNAL AND CHILD HEALTH AND RESOURCES DEVELOPMENT

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Maternal and Child Health Research Program: I. Active Projects

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October 1989

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FOREWORD

This publication presents information for each of the 52 research projects active under the support of the Maternal and Child Health Research Program (MCHRP) in 1988. The information is presented in summary form similar to that used for a companion publication reporting on research projects completed in 1987. A quick first reading of the summaries will reveal the variety of research topics and objectives pursued by the 52 investigations and the diversity of the research traditions represented. Such variety and diversity mirrors the broad mandate of the MCHRP as well as the eclectic and multidisciplinary approaches that historically have been used by the Bureau of Maternal and Child Health and Resources Development (BMCHRD) to carry out its mission. An underlying characteristic of the projects as a group is the applied nature of the research. This is consistent with the mandate contained in the original Title V legislation which made possible the MCHRP in the early 1960s.

This publication, or inventory of projects, is broadly divided into two sections—new and continuation projects. Within each of these two sections, projects are ordered according to grant number. The first two digits of the grant number represent the State where the grantee institution is located (i.e., MCJ-01 = Alabama). Thus, new and continuation projects are also arranged alphabetically according to State.

Except for the information in the pre-award evaluation, the content of the abstracts in the two sections is similar. The specific items of information contained within the summaries represent requests and suggestions from intended users of the inventory, both internal and external to the Federal government. Many of these intended users are concerned with the production of discipline-specific knowledge and with the overall technical aspects of doing research and interpreting research findings; hence the preponderance of information on the research plan, particularly as it refers to research design, measurement approaches, sample size, and data analysis plan.

The information in the pre-award evaluation of projects is a synthesis of the written comments of the assigned reviewers and notes taken during the discussions that precedes the collective recommendation of the Maternal and Child Health Review Committee. There are several reasons why this information should be made available. First, it attests to the significance of the research questions and the technical quality of the research plan as judged by a panel of peers under a set of procedures that minimizes bias and promotes fairness and objectivity in what is selected for funding. Second, the information in the pre-award evaluation indicates not only what is good about the project, but also what may not be. This approach, it is felt, gives a more balanced view of the nature of funded research and emphasizes that, for the most part, it is always less than perfect. Third, the pre-award assessment information also attests to the contribution of the peer review process to the improvement of the research that ultimately is funded. While the criticisms and suggestions for improvement made by reviewers are not binding on the investigators unless issued as conditions of the award, they are usually attended to and adopted prior to

conducting the research. Fourth, the information in the pre-award evaluation is instructive for those who practice or plan to practice the research crafts, particularly graduate students and new, doctoral-level professionals seeking to establish a foothold in what is an extremely competitive field.

Finally, it must be noted that the research projects listed in this inventory appear in a much larger BMCHRD publication entitled Abstracts of Active Projects Office of Maternal and Child Health, which contains information on all Special Projects of Regional and National Significance (SPRANS) supported under Title V funds. This overlapping is necessary in order to satisfy the information needs of the various categories of users as well as the needs of the different programs subsumed under the SPRANS acronym.

Gontran Lamberty, Dr.P.H.
Director, MCH Researc Program
October 1, 1989

PROGRAM ACTIVITIES

Program Description

The Maternal and Child Health (MCH) Research Program is authorized by Title V, Section 502 (a) (1) of the Social Security Act as amended by the Omnibus Reconciliation Act of 1981, Public Law 97-35. The program is located in the Office of Maternal and Child Health (OMCH), Bureau of Maternal and Child Health and Resources Development (BMCHRD), Health Resources and Services Administration (HRSA). HRSA is a component of the Public Health Service (PHS), which in turn is part of the Department of Health and Human Services (DHHS). Other components of the PHS are the National Institutes of Health (NIH), the Food and Drug Administration (FDA), the Centers for Disease Control (CDC), etc. The purpose of the program is to support applied research relating to maternal and child health services which show promise of substantial contribution to the advancement of such services. Findings from the research supported by the MCH Research Program are expected to have immediate potential for transfer to health care delivery programs for mothers and children.

Other Federal entities are active in maternal and child health research. Foremost among them are the National Institute of Child Health and Human Development (NICHD), the National Center for Nursing Research (NCNR), the National Center for Health Services Research (NCHSR), and the National Institute of Mental Health (NIMH). Because of overlapping interests, OMCH, NICHHD, NCNR, NCHSR, and NIMH maintain close contacts to insure that duplication of effort does not occur and that new areas of concern receive adequate attention. Frequently, funds are merged to support research that an individual entity might not be able to fund adequately independently, or that it is of mutual interest. These joint ventures are identified with an asterisk in the Grant Award Information section of the project abstract.

Research projects are selected for support by the MCH Research Program using a peer review system independent of that of the National Institutes of Health (NIH). The initial review group (IRG) is called the Maternal and Child Health Research Review Committee. It is composed of nongovernmental experts appointed for this purpose by the Secretary of DHHS. Committee members are research scientists of national stature who are also experienced and knowledgeable in maternal and child health programs. They are selected from the fields of biostatistics, developmental psychology, epidemiology, nursing, nutrition, obstetrics, pediatrics, sociology, social work, and public health. When the volume of the applications received for review and their content requires it, special and collateral reviewers are brought in to supplement the expertise present in the MCH Research Review Committee. Except for not voting, special reviewers participate in the review process exactly in the same manner as appointed members of the committee do. Collateral reviewers, on the other hand, do their reviews by mail and do not vote. A list of reviewers for the June 1989 meeting is presented at the end of this introductory section.

Review Activities

One hundred and fourteen (114) applications were reviewed by the program in 1988 (Table 1). Nineteen, or 16.7 percent, of these applications were non-competing (i.e.,

continuations) while the remainder, 95, or 83.3 percent, were applications competing for the funds that were available to support new research (Table 2)

Of the 95 competing applications reviewed in 1988, 85, or 89.5 percent, were "new," a category which includes applications submitted to the Research Program for the first time, new applications from the previous cycle for which a recommendation for action was deferred by the committee, revisions of previously disapproved new applications, and revisions of previously approved applications that had remained unfunded because of an insufficient priority score (Tables 3 and 4). As can be seen in Table 5, the rate of approval for the various subcategories of new applications varied considerably. It was the lowest for applications submitted for the first time (12.3 percent), next highest for revisions of previously disapproved applications (33.3 percent), applications deferred by the committee pending new information (75.0 percent), and revisions of approved-but-not-funded applications (100 percent), in that order. The approval rate of 33.3 percent for the resubmission of previously disapproved applications reflects the conscious efforts of the committee to be constructive in their reviews as well as the willingness of disapproved applicants to pay attention to the criticisms and suggestions for improvement made by reviewers. In general, the "gross" approval rate of 20 percent (the number of new applications recommended for approval by the committee divided by the total number of new applications reviewed) is relatively low when compared to other Federal research programs such as those of the NIH. The "net" approval rate (the number of new applications reviewed that actually got funded divided by the total number of new applications reviewed) compares favorably with other Federal research programs including NIH.

Unless there has been a significant departure from the originally approved project plan, a request for additional funds and/or evidence that the project is experiencing difficulties in execution, continuation applications are ordinarily reviewed by program staff and for the most part are assured of continuing support for the duration of the originally approved project period.

The number of years of support requested (i.e., length of the project period) for the new applications ranged from one to five, with two, three, and five being the most popular numbers of years. The average number of years of support requested was three.

When translated into dollars, the 114 applications reviewed in 1988 represented a total request of $14,645,873; the disapproved applications, $8,890,456; and the approvals, $5,764,345. The total costs (direct plus indirect) for new applications that were funded ranged from $64,375 to $395,456, the mean being $120,345.

Table 1. Number of Applications Received According to Cycle of Review and Type: MCH Research Program – 1988

Type	Total	Nov 87 Cycle	June 88 Cycle
All Types	114	62	52
Competing	95	47	48
Deferrals	7*	3	4
New & revisions of new	81	39	42
Competing Extensions	7	5	2
Non-competing (Continuations)	19	15	4

* Includes 2 Competing Extensions and 1 Continuation

Table 2. Percent Distribution of Applications Received According to Cycle of Review and Type: MCH Research Program – 1988

Type	Total	Nov 87 Cycle	June 88 Cycle
All Types	100.0	100.0	100.0
Competing	83.3	75.8	92.3
Deferrals	6.1	4.8	7.7
New & revisions of new	71.1	62.9	80.7
Competing Extensions	6.1	8.1	3.9
Non-competing (Continuations)	16.7	24.2	7.7

Table 3. Number of "New" Applications According to Cycle of Review and Type: MCH Research Program – 1988

Type	Total	Nov 87 Cycle	June 88 Cycle
All Types	85	42	43
Deferred from a Previous Cycle	4	3	1
Submitted for the First Time	65	31	34
Revision of a Previously Disapproved Application	15	8	7
Revision of a Previously Approved-But-Not-Funded Application	1	0	1

Table 4. Percent Distribution of "New"Applications According to Cycle of Review and Type: MCH Research Program – 1988

Type	Total	Nov 87 Cycle	June 88 Cycle
All Types	100.0	100.0	100.0
Deferred from a Previous Cycle	4.7	7.1	2.3
Submitted for the First Time	76.5	73.8	79.1
Revision of a Previously Disapproved Application	17.6	19.1	16.3
Revision of a Previously Approved-But-Not-Funded Application	1.2	0.1	2.3

Table 5. Number and Percent of "New" Applications Approved According to Type: MCH Research Program – 1988

Type	Number	Percent Approved
All Types	85	19.6
Deferred from a Previous Cycle	4	75.0
Submitted for the First Time	65	12.3
Revision of a Previously Disapproved Application	15	33.3
Revision of a Previously Approved-But-Not-Funded Application	1	100.0

MATERNAL AND CHILD HEALTH RESEARCH GRANTS REVIEW COMMITTEE MEMBERS – JUNE 1988

CHAIR

Deborah Klein Walker, Ed. D.
Assistant Commissioner
Bureau of Parent, Child, and Adolescent Health
Massachusetts Department of Public Health
Boston, MA 02111

MEMBERS

Joan S. Chmiel, Ph.D.
Associate Professor
Department of Community Health and
Preventive Medicine
Director, Cancer Center Biometry Section
Northwestern University Medical School
680 North Lake Shore Drive, Suite 1104
Chicago, IL 60611

Renee R. Jenkins, M.D.
Associate Professor
Department of Pediatrics and Child Health
Howard University Hospital
2041 Georgia Avenue, N.W.
Washington, D.C. 20060

David A. Nagey, M.D., Ph.D.
Director
Division of Maternal-Fetal Medicine
University of Maryland Medical
System/Hospital
22 South Greene Street
Baltimore, MD 21201

Norma L. Radin, Ph.D.
Professor
School of Social Work
The University of Michigan
2060 Frieze Building
Ann Arbor, MI 48109

Barbara A. Sachs, Ph.D.
Associate Professor
College of Nursing
University of Kentucky Medical Center
529 Health Science Learning Center
Lexington, KY 40536-0223

Cynthia Garcia-Coll, Ph.D.
Research Psychologist and Associate
Professor of Pediatrics
Brown University and Women and Infants
Hospital of Rhode Island
Providence, RI 02905-2401

Denise M. Main, M.D.
Assistant Professor of Obstetrics
and Gynecology
Mount Zion Hospital and Medical Center
2356 Sutter Street Pavillion, 5th Floor
San Francisco, CA 94115

Ronald L. Poland, M.D.
Professor of Pediatrics
Director of Neonatal – Perinatal Medicine
Children's Hospital of Michigan
3901 Beaubien Boulevard
Detroit, MI 48201

Edward G. Stockwell, Ph.D.
Professor
Department of Sociology
Bowling Green State University
Bowling Green, OH 43403

Charlotte S. Catz, M.D. (Ex Officio)
Chief, Pregnancy and Perinatology
Branch, CRMC, NICHD, NIH
Executive Plaza North Building
Room 6-43, 6130 Executive Boulevard
Bethesda, MD 20892

SPECIAL REVIEWERS

Keith Crnic, Ph.D.
Associate Professor of Psychology
Department of Psychology
Pennsylvania State University
University Park, PA 16802

Karyl Rickard, R.D., Ph.D.
Associate Professor of Nutrition and Dietetics
University Hospital
D-132, 1100 West Michigan Street
Indianapolis, IN 46223

Judith G. Smetana, Ph.D.
Associate Professor of Education,
Psychology and Pediatrics
Graduate School of Education and
Human Development
University of Rochester
Rochester, NY 14627

Michael J. Symons, Ph.D.
Professor
Department of Biostatistics
University of North Carolina
Rosenau Hall, Campus Box 7400
Chapel Hill, NC 27599-7400

COLLATERAL REVIEWERS

George Comerci, M.D.
Professor, Department of Pediatric and
Family Community Medicine
Chief, Adolescent/Young Adult
Medicine Section
University Medical Center
1501 North Campbell Avenue
Tucson, AZ 85724

Louis J. Elsas, M.D.
Director, Division of Medical Genetics
Professor of Pediatrics
Emory University School of Medicine
2040 Ridgewood Drive
Atlanta, GA 30322

Stephen Embury, M.D.
Chief, Division of Hematology
San Francisco General Hospital
Associate Professor of Medicine
University of California, San Francisco
Building 100, Room 263
1001 Potrero Avenue
San Francisco, CA 94110

Cutberto Garza, M.D., Ph.D.
Professor of Nutrition
Director, Division of Nutritional Sciences
Cornell University
127 Savage Hall
Ithaca, NY 14853

Paul McCurdy, M.D.
Special Assistant for Clinical Hematology
Division of Blood Diseases and Resources
National Institutes of Health
Federal Building, Room 518
Bethesda, MD 20892

James E. Mitchell, M.D.
Associate Professor
Department of Psychiatry
University of Minnesota, School of Medicine
420 Delaware Street, S.E.
Box 393 Mayo
Minneapolis, MN 55455

Stephen W. Porges, Ph.D.
Professor, Institute for Child Study
Department of Human Development
University of Maryland
Room 3304, Harold Benjamin Building
College Park, MD 20742

Beverly White, M.D.
National Institutes of Health
Building 10, Room 5N-110
Bethesda, MD 20892

Susan Scrimshaw, Ph.D.
Professor and Associate Dean
for Academic Affairs
Los Angeles School of Public Health
University of California
CHS, Room 36-081
405 Hilgard Avenue
Los Angeles, CA 90024-1772

William Woods, M.D.
Professor of Pediatrics
Division of Pediatric Oncology
University of Minnesota Hospital
Box 454, Mayo Building
Harvard Street and East River Road
Minneapolis, MN 55455

New Grants Awarded

HEALTH AND NUTRITION OF U.S. HISPANIC CHILDREN

GRANTEE Stanford University

INVESTIGATOR Fernando S. Mendoza, M.D.
Stanford University School of Medicine
Department of Pediatrics
Stanford, CA 94305
Telephone: (415) 327-4800 (Extension 538)

GRANT AWARD INFORMATION

Project Number:	MCJ-060518
Project Period:	04/01/88–03/31/91
Grant Year:	1 of 3
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3
Awarded:	315,670		
Requested:	374,447	311,744	346,730

SUMMARY

Study Objective

This study proposes to analyze data from the National Health and Nutrition Examination Survey I (N-HANES-1971-74) and II (1976-80) and the Hispanic Health and Nutrition Examination Survey (H-HANES-1982-84) to identify and quantify the major health and nutritional problems of Hispanic children and adolescents in the United States. It is an extension of an earlier investigation which focused on the Mexican-American data only. The new investigation covers mainland Puerto Ricans and Cubans as well. It seeks to:

1. Assess the level of severity of health and nutritional problems for these population groups;
2. Identify factors related to poor health and nutrition;
3. Assess the functional implications of identified health problems; and
4. Determine how they are buffeted by health care programs.

The analysis of the mainland Puerto Ricans component takes place with the collaboration of investigators from the University of Puerto Rico. This allows for not only more insightful analyses but also for an opportunity to compare the H-HANES information to data available in Puerto Rico.

Research Questions or Hypotheses

A series of general and specific hypotheses guide the proposed within- and between-ethnic group analyses. These are organized along topic areas (i.e., growth and development, nutrition, health status, and health care utilization). Examples of these hypotheses are:

1. Major differences exist in the nutritional status of the three principal populations of Hispanic children in the U.S. as reflected by biochemical, dietary, and anthropometric data;
2. Differences in linear growth between pre-adolescent children of Hispanic and non-Hispanic origins are not entirely explained by differences in socioeconomic status;
3. The nutritional status of mainland Puerto Rican children is impaired in comparison to Mexican-American, Cuban-American, and non-Hispanic children;
4. The increased fatness in U.S. Hispanics is largely in trunk and fat folds. This tendency is more marked in Mexican-Americans than in Cubans or Puerto Ricans.

Population and Sample Description

N-HANES I and N-HANES II are complex national probability surveys of the United States non-institutionalized population. The H-HANES was limited to Mexican-Americans, Puerto Ricans, and Cuban-Americans from specific regions. The Mexican-American sample was selected from five Southwestern States—Texas, California, Colorado, New Mexico, and Arizona. The Puerto Rican component included New York City and portions of New Jersey and Connecticut; the Cuban-American component, Miami, Florida.

Specifically, the Mexican-American subsample included 7,462 individuals; the Cuban, 636, and the Puerto Rican, 2,834. N-HANES I and II contain approximately 6,700 non-Hispanic children (1-19 years) who are used for comparison. (They also include about 500 Hispanic children.)

Study Design

The overall study design is descriptive and correlational. It involves secondary data analysis using univariate and multivariate statistical techniques.

Methods and Procedures

A three-tier approach to the H-HANES data is planned. First, the investigators quantify the extent and nature of health and nutritional problems in the Cuban and Puerto Rican populations and compare these results to what has already been learned from the Mexican-American component of the survey and from non-Hispanic whites and blacks derived from the N-HANES I and II surveys. Second, the investigators identify variables associated with these conditions to assess whether the pattern of relationships among these potentially exploratory variables differs by ethnic group. Among the factors considered are familial factors such as income, education, household structure, and maternal characteristics, and individual factors such as age, sex, and levels of acculturation. Third, the investigators assess the functional implications of abnormal health and nutritional status for Puerto Rican and Cuban children, and compare these results with those obtained for

Mexican-American children as well as comparative samples of non-Hispanic white and black children derived from the N-HANES II. In addition, utilization of health and nutritional services are studied to evaluate the impact of the three Hispanic subgroups' nutritional and health status.

Analysis Plan

The plan for data analysis demands attention to some complex statistical and computational issues. These require understanding of the complex stratified multistage probability sampling methods used in H-HANES. Traditional methods of point and variance estimation and hypothesis testing cannot be used to analyze the data. Special statistical software designed to incorporate the complex sample design into variance estimation is needed to compute sampling variances. Special codes are included in the H-HANES data base that allow the analysis to be done using special software recommended by the National Center for Health Statistics (NCHS). There is instability in some estimates, however, especially for subgroup analyses. The routine analysis proceeds in three steps: (1) data cleaning and code book development, (2) descriptive analyses, and (3) hypothesis testing.

PRE-AWARD EVALUATION

Originality and Importance

This is an original proposal of considerable importance. Until the NCHS conducted the Hispanic Health and Nutrition Examination Survey (H-HANES) during 1982–84, there was only limited information related to health and nutrition in this rapidly expanding population that includes Mexican-Americans, mainland Puerto Ricans, and Cuban-Americans. The investigators have begun to analyze the H-HANES data, and clearly this work needs to continue. The Stanford University research team has been the first and only research team to systematically study issues of health and nutrition in Hispanic children using the N-HANES I and II and H-HANES data bases.

Regional and National Significance

The Hispanic population is growing and may soon become the largest minority population in the United States. This population is young and poor compared to the U.S. population as a whole and can be expected to become more so. Therefore, the proposed study is certainly of national significance.

Scientific and Technical Merit

This is a well-written application with clearly defined, achievable objectives. The Stanford Center for Chicano Research, which coordinates this study, is a multidisciplinary research center which is well qualified to carry out this research. The Stanford group has established a working relationship with the University of Puerto Rico Schools of Public Health and of Medicine. The interaction among these

groups on this project should significantly strengthen the proposed studies. The five areas of interest for this study (growth and development; nutritional status and diet; health status and health services utilization; obesity and cardiovascular risk; and adolescent health behaviors and self-perceived health) are judged to be very important and worthy of study using the H-HANES data. This is the first national analysis of the nutrition and health of Hispanic children, and therefore provides much-needed information. National estimates of the extent and nature of health and nutrition problems may be identified. Thus, it may be possible to identify susceptible individuals and populations. Data available on biological outcomes (e.g., diabetes, hypertension, and obesity) help planners assess the biological and social costs of poor nutrition and health in the Hispanic population, and facilitate actions that improve the health and nutrition of Hispanics. The team of investigators has an impressive productivity record, as seen from their currently-funded work. The review of the literature and rationale are thorough and on target. The H-HANES data are worthy of analysis. The research goals involve extension of previous work to include the Puerto Rican and Cuban samples, and evaluation of special areas of interest involving the Mexican-American subsample. The investigators have provided an extensive list of hypotheses for each area of interest in the comparative phase of the study; key dependent and independent variables and their method of assessment in H-HANES have been identified. The two special focus studies (obesity and cardiovascular risk among Mexican-American children and health care utilization) are similarly well-detailed, with a hypothesized model and specification of dependent, independent, and intermediate variables. Concepts and working definitions are well defined. The data file from H-HANES is described, as is the current and estimated availability of various data tapes for H-HANES.

LABORATORY WORKUP OF JAUNDICED NEWBORNS: A RE-EVALUATION

GRANTEE University of California – San Francisco

INVESTIGATOR Thomas B. Newman, M.D.
University of California
400 Parnassus Avenue, A-205 Box 0314
San Francisco, California 94143
Telephone: (415) 476-6451

GRANT AWARD INFORMATION

Project Number:	MCJ-060573
Project Period:	11/31/88–10/31/90
Grant Year:	1 of 2
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3
Awarded:	99,780		Denied
Requested:	103,591	111,146	118,928

SUMMARY

Study Objective

This study seeks to evaluate the validity of the standard textbook recommendations for the clinical laboratory approach to the diagnosis of jaundice in newborn infants. Since standards of care are based on traditional recommendations, the study proposes to look at the specificity, sensitivity, and positive predictive value of each of the routine laboratory tests recommended for the evaluation of jaundiced infants.

Research Questions or Hypotheses

A set of specific and general questions guides the study. Examples of these questions are:

1. What is the incidence of "non-physiologic hyperbilirubinemia" on each day of life in white, black, Asian, and Hispanic children?
2. What are pre- and perinatal predictors of hyperbilirubinemia?
3. In infants with "non-physiologic hyperbilirubinemia," what proportion have had each of the following tests done: complete blood count, reticulocyte counts, red blood cell morphology, blood type and group, direct Coombs test, and direct bilirubin?
4. For each of the above lab tests, how should normal and abnormal be defined?
5. Is it possible to define sub-groups of infants for whom a single test or combination of laboratory tests are most clearly indicated?

Population and Sample Description

The subjects for this study are infants with birthweights greater than 2500 grams who were born 10/1/80–9/30/82 at University of California – San Francisco (UCSF), or, from 1/1/86–12/31/87, at either (UCSF) or Stanford University Medical Center (SUMC). The sample size for this study is approximately 12,000 newborns for whom data are available in the Combined Patient Experience (COPE) database. Although the primary focus of this study is babies who are not critically ill, severely jaundiced infants are not initially excluded from the sample, in order that the study not be biased towards finding that serious consequences of jaundice and useful yields of laboratory tests are rare.

Study Design

This study is not exclusively of one design. The investigation of risk factors for jaundice in newborns is a retrospective cohort study, i.e., entrance into the cohort is determined by birth at one of the designated locations, and measurement of "risk factors" occurs before ascertainment of outcome (jaundice). A retrospective cohort study is also the design for the investigation of laboratory tests to evaluate jaundiced babies. A number of this study's questions, however, are primarily descriptive rather than analytic. In the case of linking laboratory tests with diagnoses, while associations are sought, they are likely to be non-causal. This type of study has been termed a "diagnostic test study."

Methods and Procedures

This study does not perform new tests or measurements; it relies instead on previously collected data maintained in two computerized databases and, where necessary, also uses medical charts from two medical centers. Preliminary studies of the databases suggest that the quality of the data is high, that the presence of "non-physiologic" hyperbilirubinemia was frequent, and that in the full study there will be a large number of hyperbilirubinemia workups to evaluate.

Database 1, developed and maintained by the Departments of Anesthesiology and Obstetrics and Gynecology at UCSF, includes clinical and demographic information on all mothers delivering and infants born since 1976. This study uses only those years for which there is also COPE data, and links the two databases using the infant's unit number.

Database 2, COPE, is a computerized database of laboratory test results covering UCSF and SUMC. COPE is created by identifying unique patient hospital admissions and then linking data from various sources for each admission. Data currently available are from the chemistry and hematology laboratories, medical records, inpatient census data, and hospital billing information. Because the COPE database contains only inpatient data, and because some patients may become jaundiced after discharge, this study obtains results on post-discharge laboratory tests and has these merged into the COPE database for infants born at UCSF in 1986 and 1987. It is hoped that this will insure against missing cases of jaundice.

Analysis Plan

The investigation of laboratory data proceeds in two phases. First, simple demographic data (birth date, age, sex, race, and birthweight) and results of bilirubin determinations are examined. From this data set, the study ascertains the proportion of babies having their bilirubin levels checked, the proportion whose bilirubin levels reached 13.0 mg/dl, and the 95th and 99th percentiles for total and direct bilirubin for babies of each race on each day of life. Of the subset of babies who had one or more bilirubin determinations performed (approximately 60 percent), additional laboratory data are examined. Specifically, for each patient, results of the laboratory tests generally ordered to evaluate hyperbilirubinemia are analyzed. This allows the generation of descriptive statistics at different levels of total and direct bilirubin. The hyperbilirubinemia risk factor and analysis begins with descriptive statistics and is followed by univariate associations of predictor variables with the presence or absence of any bilirubin value of 13.0 or more. These analyses are followed by stepwise logistic regression with bilirubin greater than 13.0 as the dependent variable. The cost per case of disease detected is estimated for different diseases and different possible diagnostic strategies in order to identify the most efficient strategy. These estimates are done separately for various patient characteristics related to incidence and prevalence levels of disease conditions such as sex, race, and degree of hyperbilirubinemia. These estimates are crude and subject to underestimation of true costs. Whatever the limitations of the cost estimates, there is presently a critical lack of data in this area.

PRE-AWARD EVALUATION

Originality and Importance

This is an original proposal that addresses the use and efficacy of specific laboratory screening and diagnostic tests in newborn children with hyperbilirubinemia. It is now estimated that the cost of following currently accepted practices for followup testing of children with a total bilirubin greater than 12-13 mg/dl is about $50 million per year in the United States. Good evidence that such testing could be reduced without compromising the health of these children would be very important. The present study will provide new results from an existing database that addresses the use and efficiency of such testing in these children

Regional and National Significance

Because expenditures for laboratory investigation of neonatal jaundice are high, and because it is possible that more than two-thirds of these tests are not really justified, it would be most useful if the information obtained by this project could demonstrate that at least some testing is not cost effective. The incidence of neonatal jaundice is similar in all parts of the U.S. and the project should affect all regions equally.

Scientific and Technical Merit

This study addresses a well-defined problem and recognizes the implications of possible findings for the general care of newborns in the U.S. The scientific questions and hypotheses have been clearly stated and carefully considered. Independent and dependent variables are clearly listed. Preliminary analyses from the 1980–82 data at UCSF suggest that the data quality is very good and the database is available for evaluation in the two calendar periods. While no preliminary analyses are presented for the Stanford data, it seems reasonable to assume that similar good quality data might be available there, as at UCSF. Concepts and working definitions are clearly stated, and the study design is appropriate for the goals. The principal investigator seems well aware of the strengths and weaknesses of his proposed study, and also seems to have a good grasp for what these problems will mean for his analysis and interpretation of results. While limitations of the database should not be minimized, overall, the study appears to be very worthwhile.

PHYSIOLOGIC RISK ASSESSMENTS TO PREDICT PRETERM BIRTH

GRANTEE University of California – San Francisco

INVESTIGATOR Denise Main, M.D
Mt. Zion Hospital and Medical Center
P.O. Box 7291, Pavilion, 5th Floor
University of California – San Francisco
San Francisco, CA 94143
Telephone: (415) 594-2874

GRANT AWARD INFORMATION

Project Number:	MCJ-060580
Project Period:	01/01/88–12/31/90
Grant Year:	1 of 3
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3
Awarded:	322,609		
Requested:	406,797	480,101	321,154

SUMMARY

Study Objective

This study seeks first to validate a highly predictive (retrospective) screening method using uterine contraction monitoring recently developed by the principal investigator, and, second, to determine whether the ability to use this method to identify women at risk for preterm labor can be further improved by the addition of pelvic examination findings.

Research Questions or Hypotheses

The current three-year proposal addresses two main questions:

1. Can these physiologic measures (uterine contraction frequency, cervical examination, and vaginal pH), when determined at standard prenatal visit intervals, be used effectively to identify women who subsequently experience preterm birth because of preterm labor or preterm premature rupture of the membranes (PPROM)?
2. Can interpretation of uterine contraction data be improved and standardized by means of a computer program?

There are four specific hypotheses:

1. Intermittent assessment of uterine contractility for one hour at standard prenatal visits during the late second and early third trimesters is an effective means to identify women without major medical risks who develop preterm labor or PPROM.
2. Periodic examination of the cervix improves the identification of women who subsequently develop preterm labor or PPROM.

3. Abnormally elevated vaginal pH corresponds to a higher risk for subsequent PPROM.
4. It is possible to develop a computerized interpretation system for the tocodynametry data which provides a broadly reproducible means to interpret the uterine contractility data.

The main questions to be addressed in the process of developing a computer program to interpret the human abdominal activity monitor strips are:

1. Does the baseline drift?
2. Is the signal purely representative of uterine activity or are there other unrelated events, such as respiration or maternal or fetal movement, to be considered?
3. Are there different forms of uterine activity that need to be distinguished from each other, e.g., contractures or low-amplitude, high-frequency activity and contractions?
4. If there are different forms of activity, how can they be individually identified and analyzed?

Population and Sample Description

One thousand women from an ethnically/racially mixed group of clients of a San Francisco obstetric service clients are studied. Kaiser-Permanente Hospital provides onsite prenatal care for approximately 1,250 women per year. The racial/ethnic mix of the population is 21 percent black, 17 percent Asian (mainly Chinese), 8 percent Hispanic (mainly Mexican-American), and 54 percent white. Virtually all women receive prenatal care well before 24 weeks' gestation. The extremes of social class are underrepresented in the Kaiser population, inasmuch as paid health care membership is a prerequisite. The overall preterm delivery rate for women who receive prenatal care at Kaiser Hospital is currently seven to eight percent. Racial differences in the prevalence of preterm and low birthweight infants are apparent and reflect the relative risks seen in the U.S. population as a whole. The individual racial and ethnic preterm rates in the Kaiser program, however, are lower than the national ethnic and racial risks. The project expects that 20 percent of these women are ineligible to participate and that the excluded group accounts for 40 percent of all preterm infants.

Exclusion criteria are: (1) multiple gestations; (2) history of preterm birth; (3) preterm labor in current pregnancy or before 34 weeks in previous pregnancy; (4) uterine malformation; and (5) clinical obesity (>140 percent ideal body weight for height and gestational age by 24 weeks' gestation).

New patients are enrolled until a total of 500 women complete the study. The clinical prediction rule developed with this sample is assessed by application to a second, independent sample of an additional 500 women.

Study Design

The study design is a prospective blinded evaluation. Data are collected by three skilled nurse clinicians.

Methods and Procedures

Subjects are monitored for one hour using a Termguard® portable tocodynamometer at weeks 24, 28, 30, 32, and 34, preceding their usual obstetric visits. At each of these visits, pelvic examinations are conducted, including vaginal pH determinations and cervical examinations.

Women with dilations ≥ 2 cm at the internal os or cervical length ≤ 0.5 cm are sent to the labor floor for further evaluation. Women with cervical change who fail to meet the study criteria for preterm labor are candidates for patient education regarding signs and symptoms of preterm labor, weekly clinic visits with cervical examination, and weekly blinded tocodynamometry. No recommendations for bed rest or decreased activity are made. If a patient experiences preterm labor, the data and details are recorded. Only predictive information obtained at least 48 hours prior to admission for preterm labor are included in our analysis. Once a patient is treated with tocolytics, no further predictive data are collected (i.e., she is a "completed" patient).

Analysis Plan

In order to establish prediction rules, a descriptive analysis is undertaken to characterize uterine activity, cervical examination findings, and vaginal pH. Inasmuch as pH measurements are logarithmic functions, pH is converted to hydrogen ion concentration prior to any arithmetic manipulation. After appropriate calculations, pH is recalculated. Summary point estimates are identified. These time-specific measures are plotted against time and inspected for gestational age trends. Methods of analysis include repeated measures analysis of variance, Student's t-test, Wilcoxon-Mann-Whitney test, and logistic regression.

In order to develop a computer program to analyze uterine activity, the study identifies a running mean for the baseline drift in tocodynamometry and subtracts it from the data points, eliminates unrelated uterine noise, and distinguishes forms of uterine activity.

PRE-AWARD EVALUATION

Originality and Importance

This study has considerable potential for substantially increasing diagnostic success in predicting preterm birth due either to preterm labor or to preterm premature rupture of membranes (PPROM). The study makes a strong case that the physiologic variables to be examined can be used to succeed where others, using largely demographic data, have failed to identify those who are at risk but who do not exhibit the few medical history conditions that indicate a high risk of

prematurity. Approximately 60 percent of women who develop preterm labor do not, in fact, have these predisposing risk factors.

Regional and National Significance

Because early identification of those at risk is associated with being able to increase the chance of delivery at term through medical management, the study is of high significance. Since approximately 6 percent of births are preterm, and preterm birth is associated with significant morbidity, the scope of the problem being addressed is large and of national significance.

Scientific and Technical Merit

The problem has been carefully delineated and its relationship to the investigators' previous work and to work by others is spelled out. The implications of work reported in the literature for the problems of predicting preterm labor and membrane rupture have been well-presented and incorporated into the research design. The hypotheses have been formulated so that they can be tested easily and, in most cases, answered in a clear-cut manner. The exception is in Part II of the study, in which the hope is to develop computer programs to interpret uterine contraction data automatically so that a standardized algorithm could be incorporated into the diagnostic procedure. Doing so is in some respects as much an engineering task as a scientific task—although it is one that has deep roots in basic science. As a consequence, it is difficult to specify in advance a testable hypothesis about computerized interpretation. Since these computer programs are adaptations of methods of automatic analysis of uterine contraction data used previously with sheep and monkeys, the investigators should have provided more information on this pre-existing computer program. It is also unclear how much human input is required for this computer analysis to succeed.

The investigators intend to hire a computer programmer and an experienced computer engineer. This study may also require a consultant with expertise in signal processing. Most computer professionals are concerned with data collection and analysis and not with signal processing and the extraction of signals from noise. Electrical engineers and biomedical engineers have specialized in this latter problem, and they utilize computers as tools to implement their sophisticated mathematical approaches. There are many new techniques (and some not so new) that can be applied to this problem and can help to yield better computer analysis software. Such approaches as pattern recognition, matched filters, optimization routines such as those used in neural networks, and correlation techniques may have applications to this problem. The field of electronic digital signal processing is one of the current "hot topics" in electrical engineering due to the recent availability of hardware and software for this purpose. The investigators would probably benefit from obtaining the advice of an expert in digital signal processing and perhaps some commercially available digital signal processing software for their microcomputer.

It is also recommended that the investigators develop an approach to testing and optimizing their uterine contraction recognition software. While there is no "gold standard," it is important that the software developers, who are familiar with

recordings from animals made under more idealized conditions than the indirect recordings from human subjects sitting in a waiting room, may not have the experience to interpret noisy clinical recordings. It is recommended that a test set of recorded data be generated and used to evaluate various computer programs. This test set should also be evaluated by a group of experienced clinicians, and inter-rater agreement should be an important factor in determining which "bumps" on the recordings represent true contractions. The recordings should also have some well established "artifacts" generated from patients sitting, moving, talking, laughing, breathing, and so forth.

Finally, the authors describe use of analysis of variance to determine whether there is difference between the variation among different gestational ages. This method of analysis is appropriate, but its importance to the measures being evaluated is not clear. The investigators also propose using multiple comparisons of outcome predictor factors with various outcome variables, and to use the t-test or the Wilcoxon-Mann-Whitney test to make these comparisons. This usage is inappropriate and likely to lead to type 1 error.

AN EDUCATIONAL BEHAVIORAL PROGRAM FOR PKU

GRANTEE University of Illinois at Chicago

INVESTIGATOR Kimberlee Michals, R.D., Ph.D.
College of Allied Health Professions
840 South Wood Street
Chicago, Illinois 60612
Telephone: (312) 996-8055

GRANT AWARD INFORMATION

Project Number:	MCJ-170575
Project Period:	01/01/88–12/31/90
Grant Year:	1 of 3
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3
Awarded:	117,116		
Requested:	156,788	162,977	119,601

SUMMARY

Study Objective

This study examines the effects of an experimental program which uses both an educational and a behavioral approach to accomplish dietary self-management by child and adolescent Phenylketonuria (PKU) patients.

Research Questions or Hypotheses

The questions to be answered by this study include the following:

1. What is the baseline understanding that children, preadolescents, and adolescents with PKU have about their disease and special dietary needs?
2. Are the educational tools used in the experimental program successful in raising baseline knowledge for the study subjects?
3. To what extent does level of knowledge/knowledge gain predict success?
4. To what extent does cognitive level (both intellectual level as defined by I.Q. measures and school achievement, and maturity with respect to operational level) predict success in this study's educational program?
5. To what extent does psychopathology and locus of control predict success in the program?
6. What is the relationship between family functioning and success in the program?
7. To what extent does social competence predict success in the program?
8. Will the success of this program continue after intensive clinic support is withdrawn?

In addition to providing answers to these questions, the study explores hypotheses related to differences between groups and differences within groups.

Population and Sample Description

Study subjects are recruited from PKU clinics at the University of Illinois Hospital at Chicago and the Children's Memorial Hospital. Their ages range from six to eighteen years. All subjects have PKU which is currently under dietary management, and all subjects have normal I.Q.'s. Those patients who participate in the self-treatment group are the experimental group, and those that receive usual clinic care are the control group. Patients participate as both a control and an experimental subject, and the order of their participation is randomly determined. It has been estimated that the experimental and control groups would each have 36 patients (20-22 children and preadolescents, and 14-16 adolescents) for a total of 72 patients for each of the two study periods. Attrition should be minimal because followup for PKU is routine.

Study Design

This study has a two-period crossover design, with each period lasting one year. Each subject receives two treatments, a standard one and an experimental one, with the order being randomly decided. In a crossover trial, each subject serves as his/her own control; this means that the sample size required is smaller than that needed for a conventional randomized clinical trial. One of the assumptions of a crossover design, however, is that there is no carry-over effect. The effect of the first treatment should not persist into the second period since this would cloud the effect of the treatment given in the second period. This study will determine if there is a carry-over effect. This is important because it is hoped that the effects of the intensive experimental treatment intervention are not short-lived. To guard against a possible carry-over effect, only data from the first study period are employed to make between-group comparisons. The data from the second period are used to determine the extent of the carry-over effect. These data are also used for a comparison of within-group differences.

Methods and Procedures

The study subjects and/or their parents from the two Chicago clinics are recruited at their routinely scheduled clinic visit. They are informed about the study, that each patient will have one year of routine followup and one year of the experimental program, the order of which is determined randomly. Participating patients are assigned to an examining room immediately so that there is no opportunity for discussion among study subjects, and patients are scheduled so that experimental and control patients do not meet in the waiting room.

Since the number of patients in the study is small, restricted randomization is needed. Random permuted blocks are used, therefore, to ensure that the number of subjects receiving the experimental treatment first equals the number receiving standard care first. Furthermore, subjects are divided into four strata according to the individuals' sex and age. Within these strata, random permuted blocks of four

individuals each are used to determine treatment assignment. Stratification guarantees that the group receiving the experimental treatment first is similar to the group receiving standard care first, with respect to certain relevant patient characteristics.

The experimental group is involved in an educational and behavioral program that includes setting behavioral goals and self-monitoring. The educational sessions occur at four-month intervals, beginning with the first clinic visit. At the first session, data are collected on blood phenylalanine level, knowledge of PKU, I.Q., school achievement, psychopathology, cognitive maturity, locus of control, family environment, and social maturity. At this same time, behavioral goals are set focusing on certain target behaviors. Also, activities to increase the patients' knowledge of PKU start at this session. Because low-protein food is essential for adequate dietary compliance, it is provided free to those study patients who cannot afford it. Between educational sessions, the patients are expected to send in, on a biweekly basis, a blood sample, a diet diary, and completed homework. Points are awarded for successful completion of assignments. Phone calls followed by postcards are sent to each patient in order to give them feedback on each element of their biweekly assignments.

At the final session, assessments are again made on a variety of measures, and an "end of study" blood phenylalanine level is determined. At this time, experimental subjects cross over and become control subjects.

The control subjects are also seen at four-month intervals. At the first session a variety of data are collected, patients are advised to follow their prescribed diet, and if the patient cannot afford low-protein foods, they are provided. Between visits, these patients send in on a monthly basis, blood phenylalanine samples and three-day diet records. At the last session the measures used to obtain data at the first session are repeated. The "end of study" blood phenylalanine level is the mean level from blood specimens sent during the last two months of the study and the specimen obtained at the last session. The controls then cross over and become the experimental subjects.

Analysis Plan

In this study there are two separate analyses of data, a between-group analysis and a within-group analysis. The between-group analysis determines whether the change in knowledge of PKU is significantly different between the experimental and control groups through the use of analysis of covariance (ANCOVA). There are two age groups: six to eleven-year-olds who require parental assistance, and adolescents capable of independent functioning. Age group and baseline knowledge are used as covariates. Similar ANCOVAs are performed to test for a significant difference between the experimental and control groups with respect to changes in blood phenylalanine level, I.Q., school achievement, psychopathology, cognitive maturity, locus of control, family environment, and social maturity.

For the within-group analysis, an ANCOVA is performed to determine whether knowledge within the experimental group is significantly increased from a baseline measure. Age group is used as a covariate to account for possible differences in the change of knowledge between preadolescents and adolescents. Baseline

knowledge of PKU is also be used as a covariate to adjust for any "regression to the mean" effect. A similar analysis is used to test for significant change in blood phenylalanine level. In addition, a logistic regression analysis is performed to assess whether such baseline measures as knowledge of PKU, I.Q., school achievement, psychopathology, cognitive maturity, locus of control, family environment, and social maturity are predictors of success in completing the treatment program.

Finally, for the experimental subjects who complete a one-year followup period, an analysis of covariance is done to test whether or not their blood phenylalanine level is maintained to the end of the followup period.

PRE-AWARD EVALUATION

Originality and Importance

The importance of the current proposal is clear. The PKU diet is notoriously unpleasant and compliance is extremely difficult to maintain. So, before the diet is routinely extended into preadolescent and adolescent years, investigators must be able to demonstrate that benefits accrue from such an effort, and they must further develop mechanisms for enhancing compliance to the strict dietary regimen. This application is therefore of considerable importance.

Regional and National Significance

The study sample of young people with PKU will be similar to the general population of young people with PKU in this country, making the results of the study generalizable to a larger population.

Scientific and Technical Merit (First Revision)

The current proposal addresses many of the concerns raised in the earlier review. Most noteworthy and most significant is the fact that the review of the literature now clearly provides evidence that there are problems related to the discontinuation of the restricted PKU diet. In the earlier review of the proposal, it was indicated that a strong enough case for this risk had not been made. This has now been corrected.

The design of the study is straightforward, involving two groups randomly assigned to an experimental and a control group. The control group simply continues to receive regular care as routinely provided at the PKU clinic. The experimental group, in contrast, receives a very well-specified intervention that is designed to address the capabilities of children of preadolescent and adolescent age. In this regard, it is important that adolescents are to be treated on their own, whereas preadolescents are to be treated in connection with their parents. This is a most attractive feature of this proposal as it reflects understanding of the fact that self-management becomes increasingly important with more mature children.

Concerns were raised in the earlier proposal about the absence of information on what kind of randomization procedure would be used. This issue is now addressed, though not in as much detail as might be desirable. Another concern raised earlier was that control and experimental subjects might have contact with each other and thereby confound the experiment. In the current revision of the proposal it is clear that this will not happen because as soon as individuals come to the clinic they will be sent to separate rooms so that they will not have time to mingle in a waiting room and discuss their particular situations.

The study has been importantly extended in one major way. In the prior submission only a posttest assessment was to be conducted at the end of the one-year intervention period. Now the research design includes a one-year long term followup, as well. This is important as it should enable the investigators to find whether or not the intervention effects, if any, are short-lived or endure for at least a year following termination of the formal intervention protocol. One problem, however, remains with the presentation of the design and also relates to the human subjects. Most of the research design summary seems to indicate that there will be experimental and control groups. At times, however, it is also indicated that a crossover design will be used and this implies that the control subjects will at some point become experimental subjects and receive the experimental treatment. This crossover plan is insufficiently detailed, so one is left to conclude that essentially a two-group design will be used. What is never stated exactly is what the subjects will be told. Will the subjects who receive the control treatment know that they are missing the experimental treatment? More generally, will the subjects of this research know that there is an experiment going on?

The measures included in the research plan seem to be thoughtfully selected. Not only will knowledge of PKU and diet be assessed but so will changes in the chemistry of the blood. Also, a number of important background factors will be assessed and chronicled over time to control for any initial group differences that result from randomization as well as to determine how these factors might change as a result of experimental or control treatment. It should be noted that the investigators have responded to a previous criticism of the family environment measure they used which resulted in an optimal score at the midpoint and thus posed problems for correlational analyses. Now the investigators plan to use the Moos family environment score which eliminates this problem. Also, the investigators have removed their previous self-esteem assessment which was unlikely to be sensitive to variations in age of subject.

The data analysis section is far too general. There is now a biostatistician where before there was none. The absence of details about the data analysis plan is of concern particularly as it refers to background factors affecting compliance with treatment. It is important for the researchers to consider within-group variation in order to identify who does or does not comply with treatment and the factors that predict compliance, and the consequences of differential noncompliance. A good amount of detail is provided concerning power analyses. From what is written it appears that even with 65 subjects there should be sufficient power to discriminate effects of the treatment.

The budget of this study is expanded greatly in part because the investigators have extended the study to include a one-year followup. It is not clear, however, that such an expansion should lead to an increase of 33 to 50 percent for the three-year

period. There appears to be a larger than necessary number of staff, with some putting in only a small amount of time. One has particular concern over the five percent of time declared for the biostatistician. Further, one wonders whether a less senior individual who could devote more time for the same amount of money would not be a better alternative.

Scientific and Technical Merit (Second Revision)

This is the second revision of an application which had been disapproved two previous times. The revised protocol outlines how this revision has responded to the suggestions previously made by the reviewers.

The investigators have given a good background of the inherent problems with PKU, dietary management, and the developmental and family issues involved. This revision resulted in a more concise summary of previous work, including a pilot study done on late adolescents by the investigators. The results of the pilot study reveal promising trends in that there was a significant improvement on the subjects' knowledge of PKU scores and a lowering of blood phenylalanine levels by 23 percent in a 16-week period.

The description of the design of the study is now clearer. A crossover design will be used with two groups assigned at random to either the experimental or control group for phase one and then going into the other group (either experimental or standard care) for the second one-year period. The intervention is carefully outlined with appropriate strategies for the educational and treatment components based on the children's ages. The randomization procedure is clearly explained and appropriate. There is assurance that the experimental and control subjects will not have contact during the clinic visit and since they know they will be in the experimental group later, the temptation to find out about what they are getting extra will most likely be reduced. Subjects and their parents are fully informed about all aspects of the study and are free to decline or withdraw at any time.

The concerns about the lack of adequate involvement by a biostatistician have been considerably reduced since a biostatistician has agreed to devote 10 percent time in each of the first two years and 20 percent time during the final year when most of the statistical analyses will be performed. The contribution of the biostatistician is reflected in the clearer and more detailed plan for data analysis and its overall improvement. The investigators have taken the reviewers' previous advice and now plan within-group comparisons based on who successfully completes the intervention plan. In addition, there are plans to analyze the role of baseline factors in predicting treatment success. The data analysis plan does not discuss anticipated subject attrition. One is left with the feeling, however, that they expect all who agree to be in the study to complete the two-year study period.

The human subject consent forms have been altered to clearly reflect the random assignment to experimental or standard care, with explanation that all subjects would receive the experimental treatment. The budget appears adequate and well-justified. There has been an approximately $80,000 budget reduction in this third submission and this reduction has resulted mainly from lower personnel costs.

In summary, this is a greatly improved proposal. The research plan is now designed to provide clear answers to the research questions previously posed.

THE NATURE, ORIGINS, AND CONSEQUENCES OF CONCEPTIONS OF PARENTING

GRANTEE Iowa State University

INVESTIGATOR Ronald L. Simmons, Ph.D.
Department of Sociology and Anthropology
Iowa State University
107 East Hall
Ames, Iowa 50011
Telephone: (515) 294-9894

GRANT AWARD INFORMATION

Project Number:	MCJ-190572
Project Period:	01/01/88–12/31/89
Grant Year:	1 of 2
Type of Grant:	New

Costs:	Year 1	Year 2
Awarded:	114,404	
Requested:	118,466	126,111

SUMMARY

Study Objective

This study investigates the nature, origins, and consequences of adult and adolescent views of the role of the parent (conceptions of parenting). Specifically, the study aims to:

1. Investigate the nature of conceptions of parenting, identifying various dimensions and components. Attention will be given to the manner in which either the nature and/or salience of these dimensions varies by age, sex, and social class;
2. Analyze the manner in which various dimensions of conceptions of parenting influence parental behavior, especially parental behaviors that have been shown to affect the physical and mental health of children; and
3. Identify the origins or determinants of variations in conceptions of parenting.

Research Questions or Hypotheses

Several unstated hypotheses guide the collection of data and plan for data analysis. These are:

1. Life stress combined with personality and social background variables determines parents' conceptions of parenting.
2. Parents' conceptions of parenting influence the socialization style and parenting practices used with their offspring; and

3. Parents' conceptions of parenting and behaviors influence adolescent views of the role of the parent, and the extent to which these images are associated with attitudes and behaviors related to premarital sex, pregnancy, and prenatal care.

These hypotheses are subsumed in a path analytic model positing one way flow of causation between several constructs of relevance (i.e., conceptions of parenting, psychological resources, etc.)

Population and Sample Description

Study subjects are 200 families residing in central Iowa, each of which consists of two parents, a seventh grader, and a sibling who is no more than four years older or younger than the seventh grader. These families will be participating in a panel study supported by the National Institute on Drug Abuse (NIDA) which is to investigate changes in family dynamics brought about by social and economic change.

Study Design

A two-wave, passive, panel design is proposed.

Methods and Procedures

Participation in the study is sought at the local school district level by means of a letter jointly signed by the principal investigator (PI) of the study and the local school principal. The names and addresses of those parents not objecting to being contacted by the project staff are forwarded to the Iowa State University (ISU) Statistical Laboratory. The laboratory makes an initial telephone call, or personal visit, if there is no phone, during which it is determined if the family meets the requirements for inclusion into the study. If so, appointments are made to visit the family for a period of about two hours, normally in the evening. During the visit a written description of the projects is reviewed with the family. The remainder of the evening involves the independent completion by the family members of the several questionnaires and rating scales to be used in the study. After these instruments have been administered, the interviewer arranges a second appointment during which a research assistant videotapes the four family members as they engage in structured tasks for about 90 minutes.

The NIDA investigation calls for study families to be paid $100 at the end of the videotaping session. A third family visit is scheduled at the end of the videotaping visit to collect data on conceptions of parenting and the fee paid is then increased to a total of $150, which is paid at the end of the third visit. After explaining the third visit agenda, interviewers audiotape the seventh graders and siblings' responses to a set of open-ended questions on conceptions of parenting. These interviews are completed in a different room, out of the presence of the parents who are completing questionnaires during this time. Once the interviews are completed, the two children begin completing the questionnaires, and tape-recorded interviews are conducted with the parents.

To encourage continued participation, families are immediately sent a followup letter thanking them for their participation. Every three months thereafter, they receive a card indicating the progress of the study and an approximate date when they will be contacted again.

The questionnaire items, rating scales, and standardized instruments embedded in the questionnaires and open-ended interviews have either been pretested or are in the process of being tested. These instruments are intended to tap the key constructs of the study which are: conceptions of parenting; empathy; view of human nature; attitudes toward sex, pregnancy, and prenatal care; and psychological resources.

Analysis Plan

Structural model techniques such as LISREL VI are employed to test the validity of the conceptual model guiding the study. After composite measures of the study constructs have been developed using confirmatory factor analysis to maximize the reliability and construct validity of the indicators of specific constructs, analyses proceed by constructing a series of structural equations to describe the model of socialization into conceptions of parenting contained in the path analytic model guiding the study. As in any path analytic problem, an equation is established for each of the endogenous variables. These equations are then tested through a sequence of regressions which regress each of the endogenous variables upon those factors in the model posited to occur causally a priori. The planned second wave of data collection will allow for stronger tests of the causal assumptions which are a part of the study model of conceptions of parenting. Following collection at time 2, the structural equations will be reanalyzed regressing dependent variables at time 2 upon changes on the independent variables between time 1 and 2, while controlling for time 1 scores on the dependent variable.

PRE-AWARD EVALUATION

Originality and Importance

An understanding of the causation of differences in parenting behaviors and their origins would be useful for health providers and service delivery systems. Looking at the relationship between conceptions of parenting and actual parenting behaviors is unique and interesting. More creative is the comparison of parenting conceptions between parents and teenagers.

Regional and National Significance

The proposed work is part of an ongoing study of rural families in North Central Iowa. The base study is supported by the National Institute on Drug Abuse. The base study seeks to investigate changes in family dynamics and, especially, parenting that result from social and economic change.

If the tools are adequate, this study could be replicated on other types of parents in other family configurations.

Scientific and Technical Merit

The study is well organized. The justification for the study and selection of variables is well presented. The justification of instruments is very good; it is impressive that a "conceptions of parenting" instrument is being piloted now. There is no concise list of hypotheses, however.

One concern about the proposed study is bias in the self-selected/volunteer sample. The researchers need to clarify what biases could be expected and how limited the findings might be. Limitations on the findings should be delineated when they become available.

More information on the data analysis plan is needed. How are the new instruments being scored and examined for reliability and validity? How are "confirmatory factor analyses" used? The researchers need to give examples of hypotheses and how they are tested using various statistical techniques, explaining how a large amount of data is reduced and linked.

HOME INTERVENTION FOR INFANTS WITH FAILURE TO THRIVE (FTT)

GRANTEE University of Maryland

INVESTIGATOR Maureen M. Black, Ph.D.
University of Maryland School of Medicine
Department of Pediatrics
660 West Redwood Street
Baltimore, MD 21201
Telephone: (301) 328-2185

GRANT AWARD INFORMATION

Project Number:	MCJ-240568
Project Period:	04/01/88–3/31/93
Grant Year:	1 of 5
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3	Year 4	Year 5
Awarded:	126,047				
Requested:	177,389	187,855	125,413	187,855	125,413

SUMMARY

Study Objective

The primary goal of this five-year project is to measure the impact of a home intervention program on the growth and development of infants with failure to thrive (FTT). FTT presents a critical sign of family dysfunction that can have serious implications for the health and development of young children. The family variables germane to FTT make it an ideal condition for the development of home-based interventions. Despite convincing evidence that parents should be involved in early intervention, there are few examples of family-centered programs for infants diagnosed as FTT.

Research Questions or Hypotheses

It is hypothesized that among families with a child with FTT, those families who receive home-based, ecologically-oriented intervention over one year show improvements in their child's growth, health, cognitive development, emotional development, motor development, and behavior, as mediated by more responsive parent-infant interactions and more effective caregiving behaviors.

Population and Sample Description

The study population consists of families who bring their children to one of the primary care pediatric clinics associated with the University of Maryland School of Medicine at Baltimore. Approximately 75 percent of this clinic population are black and almost 90 percent are on welfare. Most mothers are young, many are teenagers, and most are single parents. Assuming 10 percent of the population meet the study criteria, there should be approximately 120 eligible subjects per

year. The sampling plan allows for an attrition rate of up to 25 percent, with an expected final sample size of 140 (70 per group). Subjects are eligible for participation if they meet the follow criteria: (1) the infant is between 1 and 18 months of age; (2) the infant was not born prematurely or small for gestational age; (3) the infant did not require more than 10 days hospitaiization at birth; (4) the infant has a weight for age below the 5th percentile on the sex-appropriate NCHS growth chart on two or more weighings at least three weeks apart; and (5) the infant drops in weight across two major centiles.

Study Design

This study applies a transactional, ecological model to the evaluation of parent-mediated intervention with failure to thrive infants. It is a randomized, experimental assessment. The evaluation component has been designed to minimize the following threats to the valid interpretation of findings: non-equivalence of intervention and control groups prior to intervention; making an incorrect no-difference conclusion about the effects of the intervention; reactivity of measurement effects; reliability of intervention implementation; horizontal diffusion; family use of other services during the study; and failure of outcome assessment staff to remain blind to group assignments.

Methods and Procedures

At referral, children and families receive a large battery of assessments, including measures of stress, social support, depression, caregiving behavior, parent-infant interaction, and child health, cognitive, emotional, and motor status. (Measures include the Life Experience Survey, Parenting Daily Hassles Scale, Depression Inventory, HOMES (Home Oriented Maternity Experience) inventory, Family Support Scale, Nursing Child Assessment Teaching Scale, and Bayley Scales.) At this point, all families receive clinical recommendations and nutritional counseling. Subsequent visits to the clinic are scheduled based on the growth status of the child. Assessment visits are scheduled at 6-month intervals until infants are 18 months of age.

Following the initial evaluation, children and families are assigned randomly to intervention or control groups. Children in the control group receive the services of a dietitian and clinical weight monitoring, but do not receive intervention services. Intervention for the experimental group are sub-contracted to Parents and Children Together, Inc. (PACT), a nonprofit intervention program already operating in the area. Implemented by an interdisciplinary team of physical therapists, occupational therapists, speech pathologists, social workers, and nurses, this program attempts to enhance infant development by facilitating an effective parent-child interaction system. Home activities are planned according to the work of Bromwich and Freiberg, as well as the Portage Project. Family members, neighbors, and friends are encouraged to participate in the intervention in order to increase the mother's social support network.

Analysis Plan

Analyses of the intervention effect are divided into two kinds: time-specific and longitudinal. Data from each collection period are analyzed by between-group t-tests, with analyses of covariance being used if differences in the randomized groups are discovered. Longitudinal analyses are accomplished using univariate and multivariate analyses of variance. Mediating variables are examined by using them as covariates in the aforementioned analyses and examining any resulting changes in the pattern of significant group differences.

PRE-AWARD EVALUATION

Originality and Importance

Although few aspects of the proposed research are novel, as such, this is a well-conceptualized study which should yield important new information about FTT infants and their families.

Regional and National Significance

FTT is a major health problem, particularly among families with multiple risk factors, such as those studied here. Understanding more about effective interventions for FTT has strong national significance. Although this proposal focuses on an urban population, the home-based intervention to be evaluated could easily be adapted to rural areas as well.

Scientific and Technical Merit

This study has numerous strengths. Its experimental design utilizes random assignment to groups, which makes it a cleaner and more easily interpretable research design than many evaluations of intervention programs. The research is driven by a strong conceptual model and the hypotheses and study design are natural outgrowths of the guiding transactional model. The assessment instruments to be used are some of the best available, and the research methods utilize questionnaire, interview, and observational data collection approaches, which is a definite strength. The expected final sample size is large enough for the needed data analyses, and the investigators have been very careful to build into their sampling plan an expected attrition rate of 25 percent. Methods for tracking the sample over time and for encouraging continued participation in the study seem satisfactory. This is a strong proposal for an important research study. A few weaknesses, however, are present, particularly in the description of the intervention to be implemented, in the proposed observation procedures, in the data analysis strategies to be employed, and in the dyadic (rather than family) focus of the study. Each of these weaknesses, however, has a reasonably straightforward remedy. These areas are briefly discussed below.

More information is needed on the specific parameters of the proposed intervention. Since one of the strengths of this project would be the ability of others to replicate the intervention should it prove to be successful, it is important that specific

aspects of the intervention be clearly documented. The description of the intervention strategies to be used is quite general. The use of programs such as Bromwich's seems very appropriate for the stated aims, but more information is needed on how this program would be combined with the other intervention models to be used (such as the Portage Project materials) as well as on how the intervention would be implemented. (For example, would any of the intervention team, such as the PT or the Speech Therapist, work directly with the infant? Is the planned intervention identical to that currently provided by PACT, or would specific procedures be implemented for study families?)

Including an observation of parent-infant interaction in the research design is one of the positive features of this study. The enthusiasm about this component, however, is diminished by the extremely limited sample of behavior to be obtained. The principal investigator's plan is to observe parents and their infants for only five minutes at each data collection point and to observe interaction in only one context, namely, toy play. Given the importance of the observations to the overall study, this plan is not satisfactory. Significantly more observation time is needed and the observations should span several interactional contexts.

Perhaps the weakest part of the study is its plan for data analysis. The principal investigator relies too heavily on analyses of covariance to test important hypotheses. According to the proposal, covariates to be included in the final analyses include all variables in which the two groups differ at the pre-intervention assessment, all variables which show differential attrition across the longitudinal course of the study, and all measures which are included as mediating variables in the transactional model guiding the study. Just the mediating variables alone, which are statistically analyzed solely by entering them into study analyses as covariates, include all the parent-child observation codes, the three subscales of the Parenting Stress Index, the subscales of HOME (Home Oriented Maternity Experience), the Life Experiences Survey, the Parenting Daily Hassles Scale, the Depression Inventory, and the Family Support Scale. Analyzing this large number of variables, along with the group difference and attrition variables, by entering them all as covariates is not appropriate. The principal investigator is strongly encouraged to seek statistical consultation in developing appropriate data analysis strategies for testing their study hypotheses and the overall tenets of their transactional model. Ideally, these analyses would allow the investigators to examine those characteristics of families of FTT infants which are predictive of successful intervention versus those characteristics which predict no change (or deterioration). The research design allows analyses of the processes through which the proposed mediating variables operate. For example, if maternal depression makes intervention success less likely, is this true because depressed mothers fail to implement the interventions and do not change their parenting behavior, or do they change behavior, yet the change is not effective in changing the outcome of their infant? The intriguing questions are posed, but the data analyses, as proposed, fall far short of addressing the exciting potential of this research. A much smaller point is that infant gender should be included in the data analyses.

A final area needing some attention is the focus of the proposal on the mother-child dyad, rather than on the family. Although the investigators expect few in their sample to be married, they have not successfully addressed the important difference it might make for child outcomes if the woman is living with a spouse or

with a stable significant other. Similarly, since many of these women are expected to be teenagers, it is likely that the infant's maternal grandmother may have major care-taking responsibilities in many families. It is a plus that the intervention is provided to everyone in the infant's environment, but the researchers need to expand their conceptualization to address other important family members, such as fathers, father-figures, and grandparents. It is not necessary that all project data be collected on these family members, but their contribution to the care of the infant and to the ultimate outcomes of the intervention needs to be more systematically incorporated into the model.

STUDY OF PSYCHOSOCIAL FACTORS IN MATERNAL PHENYLKETONURIA

GRANTEE Children's Hospital

INVESTIGATOR Susan E. Waisbren, Ph.D.
Department of Psychiatry
Children's Hospital
300 Longwood Avenue
Boston, MA 02115
Telephone: (617) 735-7945

GRANT AWARD INFORMATION

Project Number:	MCJ-250529
Project Period:	01/01/88–12/31/90
Grant Year:	1 of 3
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3
Awarded:	181,224		
Requested:	198,777	210,774	144,548

SUMMARY

Study Objective

Women with phenylketonuria (PKU) are at risk for bearing children with mental retardation and/or physical disabilities. Dietary treatment during pregnancy, if initiated prior to conception offers protection to the fetus. May women seek medical attention after they are pregnant. The investigators of this study posited that psychosocial factors determine when a young woman with PKU is likely to plan her pregnancy and comply with medical recommendations for treatment. A three-year prospective longitudinal study is currently underway to test these assumptions using a stage model of decision making. The current extension request proposes to continue such a prospective, longitudinal study so as to achieve the goal of having 75 women who have gone through all the stages of the decision-making model. The stages of the model are: (1) prevention of unplanned pregnancies; (2) reproductive decision making; (3) diet initiation; and (4) diet continuation during pregnancy. In addition, two other objectives were proposed for the current extension request:

1. To facilitate collaboration with a study ongoing in Israel on the same topic; and
2. To conduct a needs assessment and feasibility study for intervention to prevent pregnancies with PKU women.

The two additional studies were not approved. The information describing the study which follows pertains to the original three-year study and the progress achieved so far. The pre-award evaluation pertains only to the request for extension of the project period with additional support.

The original study objectives were to determine: (1) the psychosocial factors related to successful outcome in maternal PKU pregnancies; (2) the differences between phenylketonuric women and those in two matched comparison groups

(diabetic and healthy acquaintances) in their psychosocial adjustment and behavior; and (3) the applicability of a stage model predicting unplanned pregnancies and noncompliance with medical recommendations.

Research Questions or Hypotheses

This study addresses four broad questions:

1. What psychosocial factors are related to successful outcome in maternal PKU, with regards to (a) achieving the behavioral goals that are necessary for prevention of mental retardation in offspring, and (b) maintaining a satisfying quality of life in the face of risks associated with maternal PKU and the required modifications of normal habits and activities?
2. Does the fact that the young women have PKU and are aware of the risks to childbearing affect their psychosocial adjustment and behavior? How do they compare with women who have no known childbearing risks and to women with other chronic medical concerns (such as diabetes) that can increase reproductive risks?
3. Can a stage model representing four areas of potential conflicts be applied to the understanding of maternal PKU? Specifically, does knowledge and do certain personality traits, beliefs, and social factors predict success or failure at one stage and not others? Does a successful outcome at one stage correlate with a successful outcome at a later stage?
4. What specific interventions for women with PKU might be most beneficial? Would it be feasible for us to develop these services?

Population and Sample Description

A total of 205 subjects are presently enrolled in the study. Sixty-nine women have PKU; 69 have diabetes; and 67 are acquaintances of the women with PKU. A substantial number of the subjects have been followed through the prevention of unplanned pregnancies and reproductive decision-making states. Relatively few subjects, however, have continued on to the stages of treatment initiation and treatment continuation during pregnancy. It is expected that 250 women will have been enrolled at the end of the three-year extension and that 75 women will have progressed through the four stages of decision making hypothesized in the theoretical model guiding the study. Currently, the majority of subjects (N=175) are in Stage 1. The rates of pregnancy, to date, are similar in PKU and diabetic samples and lower in the acquaintance groups.

Study Design

A nonequivalent, prospective, matched three-group design is being used. The two control groups are women with diabetes and acquaintances of the PKU sample women.

Methods and Procedures

All young women with PKU known to the New England Regional Maternal PKU Project are invited to participate in the study. Those women with moderate to severe mental retardation and women with untreated hyperphenylalaninemia who have recently participated in extensive research regarding outcome in pregnancies identified through umbilical cord blood screening. Each hyperphenylalaninemic woman who participates in the study will be asked to name several acquaintances who might be willing to join the study as controls. A comparison group of acquaintances will be recruited from these names. Young women with diabetes followed at the Joislin Diabetes Center who were at least one year post-diagnosis, were individually selected to match PKU subjects on age, level of education, marital status, and number of children. Acquaintances and diabetic women with major medical complications will be excluded.

Subjects will be contacted first by letter which then is to be followed by a phone call. Informed consent will be obtained from those who wish to participate. Parents of women under age 18 will be asked to give informed consent, as well. Informed consent procedures used with PKU mothers will also be used with control subjects.

Participation in the study involves an interview and the completion of several self-administered questionnaires. The majority of the subjects will be interviewed at home; some will be interviewed at Boston Children's Hospital, with reimbursement for transportation costs provided.

Analysis Plan

Data is analyzed with Statistical Packages for the Social Sciences (SPSS) software. Parametric statistical procedures are used when possible. Data reduction is accomplished by inter-correlations and by establishing standard scores.

For the descriptive study, means and standard deviations are obtained for interval data, and medians, modes, and frequencies are calculated for ordinal data. Frequencies are also calculated for nominal data.

For correlational studies, the study employs the Fishbein formula for data fit, Pearson Correlations, Spearman Rank Order Correlations, and biserial correlations. To determine markers for identifying women at high risk for failure in achieving outcome goals, regression analyses are performed for each stage.

The prospective, longitudinal study employs correlational analyses, or Chi-squares for dichotomous variables. Structural equation analyses are employed to analyze the interaction of variables in sequences over time.

PRE-AWARD EVALUATION

Originality and Importance

This study represents a very important area of investigation. The early work for screening, diagnosing, and providing effective treatment for PKU was an important

genetic breakthrough. Now many of these children have survived to adulthood and have the potential of becoming mothers. The intent of the study is to examine reproductive decision making and to develop a health learning environment that will increase dietary compliance prior to and after getting pregnant, so as to protect the offspring. There is very little work being done in this area and this study represents a very significant beginning. In addition, there could be important knowledge spinoffs with respect to life decisions generally and sexuality and contraception decisions specifically

Regional and National Significance

The study is being done in the New England region. There is no reason to believe that the study groups will pose a bias that would not make the results generalizable. The investigators, with few exceptions, have tried to include in the study all of the known PKU women of reproductive age in the New England area.

Scientific and Technical Merit

The goals of this study are admirable. It is clear that PKU has a disastrous effect on the fetus and on the child who is born to an untreated mother The measures that the investigator has selected for the study are appropriate. They will tap basic information on maternal background, education, intelligence, personality, knowledge of medical information and social support. These are the measures that have been shown in the literature to be related to compliance in different medical situations. Some modifications and substitutions in the measures originally proposed for the study have been made. For example, the Coopersmith Self-Esteem Inventory has replaced the earlier self-esteem measure. New measures of social support are also being proposed. What is not clear in the proposal is when the changes were done or are to be made. It will affect sample size, but just how much cannot be determined from the new proposal.

The execution of the study interview and preliminary data analysis of year 1 and year 2 data indicate progress. The finding that social support explains considerable variance in contraceptive practice is important, and the investigators have adjusted interview schedules to collect qualitative data on this. Likewise, experience to date suggests some PKU clients have considerable problems maintaining dietary control. This has prompted questions about possible intervention strategies.

There are the following concerns:

1. Why recruit women from the later stages of the model at all? If the study is longitudinal and predictive of medical decision making and compliance, why not focus on the women who are in Stage 1 or at least those who are about to enter Stage 2, the stage of decision making for having a child?
2. The proposal states that data is being collected yearly with six-month phone calls. This hardly seems adequate for a study of this nature. Assuming that data is collected on a Stage 1 mother who states that she has no intention of pregnancy, if six months later she has changed her mind, one must ask, are data collected at this point? There needs to be some way to collect data as baseline

during Stage 1 and then again at the point of decision making regarding pregnancy. It is unclear from the proposal that this is occurring.

3. The proposal states that a potential weakness of the study is the disproportionate number of women in Stage 1. It is also stated that another weakness is the large number of variables. These have been reduced through the creation of scales, but this data reduction undertaking is not reflected in the proposal.

With respect to the two additional objectives for the extension of the current study, it is unclear why the current funding agency should fund the collaborative effort with the Israeli team, since it would appear that adequate funding already exists for that team to complete the research and for meetings between the two study teams. The needs assessment and feasibility part of the study is not well-described. Two paragraphs are devoted to this part of the study with suggestions for setting up live-in arrangements for those women having difficulties in controlling their diets.

The budget appears to be excessive in the areas of personnel, consultants, and computer time, and it should be reduced accordingly.

In summary, progress in the conduct of the original study has been substantial and the proposed extension of time and funds reasonably well-supported. Approval for the continuation of the decision-making study is recommended with a substantial reduction in budget and personnel. The parts having to do with the Israeli collaboration and the needs assessments for developing an intervention to affect dietary non-compliance should not be supported for reasons stated earlier.

PRECONCEPTIONAL VITAMIN USE AND NEURAL TUBE DEFECTS

GRANTEE Boston University

INVESTIGATOR Allen A. Mitchell, M.D.
Boston University School of Medicine
Slone Epidemiology Unit
1371 Beacon Street
Brookline, MA 02146
Telephone: (617) 734-6006

GRANT AWARD INFORMATION

Project Number:	MCJ-250567
Project Period:	03/01/88–02/28/92
Grant Year:	1 of 4
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3	Year 4
Awarded:	283,800			
Requested:	336,143	337,370	363,072	278,736

SUMMARY

Study Objective

This study seeks (1) to establish the potential benefit of preconceptional vitamin supplementation in reducing the incidence of Neural Tube Defects (NTDs) and (2) to examine some of the potential hazards of excessive preconceptional vitamin supplementation.

Research Questions or Hypotheses

Two primary hypotheses and one secondary hypothesis guide the study. The primary hypotheses are: (1) Multivitamin supplementation in the month immediately preceding the Last Menstrual Period (LMP) is associated with a 50 percent reduction in NTDs; and (2) Folate supplementation in the month immediately preceding the LMP is associated with a 50 percent reduction in NTDs. The secondary hypothesis posits that excessive supplementation with vitamins or minerals in either the month preceding or including conception or in the months following conception, increases the risk of selected birth defects.

Population and Sample Description

Study subjects (cases and controls) consist of malformed, liveborn infants under six months of age, stillborn infants, and therapeutic abortions (TAbs). Both cases and controls are identified through an existing network of 188 birth and teaching hospitals in three study centers (Boston, Philadelphia, and Toronto). During the three years of the study, about 450 NTD cases will be identified. It is expected that 50 such children will be from families which have had a previous child with NTD. Controls are 1800 liveborn, stillborn, or therapeutically aborted infants who

have other malformations besides NTD. The distribution of defects in the control series approximates that found in the general population.

Study Design

The investigation proposes to use a quasi-experimental study design of the case-control variety.

Methods and Procedures

Each week research assistants telephone designated individuals in the newborn nurseries of participating hospitals and in a systematic fashion obtain name, diagnosis, and physician's name for each infant born with a malformation during the previous week. In addition, study nurses systematically visit each participating tertiary care pediatric hospital and freestanding clinic, where they abstract similar information on babies under six months of age. This information is obtained by review of admission, clinic, and surgical logs.

From this pool of potential subjects, ineligible babies are eliminated. The study then writes to the physicians of the eligible infants to confirm the diagnosis and obtain their permission for the study personnel to approach the mother.

Similar methods are used to identify liveborn/stillborn infants where diagnosis of enrolled subjects is obtained through review of pathology reports. Mothers of designated subjects are approached for interview by an introductory letter. Informed consent is obtained prior to the interview. For liveborn/stillborn subjects, interviews are conducted between three to six months after delivery; for TAbs, interviews are conducted between one and three months after the procedure.

Completed questionnaires are forwarded to the Slone Epidemiology Unit (SEU), where study personnel assign codes for all medications identified (using a unique drug-coding system developed and used by the SEU in the past decade). Additional codes are developed for vitamins and mineral supplements, to include specific components and doses. Birth defects are coded according to the system developed by the investigators for use in analyzing data from the Collaborative Perinatal Project. In addition, as the data are entered onto computer file, they are reviewed for internal consistency of dates, validity of codes, and missing items.

Analysis Plan

An approach to data analysis similar to one used in prior study of drug exposure and birth defects is used. Generally, this consists first of the generation of frequency distributions and cross tabulations by outcome of all variables. Odds ratios and test-based 95 percent confidence intervals are then calculated to test and estimate associations for the relevant exposure variables. Potential confounding effects of other factors are assessed univariately by the Mantel-Haenszel procedure. Logistic regressions using the method of maximum likelihood allows estimation of odds ratios and confidence intervals while adjusting for the joint effects of potential confounders. The logistic regression model includes terms

for known risk factors for the outcome, as well as those factors which alter the crude ratio when controlled univariately.

PRE-AWARD EVALUATION

Originality and Importance

This study promises to fill a significant information gap concerning the relationship between multivitamins and NTD and other congenital anomalies. The literature review supports a contemporary examination of the question of whether vitamin supplementation can lower the incidence of NTD, as well as whether its excessive use has any potential harmful fetal effects. The data are currently incomplete.

Regional and National Significance

The findings resulting from this study should have a significant impact on general health care policies dealing with vitamin supplementation.

Scientific and Technical Merit

This application was reviewed at a prior review cycle where action was deferred pending ..e clarification of a number of substantive issues. Similar studies were currently underway. Collected nutritional data was insufficient to permit determination of dietary and "non-prenatal" vitamin intake; the total number of patients delivering babies with neural tube defects could have been grossly underestimated as it was unclear whether induced and spontaneous abortions with the anatomic diagnosis of NTD were to have been counted; ethnic background information collected would have been insufficient for the purposes intended. The investigators have responded well to the issues raised during the last review of the proposal. The response included a letter of clarification, an additional paper, a supporting letter from an investigator of another case-control trial on vitamin use and a revised questionnaire.

One issue raised in the prior review was the question of the need for this study when other similar work is already ongoing. In particular, there is a National Institute of Child Health and Human Development (NICHD) case control trial underway as well as Milunsky's study in England, and the researchers have also examined the relationship between birth defects and vitamin supplementation. The NICHD trial involves 300 cases while that of the present researcher involves 400. Also, telephone interviews are used in the NICHD study whereas home interviews are proposed in this study. Milunsky's study involves less than 70 cases of NTDs and has little statistical power to detect the differences looked for in this study.

The earlier proposal described some relevant work by the research group using their data from the Birth Defects Study (BDS). These data did not include any information on therapeutic abortions and was weak in the area of nutrition and health behaviors. Data from this current study focus on these issues and information not obtainable from BDS data.

The investigators argue that multiple observational studies are often needed to resolve complex health questions. The first studies of spermicidal contraceptives and Bendectin, for example, suggested the risk of birth defects. However, later studies failed to confirm these findings, and scientific debates on these issues are mostly resolved now. This argument is sensible given the relatively high prevalence of NTDs (1.5/1000) and the potential adverse effects of megavitamin intake. Perhaps the worst situation would be to leave unresolved the major questions under study.

Other points about sample accrual and choice of sample size are clarified in the additional information submitted. Data analysis is also described sufficiently.

The questionnaire has been modified to include additional information on ethnicity, parental and grandparental countries of origin, religion, a semi-quantitative food frequency questionnaire, health behaviors (including seatbelt use and exercise), and vitamin supplementation. The food frequency questionnaire, for example, attempts to collect information on current diet, then asks about variations in diet during pregnancy in two ways. It would make a stronger study to include a modest prospective component which asks about diet at that time. In this way retrospective recall bias or unreliability also affects the results of analyses involving NTD as a dependent variable, so corrections for attenuations should be considered.

COORDINATED CARE AND CASE MANAGEMENT FOR CHILDREN WITH SPECIAL HEALTH CARE NEEDS

GRANTEE Massachusetts General Hospital

INVESTIGATOR James M. Perrin, M.D.
Department of Children's Service
Massachusetts General Hospital
Fruit Street
Boston, MA 02114
Telephone: (617) 726-1885

GRANT AWARD INFORMATION

Project Number:	MCJ-250581
Project Period:	01/01/88–12/31/90
Grant Year:	1 of 3
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3
Awarded:	169,950		
Requested:	249,846	248,679	223,698

SUMMARY

Study Objective

This project proposed to investigate the effectiveness of coordinated, community-based case management services for children through three related studies. The three studies were: (1) a survey of families with a range of chronic conditions in states with and without case management services, (2) reanalysis of data from the REACH experiment in Florida, and (3) pilot analyses of state Medicaid data bases to compare utilization with and without case management programs. Only Study 1 was recommended for approval and funded. The technical information which follows pertains to Study 1 only. The pre-award evaluation information covers Studies 1, 2, and 3.

Research Questions or Hypotheses

The study's hypotheses are that children and families who receive case management services (as compared to those controls who do not) will have:

1. Greater utilization of non-medical and non-hospital services; greater utilization of community services; a decrease in the use of emergency rooms; a greater proportion of expenditures for non-emergent rather than emergent services; a decrease in unmet needs, as perceived by parents; and no demonstrable difference in the overall amount of expenditures for care;
2. Improved functional status as indicated by increased participation in age-appropriate community activities; and
3. Improved psychological status for both the children and their mothers.

Population and Sample Description

Subjects for study are drawn from six states: Florida, Illinois, Iowa, Massachusetts, North Carolina, and Rhode Island. Two of these states have broad case management systems, two have case management services targeted only to technology-dependent or Medicaid waiver-eligible children, and the remaining two have very limited or no case management services available. Approximately 120 families per state are sampled in order to achieve a final sample of 100 per state. The sample includes children aged 2 to 16, stratified according to three health condition groups: (1) broncho-pulmonary dysplasia with or without ventilator dependence, (2) spina bifida, and (3) other conditions with high health services utilization patterns except those associated with moderate to profound mental retardation. These groups represent the variety of chronic health conditions seen in state programs for children with special health care needs. The children differ in the degree to which they require the services of multiple providers.

Study Design

The study uses a modified case-control design in which children in states with case-management services are matched with comparable children in states without case management. Matching is done on age, sex, and health conditions. Using children from states that do not offer case management permits the determination of the extent of and the need to control for selection bias in families chosen by the state programs to receive case management. This approach does not control for the variation in health services available to families in different states; however, the mix of urban and rural states and representation of states from the north and south will offer some balance for differences.

Methods and Procedures

Access to study subjects is obtained through each state program for children with special health care needs. After stratification is determined for the state sample, families are contacted either by the state program staff or by their usual health care providers and asked if they are willing to participate. Those families who indicate a willingness to participate are then contacted by the staff of the Survey Research Laboratory of the University of Illinois, which has contracted to carry out the data collection activities. Data are collected through a questionnaire and a battery of standardized measures. A questionnaire administered to the parents is used to assess the adequacy of case management services for the preceding week, month, and year, and to gather basic demographic information. A revised version of Kanthor et al.'s Unmet Needs Questionnaire is used to assess the adequacy of case management services and the experience of families in managing care for their children. Functional status of children is measured through the FS II, a standardized measure developed by Stein and Jessop. Psychological status of children is measured by the Child Behavior Checklist (CBCL) and the Personal Adjustment and Role Skills (PARS II). The functional status of parents is measured both by the workforce participation and income estimates and also by the Impact on Family Measure. The psychological status of parents is evaluated primarily through the use of the Tennessee Self Concept Scale (TSCS).

Analysis Plan

Data tape provided by the survey research laboratory is checked for accuracy and face validity through frequency analyses and other descriptive statistics. The analyses directed at testing the major hypotheses of the study use multiple regression as the statistical tool of choice. In these analyses the main dependent variables are utilization of services, functional status, and psychological status measures. Analyses control for socioeconomic and demographic variables, and, through the use of dummy variables, it is possible to assess whether specific health conditions predict these outcomes differentially. The use of dummy variables also allows correction for any bias from condition-specific use of case management in some states. Data on the process of case management and access to services are then entered into the regression equations as independent variables.

PRE-AWARD EVALUATION

Originality and Importance

The three studies proposed are responsive to the stated priorities of the special research initiative on case management. The questions asked are important and the proposed research uses several complementary approaches to evaluate case management programs for children with special health care needs.

Regional and National Significance

The proposed research is of national significance. With constantly rising health care costs, it is important to know if case management services can have a positive impact on the quality of delivery of health services to children and at the same time can affect utilization of high-cost services, such as emergency room use.

Scientific and Technical Merit

Study 1 is the strongest of the three studies proposed and promises to provide important information about the effects of case management on families of children with special health care needs. This study is described in rich detail and makes an admirable attempt to bring scientific rigor to bear on evaluation of an applied service system. This is a challenging and often difficult task. The proposal reflects sensitivity to many of the difficulties involved.

The study hypotheses are well formulated and important, focusing on several potential indicators of program effectiveness; namely, differences in utilization and expenditures for specific health services, functional and psychological status of the child, and psychological status of the mother. In general, the measures to be used in the study are sound. The stratified random sampling procedure, matching across states on sex, age, and health condition is a strength, as is the ability to use existing differences in state service systems to create a "natural experiment" in case management. using quasi-experimental designs.

The natural history study includes subjects in diagnostic groups which represent heterogeneous populations. If the broncho-pulmonary dysplasia and spina bifida groups could be more focused into well-defined groups with respect to physical disabilities at age ranges, for example, the sample would be more homogeneous and the data comparing case management interventions more meaningful.

When the variable of case management is defined, "family-focused" managers should be a component variable. Family outcomes, not just maternal self-esteem, should also be included as a measure.

Study 2, the reanalysis of the Project REACH evaluation data, is not well developed on the proposal. Although it is agreed that this is potentially an important program which warrants the most careful evaluation, the description of the proposed reanalysis is so sketchy that adequate evaluation of the scientific and technical merit of the re-evaluation plan is not possible. Important information, such as a detailed description of the data collected in the initial evaluation and the number and characteristics of subjects on which each variable is available at each data collection period, is not provided in the proposal. Only one sentence is provided describing the measures in the data set. Similarly, the population description is brief and vague. The investigators present a convincing argument that the original evaluation may have been flawed, with numerous confounding variables, problems in defining the study sample, and a shifting population over time. Issues, such as the fact that only 165 of 483 families who received REACH services even remembered that they had received REACH services, needed more attention.

It is quite possible that the failure of the initial evaluation to find any significant effects for the intervention provided by Project REACH may in part result from the design and sampling problems outlined in the proposal. Yet, the investigators provide no convincing evidence that they will be able to rectify these problems. The data analysis section is very brief and uninformative. Generally, the description of Study 2 suffers from a lack of important information which makes it impossible to judge the worthiness of the proposed analysis. The proposed reanalysis of data collected to evaluate Project REACH is perhaps susceptible to more unrecognized problems which might not be easily solved.

Study 3 is interesting but even further subject to biases in the data that may be hard to identify. It may be worthwhile, nevertheless, to explore what is available and try to relate it to the existence of a case management program in the state. Study 3, however, was not described in adequate detail and as such was not approved. The many potential problems in working with the data set need to be examined carefully in order to embark on such a project.

A MULTIDIMENSIONAL HEALTH STATUS INDEX FOR INFANTS

GRANTEE Rochester General Hospital

INVESTIGATOR Kenneth M. McConnochie, M.D., M.S.
Department of Pediatrics
Rochester General Hospital
1425 Portland Avenue
Rochester, NY 14621
Telephone: (716) 338-4406

GRANT AWARD INFORMATION

Project Number:	MCJ-360571
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Costs:	Year 1	Year 2
Awarded:	128,357	
Requested:	146,112	143,430

SUMMARY

Study Objective

The primary objective of this project is to develop and validate a multidimensional index of infant health status (INSTAT), ultimately to be based on diagnostic information routinely collected through the encounter forms used in pediatric practices. The index is based on a conceptual model that assumes multiple determinants of health and multiple risk factors in disease etiology. It is argued that the multidimensional index as proposed could be used for various purposes such as to conduct needs assessments in population groups and communities and to act as the dependent variable in evaluation and epidemiologic studies.

Research Questions or Hypotheses

This is a methodologic rather than a hypothesis testing study. Validation of the index, however, involves assessment of three broad hypotheses. These are:

1. Dimensions of the INSTAT discriminate between infants having different levels of exposure to risk factors known to be associated with excess morbidity. Such risk factors include premature birth, low birthweight, low socioeconomic status, male sex, race and ethnic background.
2. Morbidity measured by INSTAT correlate with direct measures of morbidity ascertained through parent diaries and interviews, developmental assessments, and medical record reviews.
3. The different dimensions of INSTAT, each reflecting a different determinant of child health, correlate with direct measures of those determinants ascertained through parent diaries, standard questionnaires, and home assessment.

Hypothesis 1 will be tested in Part I of the study; hypothesis 2 in both Parts I and II, and hypothesis 3 will be tested entirely in Part II. Only funding for Part I was requested.

Population and Sample Description

The study is practice-based, using a 100 percent enrollment of all newborns for a two-year period at four large sites which collectively have an enrollment of 2,025 newborns annually. These four sites provide care for about 18.5 percent of all newborns and include all socioeconomic groups of the community, with strong oversampling of minority groups and Medicaid patients. Site one serves mostly white middle-class patients, site two serves mostly blacks and Hispanics, site three serves mostly low-income black and white patients, and site four serves mostly white and Hispanic patients.

The study is conducted in Monroe County, New York (the Rochester area). The county is the urban center for the five-county Rochester Standard Metropolitan Area (SMA). Monroe County had a population of 702,000 in 1980, of which 10.1 percent were black, 7.9 percent on Medicaid, and 6.5 percent below the poverty line. The community has about 11,000 newborns per year. Of the total child population, 11.9 percent were covered by Aid to Families with Dependent Children (AFDC) in 1984. The Rochester area very closely resembles national averages for SMAs on most sociodemographic indices except for geographic mobility. At the last census only 15 percent reported a move over county boundaries in the preceding 5 years as compared to 21.4 percent nationally.

Study Design

This is a test-construction study that follows standard practice in instrument development and uses secondary data bases, an expert-based rating system applied to clinical diagnoses, and primary data collection through home visits to develop the intended instrument and test its reliability and validity.

Methods and Procedures

An expert panel is convened comprised of ten local community pediatricians who have participated actively in research programs of the University of Rochester Department of Pediatrics and ten academic pediatricians who are actively involved in training residents and fellows in general pediatrics at the same institution.

The expert panel is asked to develop a list of childhood diagnoses/morbidities and to classify them on potential severity and on impact of risk factors and health services A modification of the Delphi group process is used to elicit the expert opinion of the panel. As is frequently the case with the Delphi technique, it is not necessary to bring the panel together face-to-face at each step of the process.

To supplement the list of morbidities and ratings provided by the expert panel, a 10 percent random sample of mothers from the study practices is asked to rate those morbidities selected for inclusion in the INSTAT. Mother's rating of need for intervention and severity might be substantially different from those of physicians

and may be important in capturing attributes of severity and perceived needs for intervention that are ignored by the professionals.

Using the same 10 percent sample of mothers, face to face interviews and developmental assessments are performed at home visits by a pediatric nurse practitioner when infants are 24 months of age. These home visits are also used to determine the (1) presence of chronic morbidities including developmental disorders; (2) occurrence of acute morbidity requiring hospitalization; (3) use of health services that would not be captured by the computerized information systems used by the pediatric practices participating in the study; and (4) the socioeconomic status of the family. Also to be administered at the home visit is an interview developed by Mechanic to measure propensity to utilize health services for child health problems.

Finally, reviews are conducted of the medical records to obtain a listing of visits and morbidities that are documented in these records.

Reliability and validity of the index and the completeness of the information contained in the data bases are ascertained through within and between comparisons of the data captured by the different databases (i.e., encounter forms, medical records, home interviews, and developmental assessments, etc.). For example, the ability of the computerized information systems to identify major acute and chronic morbidities is assessed by comparing morbidities identified by computerized information systems with morbidities ascertained through face to face interviews and medical record reviews.

Analysis Plan

Several statistical analyses are planned. Analysis of the information generated by the expert panel through the Delphi technique will employs correlation techniques as well as nonparametric measures. Measures of concordance include the Kappa Index and the weighted Kappa. Clustering techniques are used to explore the interrelationships between ratings for the various morbidities. The analysis of the encounter data, weighted by the INSTAT dimensions relies on analysis of variance techniques.

The analysis of the home visits information may be the most complex aspect of the planned analyses. Data cover clinical assessment of child functioning, morbidity histories, morbidity ratings, and utilization histories. Comparisons with the encounter histories based on computerized encounter forms, and utilization histories based on chart abstraction, are the main focus of the analysis. It is this comparison that constitutes the crucial test of whether INSTAT has sufficient value to be recommended for its intended purposes. Only if INSTAT can be shown to capture the morbidity experience in infancy sufficiently to be of practical value, will the further validation and refinement recommended in Part 2 of the study be conducted.

PRE-AWARD EVALUATION

Originality and Importance

Lack of widely accepted child health indices currently handicaps attempts to evaluate health service interventions in population groups and communities and epidemiological investigations designed to show the causal mechanisms underlying differentials in health status among population groups. The proposed study to develop a new multidimensional index of child health status is both original and important. It takes up the thread of previous research in this area and pushes the state of the art further in a systematic and comprehensive manner using an original conceptual model that links risk factors to disease etiology and health services utilization.

Regional and National Significance

The index is to be developed in the home region of the investigative team, but it is very likely that the result can be generalized to most communities in the nation. Validation of the instrument over a wider area is planned for the future.

Scientific and Technical Merit

This is a well-written proposal that pays attention to details in describing the significance of the problem, the development and testing of the index and the sampling schemes and validation studies. Although indices are not always appropriate for combining data for monitoring child health status, the investigators present a convincing case that their approach should be explored. The process outlined would allow for the development of the index and its validity testing. Appropriate checks and balances have been written into their procedures to insure that the information will not be empirically lumped into a quantitative score without meaning. In addition, if the data collected did not ultimately form an index, but instead a series of markers or a profile of markers, the investigators would have collected information and examined it against a theoretical framework. That in itself would be a significant contribution. In other words, the study, if executed as designed, will contribute valuable information to our knowledge base, whether in index form or not.

The city of Rochester is a good community to do pediatric research since most children are in some type of care and many of the sources of care are using computerized encounter forms. More information about the type of developmental and other assessment to be performed on the home visits would have been useful in order to be able to evaluate the usefulness of the substudy. Much more about the data analysis plan should have been presented.

More emphasis should have been placed on specifying what information is to be collected during the first year of life as opposed to the first two years of life. In the data analysis section, reference is made to six months and one year intervals while the home visit substudy focuses on two years.

In summary, this is an original and well-conceptualized approach to the development of a health status measure for the infant period. While more detail

and specificity in how the index is to be developed would have been ideal, there is sufficient clarity of purpose to assure that a worthwhile set of activities will be undertaken and accomplished.

STUDY OF HOME VISITATION FOR MOTHERS AND CHILDREN

GRANTEE University of Rochester Medical Center

INVESTIGATOR David L. Olds, Ph.D.
Department of Pediatrics
University of Rochester Medical Center
601 Elmwood Avenue
Rochester, NY 14642
Telephone: (716) 275-3738

GRANT AWARD INFORMATION *

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Awarded:	324,379				
Requested:	324,379	453,486	465,178	305,065	16,109

* Jointly supported by the National Center for Nursing Research (NCNR)

SUMMARY

Study Objective

To determine the effectiveness of prenatal and postpartum nurse home-visitation services as a means of enhancing the life course development, social resources, and caregiving skills of parents living in a high-risk urban environment, and to ascertain whether these services can prevent a wide range of health and developmental problems in their children. The proposed study is an attempt to validate some of the findings of the previously completed Prenatal/Early Infancy Project (PEIP) conducted by the principal investigator in Elmira, New York, several years ago.

Research Questions or Hypotheses

Because the original Elmira study was carried out with whites in a rural/small city environment, the primary question addressed by the proposed validation study is whether the nurse home-visitation services model will work with blacks living in urban settings. Because the Elmira program was most effective with young adolescents and smokers during pregnancy, and among unmarried women once their babies were born, the proposed new study will enroll only unmarried women and will make special efforts to ensure that a large portion of the sample consists of young teenagers (under 17 years of age) and smokers.

In general, it is hypothesized that the home-visitation program promotes the health and well-being of the participating women and children, and that the effectiveness of the program is greater for women and children at greater risk for the particular problems under consideration. It is also hypothesized that the financial investment in prenatal and postpartum nurse home-visitation will be recovered by avoiding subsequent costs associated with maternal and child dysfunctions.

Population and Sample Description

Approximately 1,468 unwed, pregnant women bearing their first child will be recruited for the study through existing health centers in Memphis, Tennessee, during a 15-month period. The 1,468 women are divided approximately as follows:

1. There are 1,350 black women and 50 white women;
2. There are 388 women under age 17, and 416 women aged 17-18, and 664 women aged 18 years and over; and
3. There are 968 women living below the poverty level, and 500 living above the poverty level.

Study Design

A randomized clinical trial design is employed. In this design, 24 age x race x smoking status x poverty subgroups within specific health centers are randomly assigned to one of two prenatal treatment conditions (home-visitation services during pregnancy vs. no home visitation) using Pocock and Simmons' procedures to ensure balanced and filled subclasses.

Methods and Procedures

The 734 women assigned to the treatment condition (i.e., home visitation) are provided intensive nurse home-visitation services during pregnancy, in addition to transportation to regular prenatal care services. A randomly selected subset (N=250) from this group is visited by a nurse after delivery, until the child's second birthday. This subset is also provided sensory and developmental screening services at the 12th and 24th months of the child's life. Those who are followed only during pregnancy (N=484) are not followed with services or with data collection procedures after their post-delivery hospital visit.

The 734 women assigned to the comparison group (no nurse home-visitation services) are provided transportation for regular prenatal care. Only a subset of these families is followed after delivery of the child: a randomly selected subset (N=500) receives periodic sensory and developmental screening services for their children (at the children's 12th and 24th month anniversaries), including referral and followup through the routine health care system. The primary function of providing the transportation and screening services is to encourage participation in the program and to allow the project a means of meeting ethical responsibilities by helping to ensure more regular use of available routine health care services and by detecting serious health and developmental problems so that they can be treated. Those families who are followed only during pregnancy (N=234) are not followed with either services or data collection procedures after delivery.

One of the attractions of the proposed intervention program is its versatility in addressing a wide range of factors that interfere with the optimal health and development of the young mothers and their children. In the home visits, the nurses are engaged in three basic activities: parent education regarding influences on fetal and infant development, the enhancement of parents' information support; and the linkage of parents with needed health and human services. The nurse uses

a detailed protocol to guide the educational activities, but adapts the specific content of the home visits to the individual needs of each family. Sensitivity to parental concerns and an emphasis on family strengths are considered cornerstones of the nurses' work with families. Behavioral change on the part of the participating women will be facilitated by the nurses' provision of information, encouragement, and praise, and by modeling of appropriate behavior. Each of the visitation components is designed to work in an integrated, complementary way to improve pregnancy outcomes, early childrearing, and each woman's own life-course development.

While the protocols guiding service delivery contain developmental and health promotion curricula to structure the plan for each visit, the nurse carries out her visits using a process approach. Each visit begins with an assessment of the current condition of the mother and family and the mother's goals. The plan for the visit is then modified and shaped by the assessment. Using a self-care perspective, with mother as active participant, the nurse helps the mother develop current and future resources with which to meet or reduce the demands of pregnancy and early childrearing in the context of poverty. The content of the visit thus represents a continuous accommodation between mother and nurse. The nurse uses the current situation of the mother to help the mother develop her knowledge, self-esteem, sense of mastery, problem-solving, and interpersonal skills.

Analysis Plan

For the outcome variables of interest, the plan is to test program vs. control differences, controlling for other important influences, and to examine whether program effects are stronger for, or limited to, certain sample subgroups. The intention is also to generalize to larger populations of clinics and nurses. Questions of this type are appropriately examined with the general linear model and its analogues, i.e., alternative exponential linear models for dependent variables that are dichotomous or in the form of counts. Decisions about the specific choice of method for hypothesis testing, and choice of method for estimating variance components, is made at the time of analysis and is specific to a given model. To obtain a complete understanding of the interrelationships among the study variables, certain analyses are carried out specifying simultaneous equations.

PRE-AWARD EVALUATION

Originality and Importance

Few health care issues have as great an impact on the need for health care services as the problems associated with pregnancy and childrearing among single, urban, low-income mothers. The proposed study represents a major research undertaking with implications that are of critical practical importance to the area of maternal-child health. If the proposed study confirms the stated hypotheses, they will demonstrate substantial benefits from home visitation by nurses among young, unmarried, urban, poor mothers. Further, should the study demonstrate the anticipated savings in health care costs as well as the benefits to the health of the

subjects themselves, they will have provided compelling arguments for the value of providing such services to this high-risk population. It is therefore difficult to overstate the importance of the proposed research.

Regional and National Significance

Although the research is to be carried out in Memphis, Tennessee, the application provides strong arguments in support of the national implications for the research. It points out that while Memphis may be ideally suited for the conduct of such research, the proposed intervention program itself could as easily be carried out in any number of major metropolitan areas serving similar populations of women and children. Although the specific aspects of the program might require some modification in order to be applied to other areas of the country, it is quite likely that the major findings will be directly applicable to the nation as a whole.

Scientific and Technical Merit

The application is extremely well-written and the study plan is extremely well thought-out. The investigators, having completed a major study of a similar intervention in Elmira, New York, could easily have argued for direct application of their findings to a variety of settings. They recognize, however, that such extrapolation might be limited by the fact that their early study was conducted among a largely white population in a rural/small city environment in New York. They appropriately argue that the major population that might benefit from their proposed intervention consists of socially and economically disadvantaged young primiparous women, most of whom are black and living in major urban centers.

This study calls for a randomized controlled trial design. Despite the complexity of such a design, the application is succinct, clearly written, and to the point. The objectives are carefully identified, the variables are appropriate and well-defined, the study design and data analysis sections are detailed, complete, and relevant. For example, a major focus will be cigarette smoking, and the investigators will take advantage of recent technological advances by measuring serum continine as an objective reflection of maternal reports of cigarette smoking.

The investigators have focused on variables that are clearly relevant to their research objectives, and when they offer more than one assessment of a given variable (such as gestational age) they indicate their priorities for accepting one estimate over another. The proposal reflects a clear understanding of the logistic problems inherent in such an undertaking. The applicants discuss a wide variety of problems, and propose either direct solutions or mechanisms by which such problems can be dealt with in the analysis of the data. They have balanced purely scientific objectives with ethical concerns and real-world logistical issues to yield an extremely well-designed study that is very likely to succeed.

From the perspective of logistics, the investigators have provided mechanisms to motivate continued participation in the study, particularly among the comparison subjects. They have recognized the importance of the nurses and and have given considerable attention to providing study nurses with both psychological support and physical support.

There are concerns. One relates to the effectiveness of blinding of the interviewers: is it really likely that the interviewers will remain blinded? On the other hand, if their assessments are quite objective, then the failure of blinding may not be serious. To provide some insight into the issue, the investigators might ask the interviewers to "guess" the treatment group of study subjects.

The analytic strategy for data analysis is thorough and sound. Its only weakness is its complexity. One wonders how easily some of the analyses can be communicated to the general public health policy-making community. Nevertheless, if the primary intervention is successful, the message should be clear. The subsequent detailed analyses simply further contribute to the value and understanding of the process through which the intervention works (if it does) in this population.

The investigators have considered a wide variety of ethical issues related to the proposed intervention, and have effectively supported their approach. In particular, they justify the need for randomization of subjects, and they provide greater than usual health care services even to the comparison group. They also make specific provisions for identifying acute health care needs that may arise within the study population, and they make clear their obligations to report such needs to the appropriate authorities, independent of their possible effects on the study itself.

Given the sensitivity towards the characteristics and needs of the study population displayed by the investigators, one is surprised to find that the consent form document is far too difficult to be understood by the intended study population. Such terms as "sensory and developmental screening" are likely to be poorly understood at best. The investigators should rewrite the consent document to put it into language that is easily understood by the target population.

SIMULTANEOUS SCREENING FOR HEARING, SPEECH, AND LANGUAGE

GRANTEE Duke University Medical Center

INVESTIGATOR Raymond A. Sturner, M.D.
Duke Child Development Unit
Department of Pediatrics
Duke University Medical Center
Durham, NC 27706
Telephone: (919) 684-5513

GRANT AWARD INFORMATION

Project Number:	MCJ-370574
Project Period:	01/01/88–12/31/90
Grant Year:	1 of 3
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3	Year 4	Year 5
Awarded:	240,665			Denied	Denied
Requested:	309,172	292,288	300,951	348,440	368,429

SUMMARY

Study Objective

The goals of this study are to:

1. Develop a means of screening for speech, language, and hearing problems in a child health setting, utilizing no more time than is ordinarily committed to hearing screening alone; and
2. Improve the current hearing screening procedures in order to be more sensitive to a wider range of audiologic impairments than is possible by current, routine pure tone screening procedures.

Research Questions or Hypotheses

The research questions investigated are as follows:

1. Can a large group of potential test items consisting of monosyllabic words, sentences from the Northwestern Syntax Screening Test (NSST) and sentences from the Sentence Repetition Screening Test (SRST) be selected so that almost all normal children between the ages of 3 1/2 and 5 1/2 can comprehend and/or repeat all of them verbatim?
2. What is the lowest intensity level, 50 dBHL, 25 dBHL, or 15 dBHL, at which normal children between the ages of 3 1/2 and 5 1/2 can complete the items identified in (1)?
3. Can normal children between the ages of 3 1/2 and 5 1/2 complete the items from (1) presented in a white noise background or in a background of speech babble at signal to noise (babble) ratios of +10 dBHL and +5 dBHL?

4. Can normal children between the ages of 3 1/2 and 5 1/2 complete the items from (1) which have been altered by lowering intensity and introducing competing sounds and then presented in an environment which has ambient noise at a level typical of physicians' offices?
5. Do a set of test items developed in (1) through (4) discriminate children with hearing impairments from normal children?
6. Do a set of test items developed in (1) through (4) discriminate children with language impairment and children with articulation impairmen. from normal performance?
7. Is the proposed screening test valid for detecting hearing, speech, and language impairments in a large population? Are the test items stable over time? What is inter-rater reliability on sentence repetition items?
8. Are the cut scores developed in (7) valid? How does the validity of the screening instrument compare with the validity of pure tone hearing screening? With the Fluharty screening test articulation subscale? With the Fluharty screening test language measures?

Population and Sample Description

Each research question employs a different sample:

(1, 2, 3, 4) Twenty children with normal hearing, ear drum compliance, language skills, and articulation, divided into four groups—3 1/2 to 4, 4 to 4 1/2, 4 1/2 to 5, and 5 to 5 1/2.

(5) Eighty children with normal ear drum compliance, language skills, and articulation, and whose hearing-impairment results in more than 15 dBHL discrepancy between the pure tone threshold averages at 1.0 k, 2.0 k, and 4.0 k are to be eligible for the study, and 80 normal children, divided into age groups as above.

(6) Twenty normal children and 20 articulation-impaired children, divided into age groups as above. The 80 normal children from (5) serve as controls in (6).

(7, 8) One hundred and fifty children, divided into the age groups defined above, selected from a countywide, pre-kindergarten registration and screening program.

Study Design

A series of studies leading to the ultimate goal of a computer-controlled screening test are conducted. These studies meet the seven requirements identified by Bilger as important in the process of developing and standardizing a test of speech recognition: (1) define the test; (2) prepare a large pool of prospective test items; (3) pretest these items with a large number of subjects from the population to which the final test is administered; (4) conduct a psychometric evaluation of the prospective test items; (5) construct one or more forms of the test; (6) cross-validate the test using data from subjects held out of the initial psychometric evaluation; and (7) validate the final form of the test on a new sample of appropriate subjects.

Methods and Procedures

Standard tests utilized include the Expressive One-Word Picture Vocabulary Test, the Fluharty Preschool Speech and Language Screening Test, the Northwestern Syntax Screening Test, the Peabody Picture Vocabulary Test-Revised, the Reynell Developmental Language Scales-Expressive Scale, the Templin-Darley Tests of Articulation, and the Test for Auditory Comprehension of Language-Revised.

Study I presents a method for eliminating test items which cannot be completed by 80 percent of the normal children of a given age. Studies II and III determine the performance of normal children on each test sentence under conditions of low intensity and noise. In study IV the large pool of test stimuli developed in studies I-III is field tested on four groups of children in an acoustic environment matched to that of a "typical" physician's office where hearing screenings are completed. In Studies V and VI the large pool of test stimuli developed in test IV is used to compare the performance of normal children with impaired populations. Test items found to differentiate normal from impaired children form the first edition of the screening test. In study VII the first edition of the test is used in the initial screening of a large countywide population. Stratified samples from that population are given comprehensive diagnostic testing to establish cut-off scores for four age groups. In study VIII the validity of the cut-off scores is tested by a replication study on a second countywide screening. The validity of the computer screening test is compared with pure tone audiometric screening for the hearing impaired and with the Fluharty Preschool Language Screening Test for language and speech impairments.

Analysis Plan

The focus of the analysis is to examine the ability of the test and its items to distinguish each of the hearing impaired groups (mild conductive loss, mild sensory-neural, moderate loss) from the normal hearing group. Analyses are conducted within groups of children receiving like items (thus children from each age group are compared with the hearing impaired group separately, since items differ across age for normal subjects).

The first analyses examine item sensitivity—the degree to which each item differentiates the hearing impaired from normals. For each hearing impaired group, the proportions of hearing impaired and normal children failing the item is calculated and a test of independent proportions performed to determine if the difference is significant. Multivariate techniques are then used to determine the relationship between the set of items and hearing impairment vs. normal status. Since the goal is to develop as short a test as possible, stepwise discriminant function analyses are performed using those items identified as promising based on the item analyses. Wilks Lamda and partial multivariate F ratios are examined to select the most parsimonious set of items for inclusion in the final test.

A series of psychometric analyses are conducted following Study VII to determine the internal structure and reliability of the test. Correlation techniques are used to determine the degree of relationship between test items and total score and each of the criteria measures. Stepwise discriminant analysis is employed to determine whether the test items or factors significantly differentiate those failing each

criterion measure from those who pass. Once the final scoring has been determined, clinical indices are calculated for all age groups combined to obtain an overall estimate of these parameters for the entire study group. The focus for analysis of study VIII is the replicability of previous results.

PRE-AWARD EVALUATION

Originality and Importance

The importance of early identification, particularly in the preschool years, is well-recognized. Unfortunately, we have not developed appropriate tools to identify speech, hearing, and language problems in these early years, especially in the primary care setting. The proposed study, therefore, addresses a most important issue which, if successful, could have a positive impact nationwide on the quality of services provided to preschool-age children.

Regional and National Significance

This project could have an impact on large numbers of children throughout the United States and abroad. It clearly has regional and national significance and is high priority. An accurate, cost-effective screening procedure would be widely applicable.

Scientific and Technical Merit

The investigators offer a strong argument for the need to do the study and are well-informed about the state of the art of this general area. The review of the literature in both hearing and speech-language problems is comprehensive and offers good rationales for conducting the proposed study. The sources used to support the research questions are current, and there is a logical organization to the general review.

One could take issue with the statement that hearing/screening programs that have incorporated otoscopy, tympanometry, and standard pretone tests have been very effective in identifying youngsters with middle ear dysfunction. To the contrary, studies that have looked at screening protocols utilizing tympanometry and/or otoscopy have demonstrated that the over-referral rate is quite high and that there is an important need to develop new protocols which will more effectively differentiate those children with disease from those children who do not have the disease.

One is in agreement with the investigators when they note that there is a need to incorporate speech materials into a screening protocol. The data by Jerger and coworkers, as well as others, have substantiated this concept.

The review on speech-language screening is also comprehensive and provides an excellent discussion on the standardization of some 40 different tests currently available in this area. Interestingly, the investigators do leave out a relatively recent protocol that would be pertinent to this investigation, the Early Language

Milestones Test (ELM) developed by Coplan, which has undergone a considerable standardization. It might be important for the investigators to review this particular test as a potential screening tool for their project.

The hypotheses of the study have been directly stated and are related to the problems defined in the introduction and statement of the problem. The questions are logically derived from the literature and systematically address various stages of the investigation.

There are eight research questions. The study begins with the development of appropriate test items for a normal population of children and moves on to the refinement and application of these materials to a normal and communicatively impaired population. For each study question proposed, there is a carefully developed statement on purpose, the subjects to be used, the protocol that will be followed for the study of the question, and the general study design. Although the study design is covered in several sections of the application document, more detailed information would have been desirable to determine if, indeed, the project investigators will be able to achieve the objectives of the study. It would seem desirable, for example, to incorporate randomized selection procedures in selecting children from the school settings. If this is the intent of the investigators, it was not clearly stated in the proposal.

Another potential problem in this study is how the investigators plan to handle the problem of attrition. That is, in Study VI, children will be scheduled for five successive days of testing. No indication of anticipated attrition is noted, nor do the investigators acknowledge how the problem will be treated.

The plans for data analysis are presented for each of the proposed studies. More detail, however, would have been desirable. Of particular concern is the lack of information relative to determining the operating characteristics of the screen that is to be developed. References are made to sensitivity and specificity, but these are only two components considered in establishing the operating characteristics of any screening tool. Will the investigators calculate predictive values and test efficiency? The positive predictive value and the negative predictive values, as well as overall test efficiency, are just as important, if not more important characteristics than sensitivity and specificity.

In general, the proposed investigation is important and worthy of support. The methods proposed to carry out the study are well chosen. The recommendation is for approval with the condition that the project be reduced from five to three years on the assumption that the success of years four and five would be contingent on what occurs during the first three years. It would be advisable that the investigators be cautioned about referral and selection bias and about the importance of obtaining predictive values and test efficiency measures.

OTITIS MEDIA IN DAY CARE: EFFECTS ON LANGUAGE/ATTENTION

GRANTEE Pennsylvania State University

INVESTIGATOR Lynne Feagans, Ph.D.
Pennsylvania State University
Department of Individual and Family Studies
S-110 Henderson Human Development Building
University Park, PA 16802
Telephone: (814) 865-1447

GRANT AWARD INFORMATION

Project Number:	MCJ-420565
Project Period:	03/01/88–02/28/93
Grant Year:	1 of 5
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3	Year 4	Year 5
Awarded:	184,322				
Requested:	205,098	203,173	213,502	193,330	138,847

SUMMARY

Study Objective

This five-year study is designed to determine whether there is a causal relationship between otitis media, observed in a day care setting, and developmental delays in language and attention. Otitis media is the second most frequent reason parents take their children to a physician. Although antibiotic regimens have helped to reduce the acute phase of the disease, there is no really effective therapy for the fluid that often remains in the middle ear after the acute phase is over. This fluid is associated with a mild to moderate hearing loss.

Research Questions or Hypotheses

Three basic research questions are addressed by the study:

1. Is illness in general or otitis media specifically related to immediate and/or later speech/language and attention deficits?
2. Does otitis media and its resultant hearing loss affect differentially immediate and/or later speech/language comprehension and production skills? Do they affect differentially auditory perception/discrimination and/or attentional processes?
3. Does otitis media and its resultant hearing loss affect language in the later years indirectly, through children's poorer attention to language input, which then affects higher order language processes?

Each of the three causal models implied in the above questions has hypothesized external influences (day care, family environment, and social class variables) and internal influences (age, sex, handicap, and frequency of illness bouts).

Population and Sample Description

The subjects for the study are selected from two day care centers located at (1) the Child Development Laboratory of Pennsylvania State University (Penn State) (University City, Pennsylvania) and (2) the Altoona Hospital Day Care Center (Altoona, Pennsylvania). The background of the children varies somewhat with SES ranging from unskilled labor to highly skilled professionals. One hundred and forty-six normally developing children who meet five criteria for inclusion participate in the study. Roughly one-third of these children are lost during the study's five-year period. Children are entered into the study at six months of age because otitis media is a very frequent disease in the first year of life and peaks just after one year of age.

Study Design

A prospective, longitudinal study design is used without a control group and with three separate data collection strategies—one for all well children, one for ill children who do not have otitis media, and one for children with otitis media. Data is collected on everyone at several data points (6, 18, 30, and 42 months).

Methods and Procedures

Each child in the study is administered a set of age-appropriate measures as the child enters the study and at well periods specified at three-month intervals until age two and at six-month intervals thereafter. In this way each child can be followed carefully in conjunction with documentation of otitis media and illness. In order to better understand the exact nature of the effect of the disease, data are also gathered when the child has otitis media. Thus, for every well data collection point at six-month intervals, an otitis media data point is used with the age-appropriate instruments. This strategy allows the study to compare the children's performance when they have otitis media and when they do not. Some data is also collected when the children are ill (respiratory or other mild illnesses without fever).

At six-month intervals children are observed in the classroom and language samples are obtained when they are generally ill, but do not have otitis media. Thus, there are three conditions under which data are collected on children. All children have well sessions, ill sessions, and otitis media sessions. In this way it is hoped a better understanding can be gained of the effect of illness versus otitis media on the development of the children. The diagnosis of otitis media in the study proceeds at several levels and includes pneumatic otoscopy (5 min.), immittance screening (5 min.), and pure tone audiometry (10 min.). Each ear is examined so that unilateral and bilateral disease can be determined. The same examiner performs the screening evaluation throughout a 12-month period to enhance reliability.

Children with otitis media, as confirmed by the otologic and audiometric screening procedures, are assessed further with tympanometry and behavioral hearing threshold measures. All children are evaluated on three speech discrimination measures at 36 to 42 months of age using the Pediatric Speech Intelligibility Test

(PSI), the Word Intelligibility by Picture Identification (WIPI) and the Children's Perception of Speech Test (NU-Chips). Measures of language production are also obtained in all children from 12 months to 54 months at intervals of 3 months. In addition, samples are also obtained during bouts of otitis media and illness at six-month intervals.

In order to further diagnose and classify the language abilities of the children in the study, the Sequenced Inventory of Communication Development (SICD) is administered every six months. Also to be used is the Narrative Comprehension and Production task developed by the principal investigator to examine narrative and discourse skills, a more subtle and complex area of language development. The task has proved useful in differentiating good and poor language users and has been linked to successful school adaptation.

Analysis Plan

Because of the large number of measures to be considered, the analytic plan for the study includes considerable data reduction activities. In general, the data analytic plan starts with a core path model (one of the three referred to earlier) linking incidence of otitis media to the ultimate outcome of language development. Although these models look relatively straightforward, many of their constructs, such as incidence of otitis media and hearing loss, are to be measured on multiple occasions in a time series fashion. To treat each construct as a single measure requires the categorization of the patterns of otitis media and hearing loss. For example, the patterns of otitis media are developed using latent growth curve analysis. Once typical patterns have been established, each child receives a score indicative of disease type. This category score then becomes the variable of incidence.

Hearing loss is expected to occur as a result of the disease process. Consequently, patterns of hearing loss are compared to patterns of otitis media using log linear analysis of the association between the patterns and index of hearing loss due to otitis media. In addition, correlation between the frequency of disease and degree of hearing loss can be generated for the group while individual correlations between otitis media episode (yes, no) and hearing loss for that episode can be used to generate an additional index. Once single and multiple indicators of the constructs are developed through data reduction approaches, these are entered into the path analytic models where conventional regression analysis is performed. When called for, as in the case where the constructs are measured with more than one variable, additional data reduction is performed either in the form of multiple indicator models, compositing variables, or variable selection, to estimate the core model.

PRE-AWARD EVALUATION

Originality and Importance

This is a timely and important study since many young children have otitis media and more children in day care have it than children who are not cared for out of home. If study findings collaborate this to be true, and the causal link between otitis media, hearing loss, and developmental outcome is substantiated, then there

is a clear and compelling justification for instituting preventive measures of all sorts including routine hearing, speech, and language screening programs. Other studies attempting to document the link between otitis media and hearing loss have been flawed because of their retrospective design or their inadequate measurement of hearing. The present study is designed to correct such flaws and thus could yield valuable data on the problem.

Regional and National Significance

If the study is successful in showing a causal link between otitis media and developmental delays in language, it will need to be replicated with other populations of children. The issue has implications for research, programs, and policies on a national level.

Scientific and Technical Merit

This study was reviewed once and disapproved. It was then revised to address the issues raised by the reviewers and submitted a second time. The action in the second review was for deferral pending a site visit to clarify concerns raised. Questions raised at the site visit were responded to in writing by the investigator.

During a site visit, the investigators clarified why a day care sample (with no other comparison group) was employed; they also provided information on the adequacy of the hearing screening and discussed the conceptual models guiding the study. In response to the remaining questions from the site visit team, the investigators provided detailed information on data analysis plans which now appear reasonable given the nature of the data.

In response to concerns about sample size, the investigators responded that they would increase the sample size by adding another day care center serving children of similar socioeconomic backgrounds to the original site. The sample size appears to be adequate. Children now are followed until 42 months, a reasonable decision since language production is one of the outcome variables of the study and it is difficult to assess at much younger ages. The criteria for inclusion in the study are now well specified, as it is the training of the residents who perform the hearing screening. The specific variables to be looked at in the study are also discussed in terms of the conceptual models guiding the study and in terms of the single and composite indicators that are used to represent the variables.

In summary, this is a well-conceived, well-documented, and well-written study which has been significantly improved by the review process and the willingness of the investigators to respond to criticism. The proposal is original and addresses the research problem in an innovative way. The hypotheses representing the three causal models are well articulated, and guide the research design so that data before, during, and after episodes of otitis media, as well as long-term followup of the children at a time when otitis media is fairly frequent in their lives, are collected. The research builds on two prior studies conducted by the investigator. Many of the measures were used successfully in these studies, which gives added confidence of their usefulness. Even though the small sample size of the study presents limits on the inferences that can be made from the data, the limits are not major flaws, and should not prevent this important study from being carried out.

BEHAVIORAL INTERVENTION WITH IUGR INFANTS

GRANTEE Women and Infants Hospital of Rhode Island

INVESTIGATOR Cynthia T. Garcia-Coll, Ph.D.
Women and Infants Hospital of Rhode Island
101 Dudley Street
Providence, RI 02905-2401
Telephone: (401) 274-1100 (Extension 1232)

GRANT AWARD INFORMATION

Project Number:	MCJ-440569
Project Period:	07/01/88–06/30/91
Grant Year:	1 of 3
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3
Awarded:	152,029		
Requested:	201,501	202,093	211,636

SUMMARY

Study Objective

The purposes of this three-year longitudinal intervention study are: (1) to examine the effectiveness of a parent-infant based behavioral intervention during the neonatal period to prevent or ameliorate the negative consequences of Intrauterine Growth Retardation (IUGR) on maternal-child sensitivity and infant physical growth, caloric intake, cognitive development, and language development; and (2) to examine the mediating effects of cultural context and risk status on the effectiveness of intervention with IUGR infants.

Research Questions or Hypotheses

This study is based on a theoretical model of development in which the impact of an early insult (e.g., IUGR) on the developing infant is a function, in part, of the characteristics of the caregiving environment. The planned intervention is expected to affect outcomes directly by improving caloric intake and indirectly by improving mother-infant interactions. A second hypothesis is that the impact of intervention is mediated by environmental risk and cultural factors.

Population and Sample Description

White non-Hispanic and Hispanic subjects for this study are recruited from two tertiary care facilities in Providence, Rhode Island and San Juan, Puerto Rico, respectively. The sample is 210 full-term infants—140 IUGR infants and their mothers, and 70 control infants with their mothers. Mothers with a significant history of substance abuse, eating disorders, or severe heart disease are excluded. IUGR is defined on the basis of birth weight and Ponderal Index below the 10th percentile, without any other fetal complications; the latter is assessed on the basis

of clinical examination. These criteria are adopted in order to reduce heterogeneity of the sample.

Study Design

This study is a randomized clinical control trial of an intervention in which three groups are compared in two sites: IUGR with intervention, IUGR with no intervention, and non-IUGR with no intervention, with 35 infants in each of three conditions. IUGR infants and their mothers are randomly assigned to the intervention and the no intervention conditions. They are matched on the basis of parity, family socioeconomic status, sex, and total neonatal score to a control group of full-term non-IUGR infants. The characteristics of subjects who discontinue participation in the study are carefully monitored to rule out selective bias, as are the characteristics of potential subjects who decline intervention, as compared to the characteristics of the larger population.

Methods and Procedures

The intervention, to be performed at three time periods (birth, 2, and 4 weeks of age), consists of reviewing with the mother the first 15 minutes of a videotaped feeding sequence. Mothers are trained to carefully observe specified dimensions of the infants' state and the mothers' and infants' behavior, with the aim of increasing the mothers' contingent and sensitive responses to their infants. To control for the effects of extra contact, the research assistants meet with the mothers not assigned to the intervention and discuss topics such as birth experiences. Assessments are conducted at 7 time periods (birth, 2 and 4 weeks, and 4, 8, 12, and 18 months) over the first 18 months of life, and are conducted both in homes and in a laboratory.

Caloric intake, feeding interactions, physical growth, and maternal-infant sensitivity are assessed during the infants' first year, using standardized measures and other measures developed by the investigator which have proved useful in other investigations and which have acceptable reliability. (Maternal sensitivity is assessed using the HOME (Home Oriented Maternity Experience) inventory.) Later assessments focus on standardized assessments of the infants' developmental status (cognitive development and communicative competence), using the Bayley Scales and the SICD-R. Physical growth is assessed using multiple methods.

To assess cultural differences in childrearing attitudes that may mediate the effects of the intervention and IUGR, mothers will also be administered a Concepts of Development Questionnaire. Data pertaining to a variety of factors constituting environmental risk (e.g., family size, stressful life events, and social support) will also be assessed.

Analysis Plan

The data analysis strategy is to first analyze the effects of the intervention separately for each site on the different dependent variables, using repeated

measure analyses of variance ANOVAs (with time as the repeated measure). Hierarchical multiple regression analysis is used to test the relative effectiveness of caloric intake versus maternal sensitivity in determining developmental outcome. Then, the effects of the proposed mediators of the impact of the intervention (e.g., environmental risk, cultural code, and etiology of IUGR) are determined, either by repeating the first set of analyses using site as an independent variable and risk factors as a covariate, or using hierarchical regression.

PRE-AWARD EVALUATION

Originality and Importance

This three-year longitudinal intervention project provides useful information both on developmental outcomes for IUGR infants and on the effectiveness of different interventions. Outcome variables are carefully chosen based on previous research, yet may provide a more comprehensive database on the early development of these infants than previously available. The attempt to distinguish whether the proposed intervention is effective through its direct effect on infants' caloric intake or through an indirect effect on maternal sensitivity could be invaluable for planning future interventions, and thus this project could serve as a guideline for policy decisions. These results may be useful not only for the specific clinical population studied, but also for infants with various feeding disorders. Also, determining the relative effectiveness of the intervention for different cultural groups could lead to more targeted and effective interventions.

Regional and National Significance

Although IUGR is not a widespread phenomenon, it does occur with sufficient frequency to be a cause for concern. It appears to have long-term effects on developmental outcome, particularly cognitive and language development. Thus, finding ways of effectively intervening with this population would have both regional and national significance.

Scientific and Technical Merit

This study was reviewed once and disapproved. It was then revised and resubmitted, and the investigator successfully responded to most of the concerns raised in the first review. Many of the procedures and methods associated with the proposed project were more thoroughly explained and justified. For example, the decision to restrict the sample selection, and thus the heterogeneity in etiology of IUGR, is an important methodological improvement. The exclusion criteria are specified, as is the rationale for choosing this particular sample of IUGR infants.

The logic of the intervention is described, and the mechanisms through which it might affect outcomes are carefully specified and plausible. The attempt to disentangle whether the intervention affects caloric intake directly or through its indirect effect on mother-infant interaction is a strength of the study. In regard to

the ability of such a limited intervention to have the types of long-term effects predicted, the investigators own pilot data are convincing.

Less convincing are other aspects of the proposal; most prominent is the choice of the Puerto Rican sample. If the intention is to apply these findings to Hispanic women in the United States, then it would seem more direct to study Hispanic women on the mainland, as we do not know the extent to which the two groups differ. However, putting aside concerns with the generalizability of this sample to U. S. populations, the inclusion of the Puerto Rican subjects is easily justified as a cross-cultural comparison group.

The transactional model is a useful framework for this project, but it does not seem to be well integrated into the design of the study. The model has been operationalized primarily in terms of assessing the different cultural codes of these mothers, but the evidence that the Concepts Development Questionnaire specifically taps different cultural beliefs is not convincing; perhaps additional ways to assess these differences should be sought.

Assessment of environmental risk is a useful addition to this study, since it has received support in the literature as an important mediator of adverse developmental outcome in high-risk children. Nevertheless, more information needs to be given as to how stressful life events and family support are assessed.

The assessment of language and cognitive development in infancy can be very problematic, since most measures are unrelated to later developmental outcomes. In general, instruments have been chosen wisely with an eye to their ability to predict later development; however, a more convincing argument needs to be made that scores on the SICD-R, a measure of communicative abilities, predicts language development.

From the description of the data analysis, it is not clear how the interactive feeding scores will be handled. Will these be combined so that one ANOVA can be performed as implied? It seems that a Multivariate Analysis of Variance (MANOVA) would be more appropriate. Similarly, it seems more appropriate to perform a MANOVA for physical growth variables than a series of ANOVAs, as is proposed. Finally, none of the proposed statistical analyses actually test the entire model proposed for the study. The investigator should consider using structural equation modeling techniques.

In general, this is a worthwhile project with many strengths. Approval is recommended with a reduction of the budget.

SICKLE CELL ANEMIA: DNA FOR NEWBORN SCREENING FOLLOWUP

GRANTEE Baylor College of Medicine

INVESTIGATOR Edward R. B. McCabe, M.D., Ph.D.
Baylor College of Medicine
One Baylor Plaza
Houston, TX 77030
Telephone: (713) 799-6175

GRANT AWARD INFORMATION

Project Number:	MCJ-480566
Project Period:	04/01/88–03/31/90
Grant Year:	1 of 2
Type of Grant:	New

Costs:	Year 1	Year 2	Year 3
Awarded:	73,690		Denied
Requested:	88,442	91,280	96,749

SUMMARY

Study Objective

The objective of this study is to demonstrate the applicability of DNA techniques to newborn screening for sickle cell disease. The current practice in Texas is universal neonatal screening; small samples of blood are dried on filter paper and analyzed by protein electrophoresis. An equivocal or positive result requires a confirmatory test by hemoglobin electrophoresis after three months (due to the predominance of fetal, as opposed to adult, hemoglobin present in neonatal blood). The primary aim of the current project is to confirm or exclude the diagnosis of sickle cell disease, by DNA genotyping directly from the original newborn screening filter paper. In the investigators' hands, the dried blood spots reliably yield 0.5 micrograms of DNA, an amount adequate for a single, direct analysis, and an ample amount for repeat analysis if the DNA can be amplified by polymerase chain reaction. The purported advantages of this approach include earlier, more definitive notification of families with affected neonates.

Research Questions or Hypotheses

It is hypothesized that with earlier results, more families would be available for followup. The early definitive results would better express the gravity of the condition to the family and could lead to improved clinic attendance and followup. Furthermore, earlier diagnosis and family notification could lead to earlier initiation of penicillin prophylaxis for pneumococcal infection, a complication in young patients with sickle cell disease that can result in death. There are four hypotheses to be tested:

1. If DNA from the dried blood spot from a filter paper is used, then a direct genotype diagnosis can be obtained from the original newborn screening specimen;

2. If the dried blood approach is used, then the confirmatory specimen is obtained more reliably and more rapidly than using the conventional approach;
3. If hemoglobin electrophoresis and DNA genotyping are carried out on the same specimen, then the results should be in agreement; and
4. If there is direct DNA genotyping using the original newborn screening dried blood specimen, then there is improved compliance with the management of the child with sickle cell disease and a better prognosis for this child.

Population and Sample Description

The study population includes all newborns with a presumptive positive screen for sickle cell disease born in Texas during the study.

Study Design

This study is a mixture of a true experimental and quasi-experimental design. Tests of hypotheses one, two, and three involve direct comparison of the investigational DNA methodology and the conventional hemoglobin electrophoresis approach, and therefore are true experiments. The test of hypothesis four has a quasi-experimental design, since it relies on a historical control group obtained before initiation of routine DNA testing. Randomization of the control and investigational groups for testing hypothesis four might delay diagnosis if hypothesis two is correct.

Methods and Procedures

During the first year of the study, the investigators are to develop further the DNA microextraction and polymerase chain reaction amplification techniques. The polymerase chain reaction amplified DNA can then be subjected to sequential digestion by restriction endonuclease, and sequence specific oligonucleotide probes for the detection of the sickle allele and C hemoglobin allele can be used. In addition, during the first year, every presumptive positive sickle cell screen is followed using the standard three month hemoglobin electrophoresis evaluation. The children identified as having sickle cell disease are followed as an historical control group, looking at outcome and clinic compliance. Specific dependent variables that are studied include death rate, frequency and duration of hospitalization, frequency and types of infection, percentage of followup appointments kept, and evaluation of medication used. In addition, the initial neonatal filter paper screens are sent to the investigators' laboratory for evaluation of the DNA extraction technique and validation of that technique in comparison with the later obtained blood evaluated by hemoglobin electrophoresis.

During the second and third years, hypotheses two, three, and four are tested. Specifically, acquisition of a confirmatory specimen is sought at approximately three months of age, and the two methods of confirmatory testing are directly compared on the same specimen. During this two-year interval, whenever an initial screen is equivocal or positive, the screen is sent to the investigators' laboratory for rapid DNA diagnosis. Families with infants presumed to be affected on the basis of this

DNA evaluation are contacted and enrolled in followup programs, including penicillin prophylaxis. The outcome and clinic compliance for these individuals identified in the last two years is compared with those of the historical controls, those infants identified during the first year of the study.

Analysis Plan

Data analysis includes Chi-square analysis and t-test. Diagnoses made by conventional hemoglobin electrophoresis is compared with the DNA diagnoses by Chi-square; the mean age at diagnosis in each laboratory is compared using a t-test. Reliability of the DNA dried blood spot diagnoses is confirmed by Chi-square analysis of duplicate samples. For each outcome and compliance variable, Chi-square testing is used to compare the compliance for children diagnosed during the first year by current techniques with the compliance of the children diagnosed during the second and third years.

PRE-AWARD EVALUATION

Originality and Importance

This is an important new approach to neonatal testing for sickle cell disease — one of the most common genetic diseases in the United States, affecting 1 in 400 black neonates. Early diagnosis is important in part because early treatment of affected infants with prophylactic penicillin prevents pneumococcal septicemia, a condition that has a 30 percent fatality rate. The investigator proposes an innovative, confirmatory diagnostic technique. The plan is not only to test the laboratory reliability of this new technique but also its practical efficacy in Texas, as well as evaluating the clinical outcome of neonates diagnosed by this new approach as compared with the more conventional approach. Should this method prove accurate and efficacious, it has broad direct implications for the diagnosis of this disease as well as indirect implications for neonatal screening of other genetic conditions, such as PKU.

Regional and National Significance

The efficacy of this new confirmatory test is evaluated for the entire state of Texas, a state with eight percent of all U.S. births. Findings should be applicable throughout the nation.

Scientific and Technical Merit

The statement of the problem is clear and forcefully written. Appropriate scientific literature (including several important papers by the investigator) is presented to defend the feasibility of this laboratory approach. The investigator has experience with DNA microextraction and PCR amplification, suggesting that he can perform the proposed work. The clinical literature summarizing the proposed advantages of early screening is also relevant and convincing.

Hypotheses are clearly stated, testable, and well presented. Concepts are clearly defined and not unique to the proposal. The study's design and its operationalization are adequate, but should have been more detailed; the actual details of how the new laboratory test is developed are limited. However, from the review of the literature, the hypotheses, and the bibliographic sketch sections of the proposal, it seems clear that this investigator is capable of performing such a technique.

The comparison of historical controls with experimental subjects, rather than a true, randomized study, appears appropriate in this situation, inasmuch as the hypothesis being tested is the impact of time and certainty of test information on clinical outcome. One major criticism of the research, however, concerns the lack of description of how the clinical data is obtained and abstracted.

The population of the study is not adequately described. It is said to include all neonates with positive screening tests for sickle cell disease in Texas; the letter of support from the Texas Department of Public Health, however, does not clearly state that all of these specimens are available to the researcher. However, inasmuch as eight percent of all United States births occur in Texas, eight percent of blacks have sickle cell trait, and 0.25 percent have sickle cell disease, the samples should be adequate.

The proposed data analysis techniques, although briefly described, are straightforward. The time schedule appears adequate for the first three hypotheses; however, the duration of the followup for the patients identified in years two and three may be inadequate to fully assess the clinical implications of the newer, more rapid, and more definitive screening technique. Approval is recommended for two years of support to test hypotheses 1 through 3.

Continuation Grants

INFANT HEALTH AND DEVELOPMENT PROGRAM

GRANTEE Stanford University

INVESTIGATOR Ruth T. Gross, M.D.
Stanford University
Infant Health and Development Program
Building 460, Room 112
Stanford, CA 94305
Telephone: (415) 497-9685

GRANT AWARD INFORMATION *

Project Number:	MCJ-C50515
Project Period:	02/01/85--01/31/89
Grant Year:	4 of 4
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4
Awarded:	524,512	496,600	586,546	571,980
Requested:	630,937	633,439	705,450	657,177

* Jointly supported by the National Institute of Child Health and Human Development (NICHD)

SUMMARY

Study Objective

To determine whether a program of intense and comprehensive developmental services can improve outcomes above and beyond that which can be achieved with high-quality pediatric followup and referral. Specifically, the Infant Health and Development Program (IHDP) seeks to:

1. Determine the therapeutic impact, if any, of a medical followup plus psychoeducational and family support intervention on the health and development of low birthweight (LBW) infants and their families;
2. Identify which LBW infants, if any, benefit most from the program; and
3. Determine which areas of development, if any, are most vulnerable in LBW infants.

Research Questions or Hypotheses

A conceptual model consistent with a general system theory approach to development is used to guide data collection and hypothesis testing. This model makes several assumptions about the individual and family systems which as a whole predict that the psychoeducational and family support intervention being tested will have positive effects on intellectual and language development as well as on the social and adaptive behavior of participating infants. In addition it will also have positive effects on the home environment, including changes in parents' child-rearing attitudes and the quality of the mother-child interaction.

Population and Sample Description

At each of the 8 sites participating in the study, 135 LBW infants are enrolled, for a total sample of 1,080. This total sample size is a purposeful over-enrollment to ensure that over the 3 years of intervention and followup the sample size retained at each site is at the required minimum level of 90. Within sites, half of the infants are randomly assigned to the experimental group and half to a control group. Two-thirds of the infants at each site are to be selected from the less than 2,000 grams category and 1/3 from the group weighing between 2,001 and 2,500 grams. No attempt is made to achieve homogeneity in socioeconomic status among the subjects; heterogeneity has been deemed desirable in order to assess differential suitability of the intervention across social class.

Study Design

A multi-site, randomized clinical control trial design is used with two treatment arms. In both arms, all infants receive continuous pediatric monitoring and developmental assessments up to three years of age. In addition, for the experimental arm, infants receive special child development services interventions both in the home as infants and in a child development center. The psychoeducational/child development intervention in the experimental arm includes: family education via home visiting; a toy lending library designed to help correct for socioeconomic differences between study families; parent support groups which will begin in the first year of the 4-year project; and a day care center to which each child will be admitted from 12 months to 36 months of age. Developmental testing for all study participants is performed during and at the end of the study period. Thus, the study is, in reality, a test of two intensity-levels of interventions in which the less intensely treated group receives more services than would likely be the case if the program did not exist.

Methods and Procedures

Recruitment of subjects takes place between November 1984 and July 1985. Potentially eligible infants are those who will achieve corrected age of 40 weeks between January 1 and July 1. Parents of infants eligible for the program are contacted by the program's pediatric nurse practitioner (PNP) or social worker. This contact occurs as soon as the infant has stabilized, in many cases while the mother is still hospitalized. The nurse or social worker explains the study, leaves materials for parents to read, and answers questions. Once the family agrees to participate in the study, randomization to treatment group takes place at the National Study Office, although neither parents or staff have knowledge of group assignment until after the infant is discharged. Data are recorded on all subjects born in the hospital during the recruitment phase, including those who are not eligible for the study. All eligible subjects are recruited for the study, and some data are collected on all eligible subjects, regardless of whether they agree to participate. Reasons for the family refusal to participate are documented.

Informed consent is obtained from the parent(s) as soon as the infants are stabilized. Consent forms are signed only after at least two contacts with the PNP or social worker.

During the hospital stay, all infants and families receive supportive services provided by the Neonatal Intensive Care Unit (NICU) staff and from the study social worker and PNP. In addition to the medical care, this help might include counseling, referral to other community agencies, or planning for the infant's arrival home. Differential treatment does not begin until the infant is discharged from the hospital. In a home visit occurring shortly after discharge, the PNP or social worker informs the family of the infant's group assignment, and, on a second visit, introduces the Family Educator if the infant is assigned to the experimental (intensive treatment) group.

Analysis Plan

The first step in data preparation and analysis is the creation of SAS analysis files. Following the creation of these files, there is a systematic item analysis of the questionnaires and instruments. This item analysis is crucial for the construction of indices or composites from individual items. A variety of analyses are employed for this purpose including traditional reliability analyses, factor analyses, and clustering techniques as well as more novel techniques such as additive-tree and multi-dimensional scaling.

For the determination of main effects, the experimental and control groups are compared on several outcome measures using covariates such as mother's education, infant's birth weight, and mother's cognitive ability. These analyses test the major hypotheses of the study concerning the effects of the intervention on the outcome variables.

In addition to evaluating main effects, the planned analyses explore hypotheses regarding interaction of the treatments with characteristics of infant and parents. These analyses identify which kind of low birthweight infants benefit most from the intervention program. These interactional effects are identified and tested using the General Linear Model and other methods. Ultimately an overall structural model will be built that will explore the interrelations among the model's independent, intervening, and dependent variables. These complex analyses are to be performed for the total sample as well as within subgroups (i.e., the two weight groups).

DEFINITION AND PREVENTION OF INFANT MACROSOMIA

GRANTEE University of California – San Francisco

INVESTIGATOR Norman Kretchmer, M.D., Ph.D.
University of California – San Francisco
145 Irving Street
San Francisco, CA 94143
Telephone: (415) 821-5453

GRANT AWARD INFORMATION

Project Number:	MCJ-060526
Project Period:	07/01/85–06/30/88
Grant Year:	3 Of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4	Year 5
Awarded:	186,377	199,859	222,743	Denied	Denied
Requested	210,044	247,920	266,290	284,141	200,240

SUMMARY

Study Objective

The overall objective of this study is to design an intervention program that will lead to the prevention of macrosomia of the newborn through intensive care in the newborn period. Several specific aims are encompassed within this overall objective, including:

1. Defining the epidemiological characteristics of women who give birth to macrosomic infants.
2. Establishing the anthropometric characteristics of macrosomic infants and their mothers.
3. Refining existing methods for prediction of macrosomia using established risk factors.
4. Developing additional methods for predicting macrosomia that could culminate in a risk-scoring instrument highly predicative of macrosomia.

Research Questions or Hypotheses

Several predictive assertions guide the study:

1. There are two distinct types of fetal macrosomia, symmetric and asymmetric, and a major distinguishing factor between the two groups is the percent of body fat at birth.
2. A reliable field method for determining the percentage of body fat is impedance analysis.
3. Prediction of asymmetric macrosomia is possible through a simple risk scoring system and through the use of antenatal sonography.

4. Asymmetric macrosomia results from excessive stimulation of growth, which in some cases is caused by excessive fetal insulin and in some cases by elevated levels of sommatomedins.
5. There is a maternal nutritional component which causes macrosomia. A common (or related) maternal factor exists in obese or glucose-intolerant women.
6. Obese, glucose-tolerant women who acquire adipose tissue during pregnancy dispose of glucose and metabolize energy in a different way than non-obese pregnant women.
7. The infants of those women who have alterations in glucose disposal and energy metabolism have a higher percentage of body fat than infants without these alterations.

Population and Sample Description

The study population consists of women registering for prenatal care at San Francisco General Hospital and its associated satellite perinatal clinics. It has been the policy of the SFGH perinatal program to screen women for glucose intolerance during pregnancy at 26-28 weeks gestation. At the time the screen is performed, information is verified concerning ethnicity, weight gain, maternal anthropometry, and past medical and pregnancy performance. The 1,700 women who are successfully screened in the first year of the study serve as the population from which study samples are drawn. This is a population rich in ethnic diversity. Approximately 49 percent are of Hispanic origin, 13 percent of Afro-American descent, 1[illegible] percent Caucasian, and the rest are of Asian origin. Because the prevalence of risk factors for macrosomia differs markedly among ethnic groups, the effect of ethnicity on the interrelationship between maternal anthropometry, maternal energy metabolism, and infant outcome is a focus of the study.

Study Design

Overall, the design of the study is descriptive where cause and effect relationships are explored using multivariate statistical techniques such as multiple regression and other modelling techniques.

Methods and Procedures

This investigation concentrates on the body composition of SGA (small for gestational age), LGA (large for gestational age), and AGA (appropriate for gestational age) infants born to women with either hypertension, substance abuse, gestational diabetes mellitus, or obesity. The AGA infants are derived from this group of women as well as a group of non-high-risk women. The infant TOBEC (Total Body Electrical Conductivity) machine is the primary method of measurement of body composition (fat-free mass) for the infants and is used in addition to the usual anthropometric measures. Attempts are made to further corroborate the distribution of total body water and to derive fat-free mass with the use of deuterium oxide and measurements of skinfolds. The infants are followed at

periodic intervals over the course of one year and anthropometric measures are taken at these intervals. Mothers are measured at three months postpartum to determine patterns of distribution of fat.

Analysis Plan

Because this study includes both descriptive and predictive components, the overall strategy is to proceed from simple analysis of patient population characteristics to a more sophisticated modelling of risk factors in fetal macrosomia. The study sample is stratified by ethnic group in order to determine which ethnic groups are most likely to produce macrosomic infants. Definition of "at risk" individuals is ultimately be based on a cumulative index that is determined by the following: weight, abnormal glucose tolerance test, and previous history of macrosomia. While individuals are initially designated "at risk" based on the the presence of one or more risk factors, subsequent analysis determines whether the risk factors operate in an additive or synergistic fashion. As additional information is gained about other predictive factors such as antenatal biochemical testing and antenatal sonography, an attempt will be made to construct a multiple regression model of risk for macrosomia. Multiple regression analysis with stepwise inclusion of dependent variables provides the most flexible method of evaluating predictive models for macrosomia.

MATERNAL PESTICIDE EXPOSURE AND PREGNANCY OUTCOME

GRANTEE San Diego State University

INVESTIGATOR Winnie O. Willis, Sc.D.
San Diego State University
Graduate School of Public Health
San Diego, CA 92182
Telephone: (619) 229-2443

GRANT AWARD INFORMATION

Project Number:	MCJ-060546
Project Period:	11/01/86-10/31/89
Grant Year:	3 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	156,004	168,452	186,313
Requested:	185,589	195,996	207,645

SUMMARY

Study Objective

The primary objective of this study is to determine whether an association exists between adverse birth outcome and exposure to pesticides that exert their effects in insects and mammals by inhibiting cholinesterase.

Research Questions or Hypotheses

The following hypotheses are tested:

1. Maternal exposure to pesticides during pregnancy increases the relative risk of spontaneous abortion and low birthweight.
2. Women who have spontaneous abortion, low birthweight babies, preterm labor, and toxemia of pregnancy have lower mean red blood cell (RBC) cholinesterase levels than women who do not.
3. Women who report exposure to anticholinesterase pesticides during pregnancy have lower mean RBC cholinesterase levels than women who report no exposure.
4. Pregnant women who are employed in agriculturally-related occupations where many anticholinesterase pesticides are used have lower mean RBC cholinesterase levels than women who are not employed in agriculturally-related occupations during pregnancy.

Population and Sample Description

Study subjects are recruited from the perinatal service population of North County Health Services (NCHS), a network in northern and eastern San Diego County. The women who use NCHS perinatal services are mostly Mexican and Mexican-

American farm workers who harvest vegetables, fruits, and cut flowers. The following sociodemographic factors are very common among this population of women:

1. Low-income and low educational status;
2. Rural living conditions;
3. Inadequate dietary habits and nutritional status;
4. Occupational and environmental exposure to agricultural chemicals;
5. Abstention from smoking and drinking;
6. Non-use of contraceptives; and
7. Average age in the mid-twenties, with more than one child.

Each patient entering the NCHS perinatal program during each of the three years of this study is asked to participate. Each year approximately 550 women enter the study; approximately 137 refuse participation and it is estimated that about 103 will be lost to followup each year. This yields 310 subjects each study year, for a total of 930 subjects over the entire study period.

Study Design

This study uses two designs. The first part of the study uses a prospective cohort design to test the hypothesis that maternal exposure to pesticides during pregnancy increases the relative risk of spontaneous abortion and/or low birthweight. For exploratory purposes, this part of the study utilizes two control groups of 25 women each. The first group consists of pregnant women who are non-occupationally-exposed and who are non-study area-exposed. The second group consists of non-pregnant, study area-exposed women.

The second part of the study is cross-sectional. The cross-sectional design allows comparisons of RBC cholinesterase activity within the following comparison groups:

1. Spontaneous abortion / no spontaneous abortion;
2. Toxemia of pregnancy / no toxemia of pregnancy;
3. Low birthweight / normal birthweight;
4. Reported pesticide exposure / no reported pesticide exposure; and
5. Agricultural employment / no agricultural employment.

Methods and Procedures

Upon enrollment of each subject at the NCHS clinic, a complete reproductive history and information concerning environmental or occupational exposure to pesticides is taken, using the National Institute of Occupational Safety and Health Reproductive Questionnaire. The subjects are followed through pregnancy, with blood samples being taken at initial visit, at 26 weeks' gestation, and at delivery (fetal cord blood samples are also taken at time of delivery). Since it is desirable to obtain as many

RBC cholinesterase (AChE) values as possible (because of daily fluctuations and possible differences in cholinesterase metabolism from one trimester to the next) women who consent to participate in the biological monitoring phase of the project will be given the opportunity to donate blood samples more frequently than is routine. In this way, an even clearer picture of their AChE activity throughout pregnancy can be seen.

Analysis Plan

The rates of spontaneous abortions and incidents of low birthweight are compared between the exposed and non-exposed populations using a Chi-square analysis. As the Chi-square analysis of preliminary data provides observed values of outcomes among the exposed and non-exposed groups, calculations are done to determine the sample sizes needed to increase the power of the study to 95 percent. The RBC cholinesterase activity of cases (abnormal reproductive outcomes) is compared with that of controls (normal reproductive outcomes) and matched for age and parity. The differences in the RBC cholinesterase activity between the cases and controls for each outcome are tested using a two-way analysis of variance to distinguish intra- and inter-individual variation from inter-group variation. Similar cross-sectional analyses are done for RBC cholinesterase activity compared with pesticide exposure and with agricultural occupation. Results of the exposure history interview are used to assign a pesticide exposure index to each trimester of pregnancy. These indices are correlated with results of the lab analysis of RBC cholinesterase activity using a correlation coefficient analysis.

A SURVEY OF CHRONICALLY ILL CHILDREN'S USE OF TIME OUT OF SCHOOL

GRANTEE University of California – San Francisco

INVESTIGATOR Bonnie Holaday, R.N., D.N.S.
Family Health Care Nursing
University of California – San Francisco
San Francisco, CA 94143
Telephone: (415) 476-4663

GRANT AWARD INFORMATION

Project Number:	MCJ-060550
Project Period:	04/01/87–03/31/90
Grant Year:	2 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	92,138	93,289	
Requested:	102,085	106,604	104,700

SUMMARY

Study Objective

The primary aim of this study is to describe and analyze the everyday out-of-school life experiences of chronically ill school-age children, and to examine the effects of different ecological contexts on the child's out-of-school life. This study is based on the knowledge that children's time outside of school is important because it contributes to the child's development and well-being.

Research Questions or Hypotheses

The study addresses the following questions:

1. What kinds of things do chronically ill children do when they are not in school?
2. What are the effects of family life, family structure, and socioeconomic status on children's out-of-school life?
3. What are the range of opportunities and constraints that shape children's time use and their attitudes towards time use outside of school?
4. What roles do neighborhoods have in chronically ill children's out-of-school activities?
5. What is the capacity of urban environments to serve as support systems to parents directly involved in planning and managing chronically ill children's use of time out of school?

Based on the analysis of data from a pilot study, two general hypotheses have been developed: first, the patterns of chronically ill children's time use depends on the extent and the manner in which parents and others engage with them in joint activities; and second, the capacity of the parents to engage in such joint behavior

depends on the extent to which there exists external support systems that provide opportunity, assistance, resources, and channels of communication.

Population and Sample Description

General population specifications require that children in the study:

1. Are diagnosed as having an organic, chronic illness that has lasted for at least two years;
2. Are 10 to 12 years old; and
3. Are attending school and have not moved or changed elementary schools within the last 12 months.

Children who are blind, deaf, mentally retarded, or are cancer patients are not eligible for this study, nor are families which have another child with one of these problems. Children from all ethnic and socioeconomic groups are eligible, as well as children from all types of family structures. Two-hundred children are chosen from among those served by selected health care facilities in each of two states (California and Alabama), for a total of 400 subjects. A stratified sampling approach is used; three master strata are created using socioeconomic status to divide them, with an equal proportion of subjects in each stratum.

Study Design

There are two design components in this study: the survey design and the sample design. When considering what sampling design to use, it was decided to use a stratified sampling plan because there is general agreement among sampling specialists that stratified sampling is the method of choice when variances are known to differ between strata. In this study, a review of the literature clearly demonstrates that socioeconomic status influenced time use and childrearing practices. Therefore, a stratified sampling approach, using Hollingshead's four-factor index of socioeconomic status is used to divide the subjects into three equal groups (high, middle, low).

A cross-sectional survey design is used to collect data at one time from the sample of chronically ill children and their parents. Since these children's use of time is not being compared to that of healthy children, a control group was not identified as a component of the study design.

Methods and Procedures

Out-of-school time use is measured by exploring five domains of children's activities which the investigators believe account for fluctuations in patterns of time use during weekday afternoons, weekday evenings, and weekends. The domains are:

1. Activities "on their own," without adult supervision;
2. Activities with parents,
3. In-house and out-of-house chores, responsibilities, and spending activities;

4. Organized activities, including recreational and cultural programs supervised by adults; and
5. Television viewing.

When the interviewer arrives at the home, a household enumeration is conducted with the parent to obtain information about who lives in the home and their relationships to the child. The parent is asked to complete an 82-item questionnaire while the child interview is being conducted in a separate room. After the child is excused, one parent is interviewed using a 17-item questionnaire. The parent interviewed is the one responsible for monitoring the child's after school activities (in most cases this is the mother).

After data has been coded, entered, edited, and cleaned, it is sent to the Department of Social and Behavioral Sciences (University of California – San Francisco) for analysis.

Analysis Plan

Each of the five time domains is analyzed with a common set of independent variables. It is anticipated that the list of variables is pared down as those that have descriptive power for particular domains are identified. The descriptive analysis uses a variety of quantitative methods selected to meet the particular analytical requirements within the limits of data capabilities. Most of this analysis proceeds with the computation of frequencies and percentages and, where the data permit, with means and standard deviations.

A second phase of analysis involves the consideration of theoretical models of time use patterns of chronically ill children, particularly models flowing from an ecological system approach. The statistical analysis involves single-equation estimation, using regression techniques. Where the data allow, ordinary least-squares regression or analysis of covariance are employed; where dependent variables are categorical or ordinal in nature, other estimation techniques are used.

RISK-TAKING BEHAVIOR IN ADOLESCENTS: IMPACT OF PUBERTY

GRANTEE University of California -- San Francisco

INVESTIGATOR Charles E. Irwin, Jr., M.D.
University of California – San Francisco
School of Medicine
Third and Parnassus Avenues
San Francisco, CA 94143
Telephone: (415) 476-2184

GRANT AWARD INFORMATION

Project Number:	MCJ-060564
Project Period:	12/01/87–11/30/90
Grant Year:	2 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	150,000	218,236	
Requested:	198,762	213,173	180,421

SUMMARY

Study Objective

The objective of this research is to examine the relationship between the timing of physiological development in adolescence and three risk-taking behaviors: sexual activity, substance use, and accident-related behavior.

Research Questions or Hypotheses

The underlying hypothesis is that the timing of physiological maturation predisposes adolescents to engage in certain risk-taking behaviors which fulfill critical developmental needs (both psychosocial and psychological) during the second decade of life. Specific psychosocial changes occur along with biological maturation and are associated with adolescent risk-taking behavior. Timing of biological maturation is expected to directly influence a set of four psychosocial factors: cognitive scope; self-perceptions; perceptions of the social environment; and personal values. These four factors are expected to influence two mediating factors, peer group selection and perceptions of risk, which, in turn, are hypothesized to predict adolescent risk-taking behaviors.

Self-perceptions, perceptions of the social environment, and personal values are expected to influence the adolescent's choice of a peer group. The adolescent's peer group is then expected to influence risk-taking behaviors, and is hypothesized to be affected primarily by characteristics of the peer group, cognitive scope, and self-perceptions. The influence of personal values on risk-taking is expected to occur as a function of its effects on peer group choice, although some direct effects of personal values are also expected.

Specifically, the following hypotheses are tested (together with related sub-hypotheses):

1. The timing of adolescents' pubertal maturation is associated with differences in adolescents' perceptions of their early social environment.
2. The timing of adolescents' pubertal maturation is associated with differences in adolescents' self-perception.
3. The timing of adolescents' pubertal maturation is associated with differences in personal values, psychosocial maturity, and cognitive capacity.
4. The timing of adolescents' pubertal maturation is associated with differences in risk-taking behavior.
5. Adolescents' environmental perceptions are associated with risk-taking behavior.
6. Self-esteem is negatively correlated with risk-taking behavior.

Population and Sample Description

One thousand seven hundred and sixty subjects are selected from three San Francisco public schools: Two middle schools (subjects selected from grades six to eight) and one senior high school (subjects selected from grade nine) have been selected and have agreed to participate in the study. Approximately 2,100 adolescents are attending the 4 grades in these schools. These 2,100 students are solicited during required classes in order to assure that all students at each grade level are offered the opportunity to participate in the research. The majority of the students are middle and lower-middle class, and represent approximately equal numbers of white, black, and Asian backgrounds. This racial/ethnic diversity allows for greater generalizability of study findings. Limiting the sample to no more than three primary ethnic groups leaves sufficient statistical power to detect differences which may emerge. The wide range of ages allows examination of the effects of both early and late physiological maturation, as well as risk-taking behaviors which occur in early or late adolescence.

Study Design

The study is a cohort, sequential, longitudinal design, with data collected at three points in time. During phase one of this study, a large cross-sectional sample of adolescents are assessed. In phase two, a cross-sectional subsample of 592 adolescents are extensively assessed. Phase three is the one-year followup of the phase two subjects.

Methods and Procedures

The adolescents and their parents are asked to give consent to participate in the screening or phase one portion of the study. During phase one, the measures which are administered to the students include pubertal development and sexual maturation scales. Sociodemographic data and height and weight measures are also collected. On the basis of data collected during phase one, subjects are selected for phase two of the study. During phase two, a physical exam, the Mariowe-Crowne Social Desirability Scale, the Jessor and Jessor Scales, and

measures of egocentrism, future orientation, body image, risk perception, risk-taking behavior, and environmental perception are administered. Six months after the phase two assessments are complete, the phase three followup occurs, and all of the phase two assessments are repeated for the phase two subjects only.

Phase one assessments are conducted during one class period. Two other class periods are used for a subject orientation and for a feedback session where the student is given a computer printout of his or her pubertal status and an overview of developmental changes he or she should expect over the next one to two years. Phase two and phase three assessments are conducted at the University of California-San Francisco. Subjects in these last two assessments are paid $10.00 for each assessment.

Analysis Plan

The analysis plan is organized around four tasks: (1) data reduction; (2) cross-sectional analyses; (3) causal modeling; and (4) longitudinal analyses. Each of these levels of analysis reflects a significant degree of complexity, due primarily to the complex nature of the phenomena under investigation. The analysis takes on an additional level of complexity as a result of its hierarchical structure; results from early analyses affect subsequent ones.

Because of the multidimensional nature of the relationships under examination, the analysis relies primarily on the use of multivariate techniques. This approach not only allows for tests of complex relationships involving multiple dependent and independent variables, but also minimizes the experimental error rate. Univariate statistics are also used when appropriate. Simple and partial correlations are used to evaluate linear relationships between variables. Multiple regression techniques are used to investigate the relationship between multiple predictor variables and a single dependent variable. When variables can be ordered on temporal or substantive grounds, hierarchical multiple regression is used. In cases where mean differences are of interest, analysis of variance (ANOVA) is employed. When multiple dependent variables are of interest, multivariate techniques such as canonical correlation or multivariate analysis of variance are used.

SEVERITY OF ILLNESS: A NATIONAL STUDY

GRANTEE Children's Hospital National Medical Center

INVESTIGATOR Murray Michael Pollack, M.D.
Department of Critical Care
Children's Hospital National Medical Center
111 Michigan Avenue N.W.
Washington, DC 20010
Telephone: (202) 745-2131

GRANT AWARD INFORMATION

Project Number:	MCJ-110527
Project Period:	10/01/85–09/30/88
Grant Year:	3 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	72,577	62,726	45,456
Requested:	80,716	69,627	65,340

SUMMARY

Study Objective

The objective of this study is to cross-validate two measures of the severity of illness (i.e., the Physiologic Stability Index (PSI) and the Dynamic Risk Index) for users of pediatric intensive care units (PICUs). Specifically, the study seeks to cross-validate the two measures in a national sample of PICUs, simplify these tests by variable reduction, improve accuracy by variable reweighting, and conduct some specific and important applications pertinent to quality of care assessment and cost containment.

Research Questions or Hypotheses

The study is designed to test the following hypotheses:

1. (a) The observed risk of eventual mortality for ordered PSI intervals at each participating institution is reliably predicted by the admission PSI.

   (b) The observed risk of acute (< 24 hour) mortality for ordered dynamic risk index intervals at each participating institution is reliably predicted by the dynamic risk index.

2. Simplification of PSI by eliminating infrequently utilized variables does not result in a significant decrease in predictive power compared to the original PSI, and the reassignment of a more objective scoring table for the remaining variables and their ranges, better reflecting their relative importance improves the predictive power of the score.

3. Stratification of patients by severity of illness using the dynamic risk index and by therapeutic modalities used in the PICU isolates a large sample of low-risk patients who never utilize services that are unique to the PICU (low-risk,

monitoring patients), or whose last PICU days before discharge are identical to the low-risk, monitoring patients even though they did receive unique PICU services during the initial portion of their PICU stay (early discharge patients). A further hypothesis is that these patients utilize a significant number and percentage of PICU days of care.

4. The impact of an innovation, the pediatric intensivist, where none existed, improves the quality of care (mortality adjusted for severity of illness) and improves PICU efficiency.

Population and Sample Description

A national sample of 9 PICUs totalling 2,700 admissions are participating in the study. These institutions range in bed capacity from 4 to 16 with a mortality rate ranging from 3 to 15 percent. All the participating institutions have appropriate facilities and routine clinical data sheets from which to gather the information needed for the study; all have been trained in data collection. Each institution is committed to collect data on a minimum of 200 consecutive patients, or at least 6 months of consecutive admissions.

Study Design

A descriptive design is employed for the most part using standard psychometric approaches to test construction and with the overall sample partitioned into two data sets—one for estimation and one for replication.

Methods and Procedures

All participating PICUs agreed to collect data on at least 200 consecutive admissions or for at least 6 months. Personnel from each institution are trained by the principal investigator in data collection techniques using standardized data sheets. All data were collected prior to the start of the study between 1984 and 1985 except for one institution where data collection had taken place between 1980 and 1982. On admission, age, diagnosis, clinical services of primary responsibility, and a classification system for goals of therapy, acute disease status and chronic disease status are recorded. The reason for admission is classified as emergency or scheduled. A chronic (greater than 30 days) disease classification is used for all chronic conditions present on admission to the ICU consisting of two qualitative categories: (1) significant underlying disease expected to limit life expectancy to less than adult age or prevent independent function as an adult; (2) no significant chronic disease. These determinations are based on the patient's record, the medical literature, and interviews with the patient's physicians. Only currently available therapies are used for this assessment; when uncertainty exists, an optimistic outlook is adopted. Outcome in terms of survival or death are also recorded for both the hospital and PICU. In one PICU, multiple experimental surgical procedures are performed; these patients are not included in the study. Each PICU admission and discharge status is considered one observation unit since patients with multiple admissions are routinely admitted for different reasons.

Analysis Plan

Comparisons of age, sex, clinical service, diagnoses, usage of therapies, and other distributions utilizes Chi-square analysis. Comparisons of duration of stay and admission PSI scores utilizes Kruskal-Wallis analysis of variance and classical analysis of variance, respectively.

Validation of the PSI and dynamic risk index utilizes ordered PSI intervals and compares the observed versus the expected number of deaths in each interval using goodness of fit tests based on Chi-square statistics. Direct comparisons of observed death rates in ordered PSI intervals between different time periods within a single institution utilizes Cochran's Chi-square statistic for ordered proportions. Receiver operating characteristic curve analysis is used to establish the overall prediction performance of the current PSI and dynamic risk index, as well as any revised version.

EFFECTIVENESS OF AN URBAN LOW BIRTHWEIGHT INTERVENTION

GRANTEE The Better Babies Project, Inc.

INVESTIGATOR Deborah L. Coates, Ph.D.
The Better Babies Project, Inc.
1717 Massachusetts Avenue, N.W.
Washington, DC 20036
Telephone: (202) 397-3131

GRANT AWARD INFORMATION *

Project Number:	MCJ-110558
Project Period:	10/01/87–09/30/91
Grant Year:	2 of 4
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4
Awarded:	224,511	229,626		
Requested:	249,118	257,730	274,530	79,506

* Jointly supported by the National Institute of Child Health and Human Development (NICHD)

SUMMARY

Study Objective

The major research objective is to determine whether a multi-risk factor intervention based on a comprehensive service/social support model can reduce the incidence of low birthweight by 20 percent in a predominantly black Washington, D.C. neighborhood by the end of a three-and-one-half-year period.

A second research objective is testing the effectiveness of a self-help guide designed for and tested on pregnant women in reducing the incidence of smoking behavior for this population of pregnant women.

Research Questions or Hypotheses

The study tests the following seven hypotheses:

1. There is a significant reduction in the pre-intervention incidence of low birthweight for the specified target and as compared with the post-intervention low birthweight incidence for that specified target area.
2. The low birthweight incidence is significantly lower for the target area and for the target sample of women from this area when compared with incidences for the nonintervention comparison groups within the city and for the city as a whole.
3. There is a significantly lower incidence of preterm delivery for the target area and for the target sample of women as compared with the preterm delivery incidence rate for nonintervention comparison groups.
4. There is a significant reduction in three adverse health behaviors known to affect the risk of low birthweight (smoking, drinking, inadequate weight gain)

during a woman's participation in the program, as compared to the incidence of these adverse behaviors in other population groups.

5. Women participating in the smoking intervention have significantly lower levels of nicotine in their saliva than do women in nonintervention comparison groups when measured at time of delivery.
6. There is a significant difference in the number of women enrolled as a function of the type of recruitment strategy used to effect enrollment.
7. There is a relationship between the type of enrollment (e.g., gestational age timing and type of outreach used to identify) and maternal characteristics (e.g., demographic and risk status).

Population and Sample Description

The subjects eligible for this study are those women living within the specific target area of nine census tracts with a population of 31,000. The population of the target area is 93.1 percent black, and 37 to 66 percent of this population earns less than 200 percent of the Federal poverty level. Fifty-three percent of the women in the target area work; less than half have completed high school. To be enrolled, a woman must be less than 29 weeks pregnant.

Study Design

The design used in this study is an interrupted time series with nonequivalent no-treatment control group time series (sometimes referred to as a nonequivalent comparison group design with multiple data points, or as a human community trial). This type of design is necessary when particular circumstances require that a community as a whole serve as the experimental unit with regard to testing a specific etiologic hypothesis or preventive procedure. The multiple data point characteristics of this time series design makes it a considerably longer test than a simple pretest–intervention–posttest design. Low birthweight incidence data for 15 years prior to the initiation of the intervention are examined and compared before and during the intervention.

The study encompasses three and one-half years of investigation. The nonequivalent comparison group design should ensure that the data collected are likely to show whether a community-based intervention can be successful in reducing the incidence of low birthweight for black, urban women.

Methods and Procedures

Subjects are aggressively recruited and referred through formal referral systems established with local prenatal care and social service institutions. An initial contact form is completed, and within seven days an hour-long interview appointment is arranged which covers pregnancy experiences and risk factors, needs, attitudes toward the fetus, and characteristics of the subjects' social networks. At enrollment, subjects sign consent forms for the release of medical data and project enrollment contracts.

If time permits, subjects who indicate that they smoke, drink, or use drugs receive some counseling and see a slide/film presentation about this risk factor. Within 72 hours after enrollment, each participant is assigned to a service coordinator who handles her case. The coordinator assists the subject in setting up appointments for prenatal care and other services. Some participants begin immediately to use the drop-in services available at the center—washer and dryer, rest area, nursery, classes, activity room, light lunch, etc.

Update interviews are conducted monthly. After 20 weeks gestation, women are encouraged to attend two classes which teach them how to identify the warning signs of preterm labor. Within three to six days after delivery, information is collected on birth outcome. At six weeks postpartum, an exit interview is conducted.

Overall, four methods for collecting data are used: (1) standardized, structured interviews scheduled at enrollment and conducted monthly during pregnancy, at delivery, and six to eight weeks postpartum, (2) self-observational schedules used to record the level of effort extended by the intervention staff for each participant, (3) prenatal care provider forms, and (4) vital records which provide information on birth outcomes for all women in the target area.

Analysis Plan

The study relies on a variety of statistical procedures including analysis of variance, multiple regression analysis, and log linear modeling. The majority of the outcome measures under observation are continuous variables and are analyzed using general linear model methods. Dichotomous dependent variables and low frequency data are analyzed using alternative distributions (e.g., binomial or Poisson). Analysis of variance and multiple analysis are used to explore relationships among sets of independent and dependent variables. Log linear analysis is used to test the recruitment hypothesis. If the recruitment hypothesis is confirmed, then there are plans to isolate the significant interventions and compare data from another sample of women (those enrolled in the D.C. Perinatal Study, done in collaboration with the National Institute for Child Health and Development).

INTERACTION AND SUPPORT: MOTHERS AND DEAF INFANTS

GRANTEE Gallaudet University

INVESTIGATOR Kathryn Meadow-Orlans, Ph.D.
Gallaudet University
800 Florida Avenue N.E.
Washington, DC 20002
Telephone: (202) 651-5206

GRANT AWARD INFORMATION

Project Number:	MCJ-110563
Project Period:	10/01/87–09/30/90
Grant Year:	2 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	154,894	158,349	
Requested:	198077	200,000	175,000

SUMMARY

Study Objective

The objectives of this research are:

1. The provision of a knowledge base for informed procedures of early intervention with at-risk infants about whom little is currently known;
2. Contributions to knowledge about the effect of hearing impairment on infants' social/emotional development; and
3. The provision of information about the relative influence of the interaction of family stress and social support on early mother-infant interaction.

Research Questions or Hypotheses

Six major hypotheses guide the study. It is predicted that each of the hypothesized relationships is specified by the presence of an impaired-hearing infant, and further specified by family stress levels and available support systems. That is, normally-hearing infants and their mothers demonstrate more interactional reciprocity and more elaborated, productive, and relaxed communication compared to hearing-impaired infants and their mothers. However, these effects are reduced for dyads with lesser degrees of family stress and heightened levels of family support. The hypotheses are:

1. Individual differences in reciprocal mother-infant interaction at ages 6 months and at 9 months predict individual differences in mastery motivation at age 12 months.
2. Individual differences in reciprocal mother-infant interaction at ages 6 and 9 months predict individual differences in mother-infant communication turn-taking behaviors and in the degree of maternal linguistic directiveness at age 12 months.

3. Individual differences in reciprocal mother-infant interaction at 6 and 9 months predict individual differences in coping abilities at age 12 months.
4. Motivation to master the environment and the ability to cope with stress increase over time.
5. At age 12 months, positive correlation is demonstrated between the ability to cope with stress and the infant's initiation of communication with the mother.
6. Over time, both deaf and hearing infants display differences in their sequential organization of reciprocal interactions and mastery motivation, as demonstrated by a lag-sequential analysis.

Population and Sample Description

A total of 20 hearing-impaired (HI) infants and 20 normally-hearing (NH) infants comprise the final groups for analysis. In order to allow for attrition (and for fluctuations in actual or diagnosed hearing loss in the HI group), 24 HI and 24 NH infants are to be recruited.

Study Design

This is a multifactorial, longitudinal study which consists of observations of the mother's and infant's behavior at three age points during the infant's first year of life (6, 9, and 12 months), and it is designed to identify and track age-related changes in several areas which are important to child development and are also related conceptually.

Methods and Procedures

In the first six weeks of the first project year, a senior investigator from Gallaudet visits each site for three days, in order to train the graduate assistant in the procedures and methodology. Part of the general orientation consists of precise discussions about methods of recruiting infants, with visits to the most likely local recruitment sites. Intensive discussions are held concerning issues of diagnosis of deafness, and family response to the diagnosis.

The central issue for the success of the research is the ability of the research group to locate and enlist the targeted number of deaf infants in a two-year period. The recruitment problem is related to both demographic and diagnostic issues in hearing impairment. Subjects are drawn from the Kendall Demonstration Elementary School at Gallaudet University, Washington, D.C., the Atlanta Area School for the Deaf, and children identified by co-investigators in the Departments of Psychology of Georgia State University, the Universities of Massachusetts-Amherst, and of Texas at Dallas.

Every effort is made to establish a reasonably homogeneous group of subjects. This is particularly difficult for hearing-impaired subjects because of possible variation in degree of hearing loss, age at onset, ability to utilize residual hearing, changes in initial diagnosis of hearing level, and additional handicapping conditions often related to etiology of deafness. For these reasons, it is even more important

to eliminate from the research group those infants who might be at risk for other reasons. Thus, potential subjects (both HI and NH) are healthy infants with no known or suspected (additional) handicapping conditions, and whose mothers experienced a medically uneventful pregnancy, labor, and delivery. Negative health-related indicators include premature birth with low birthweight for gestational age and any postpartum complications requiring an extended stay in a neonatal intensive care unit.

Sociodemographic factors that are indicators for exclusion from the research groups are economic or cultural conditions that place an infant at risk, or a parent with chronic illness or drug dependency.

As an additional safeguard against the inclusion of infants with significant developmental delays, the physical development and self-help scales of the Alpern-Boll Developmental Profile are administered when infants are 12 months old.

Analysis Plan

Data analysis is comprised of three parts: data reduction, including coding systems; data management (using IBM personal computers, a VAX mainframe, and SAS system files); and statistical tests of the hypotheses.

For hypotheses one through three, separate stepwise multiple regression analyses examine the predictive relationships between hearing status, stress and coping, and the measures of reciprocity at 9 months and the infants' motivation, communication skills, and coping abilities at 12 months. Further analyses examine the cross-age relationships between the primary 9 and 12-month measures, and the reciprocity, problem-solving, and communication measures at 18 months.

For hypothesis four, Pearson product-moment correlations are computed for 12-month measures of mastery, coping, and stress. Partial correlations, controlling for hearing status, stress, and support are also performed.

For hypothesis five, Chi-square techniques are utilized for comparing the pattern of transitional probabilities for the two groups, observing the criteria proposed by Sackett (1978).

Statistical integrity is maintained by means of adjustments to the *df* and *p* values and the use of planned contrasts for hypothesis testing.

IDENTIFICATION OF RISK FOR SIDS: SUBSEQUENT SIBLINGS

GRANTEE The American SIDS Institute

INVESTIGATOR Alfred Steinschneider, M.D., Ph.D.
The American SIDS Institute
275 Carpenter Drive
Atlanta, GA 30328
Telephone: (404) 843-1030

GRANT AWARD INFORMATION

Project Number:	MCJ-130516
Project Period:	04/01/85–03/31/90
Grant Year:	4 of 5
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4	Year 5
Awarded:	131,156	108,925	125,251	139,788	
Requested:	150,812	127,812	135,925	140,376	136,586

SUMMARY

Study Objective

The primary objective of this research is to evaluate in subsequent siblings the effectiveness of neonatal measures of respiratory instability obtained during feeding and sleep, as well as measures of passive muscle tone, in identifying the infant who is at risk for prolonged apnea (no respiratory activity for more than 18 seconds) or bradycardia (sudden drop in heart rate to below 80 bpm for 5 beats or more). It is hoped that the physiological observation of feeding and sleep, and the assessment of muscle tone, under carefully controlled conditions, might provide valid criteria for the early identification of subsequent siblings who would benefit from home monitoring.

Research Questions or Hypotheses

This study addresses the following issues:

1. The determination of the proportion of subsequent siblings who develop episodes of prolonged apnea and/or bradycardia;
2. The examination of the hypothesis that neonatal respiratory instability during sleep and/or feeding, and muscle hypotonia are associated with the occurrence of prolonged apnea and/or bradycardia; and
3. The determination of the effectiveness of measures of respiratory instability during sleep and feeding and muscle hypotonia, considered singly and in combination, in identifying the subsequent sibling at risk for prolonged apnea and/or bradycardia.

Additionally, there will be testing (direct and indirect) of the hypothesis that respiratory instability during sleep and feeding and muscle hypotonicity, are neonatal manifestations of the same underlying abnormality; also there will be

testing of the assumption that episodes of prolonged apnea and/or bradycardia are a surrogate for SIDS.

Population and Sample Description

At least 400 subsequent siblings are studied during this project—approximately 200 each in Atlanta, Georgia and Portland, Oregon. A subject is entered into the study if a previous sibling (with the same biological parents) had died suddenly and unexpectedly and a review of the autopsy protocol failed to demonstrate a known cause for the death. Participation is encouraged, and informed consent is obtained during the third trimester of pregnancy.

Study Design

A prospective, non-experimental research design utilizing a cross-sectional sampling plan is employed to determine the occurrence rate of prolonged apnea and bradycardia in siblings and the degree to which suspected risk factors are associated with them. This requires that an unselected sample of siblings be enrolled, classified according to risk status, and followed over time to determine the subsequent occurrence of prolonged apnea and/or bradycardia.

Methods and Procedures

Obstetrical, maternal, and neonatal information is recorded for each infant participating in the study. In addition, the placenta from each pregnancy is obtained and examined. All infants are studied in a physiology laboratory on two separate occasions, during the first and fourth week postnatally. Observations of a number of physiologic activities are obtained. Sucking activity is recorded during a formula feeding, including the recording of respiratory activity and heart rate. A complete nap is observed, during which recordings are obtained of respiratory activity, heart rate, and two channels of eye movements. During feeding and sleep studies, all apneic pauses of at least two seconds in duration are measured. Muscle tone is evaluated with the infant in a quiet and alert state.

At the time of the laboratory testing, each infant is placed on a home monitor/recorder system. The monitor system alarms following an apneic episode of 20 seconds or a drop in heart rate to 80 bpm or below. The system provides cassette tape recording of respiration and ECG for the minute prior to and after each alarm, as well as every apneic episode longer than 15 seconds in duration; the date and time of the apparent event is recorded. Parents are instructed in the use of the equipment and in techniques of resuscitation; they are required to complete a daily log and fill out reports each time the alarm sounds. Information from the cassette tapes is transcribed onto a multichannel polygraph and examined for all episodes of prolonged apnea and bradycardia.

All infants are maintained on the monitor system for at least six months; the system is discontinued at age six months if the infant has had no prolonged apnea or bradycardia as documented on the tape. If episodes are documented, further diagnostic studies are conducted as clinically indicated and not as part of this

research protocol; monitoring may be continued beyond age six months as necessitated by clinical considerations. Nurses are in contact with the parents weekly to discuss the baby's status and to remind them to return the cassette tapes and completed forms.

Analysis Plan

The principal analysis methods are those appropriate for estimation and comparison of rates and proportions. To determine the proportion of subsequent siblings who develop prolonged apnea and/or bradycardia, point estimates and confidence intervals are calculated for the proportion of siblings having prolonged sleep apnea, bradycardia, and apnea and/or bradycardia. To test the hypothesis that neonatal respiratory instability during sleep and/or feeding and muscle hypotonia are associated with the occurrence of prolonged apnea and/or bradycardia, Chi-square tests of homogeneity and independence are used to determine significance of the associations between primary independent variables (measures of respiratory instability and muscle tone) and dependent variables (prolonged apnea and/or bradycardia). To determine the effectiveness of measures of respiratory instability during sleep and feeding and muscle hypotonia, in identifying subsequent at-risk siblings, measures of specificity are calculated; relative and attributable risks are calculated and tested for statistical significance via confidence interval estimation techniques in order to assess the ability of respiratory instability scores and muscle tone to identify those infants who develop episodes of prolonged apnea and/or bradycardia. To test the hypothesis that respiratory instability during sleep and feeding and muscle hypotonicity are neonatal manifestations of the same underlying abnormality, Chi-square tests of association between independent variables are employed to test, indirectly, the secondary hypothesis that hypotonia and respiratory instability are related. To test the assumption that prolonged episodes of apnea and/or bradycardia are a surrogate for SIDS, retrospective examinations are conducted for the presence of SIDS maternal, obstetrical, and neonatal risk factors.

Other analyses include periodic evaluations of collected data to determine the demographic and epidemiologic makeup of subsequent siblings, comparisons with population norms derived from a previous prospective study of unselected infants, and assessment of monitor usage and alarm rates. Statistical methodologies include Chi-square tests, t-tests, ANOVA, logistic regression, and discriminant analysis.

INTRAVENOUS ANTIBIOTIC THERAPY IN CYSTIC FIBROSIS: HOME VERSUS HOSPITAL

GRANTEE Tulane University

INVESTIGATOR William D. Waring, M.D.
Department of Pediatrics
Tulane University School of Medicine
1430 Tulane Avenue
New Orieans, LA 70112
Telephone: (504) 588-5601

GRANT AWARD INFORMATION

Project Number:	MCJ-220556
Project Period:	05/01/87–10/31/90
Grant Year:	2 of 4
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4
Awarded:	301,586	377,434		
Requested:	301,586	400,813	429,312	45,988

SUMMARY

Study Objective

The purpose of this study is to compare two treatment locations—hospital and hospital/home—for use of intravenous (I.V.) antibiotics on patients who have cystic fibrosis and who experience acute pulmonary exacerbations. The study compares the safety, efficacy, cost, and psychosocial effects of the two places of treatment.

Research Questions or Hypotheses

The study is designed to test the following hypotheses:

1. Therapy with I.V. antibiotics is as effective, safe, and acceptable at home as in the hospital;
2. Therapy with I.V. antibiotics produces the same psychosocial effects at home as in the hospital; and
3. Therapy with I.V. antibiotics is less expensive at home than in the hospital.

Important questions raised in this research concerning home I.V. therapy include:

1. How should eligibility for such therapy be determined?
2. What effects does home therapy have on the lives of the patient and family?
3. What are the components of a home therapy program?

Population and Sample Description

In order to have a patient population of sufficient size from which to select prospective patients, 12 cystic fibrosis centers collaborate in the study. Seventy-eight patients have been selected over a period of 2 1/3 years. Inclusion criteria have been set up to select CF patients, aged six years or older, admitted to participating centers for treatment of an acute pulmonary exacerbation with a strain of *Pseudomonas* that is sensitive to ceftazidime or tobramycin. Exclusion criteria have been set up to identify patients whose disease was too severe or who have families who were thought not to be able to manage home I.V.'s.

Study Design

This study is a multicenter, prospective, randomized controlled trial. Patients meeting the inclusion criteria are randomly assigned to two groups: those who receive conventional therapy exclusively in the hospital (Group I), and those who receive therapy in both the home and hospital settings (Group II).

Methods and Procedures

Patients are given psychological and physical examinations (including relevant laboratory work). Patients in Group I receive conventional antibiotic therapy in the hospital for any acute pulmonary exacerbations that may occur over the following period of 12 months. Patients in Group II remain in the hospital for a minimum of three days, during which time they receive instruction in I.V. antibiotic administration; they are then sent home to complete their course of therapy. Treatment for subsequent pulmonary exacerbations occurring over the next 12 months are either home or hospital-based, depending on the original group assignment.

Each patient receives intravenous aminoglycozide and ceftazidime. The aminoglycozide administered is chosen based on sputum culture *Pseudomonas* sensitivities. In addition to I.V. antibiotic therapy, patients in both groups receive the following concomitant therapy during their treatment of acute pulmonary exacerbations: chest physical therapy, aerosol (bronchodilator and/or mucolytic agent), high calorie and high protein diet, pancreatic enzymes, and multivitamins.

On the first day of therapy for both groups, the final day for Group I, and the first weekday after the final day of therapy for Group II, patients have the following tests: urinalysis; creatinine; pulmonary function—FEV_1, FVC, $Vmax_{50VC}$; acute clinical score; and psychological testing. Sputum cultures and chest roentgenograms are done at the onset of therapy. Each patient is followed for 12 months. Data are collected throughout the exacerbation and then at six months and again at one year.

Analysis Plan

The majority of short-term hypotheses are analyzed by means of multiple regression of the outcome variable (or change in the variable) on a dummy variable treatment (0-hospital, 1-home), together with stratifying covariates—age, NIH

score, and any other covariates for which there should be adjustments. The result then assesses home versus hospital care adjusting for other variables. Long-term hypotheses are examined by means of random effects models for longitudinal data developed by Laird and Ware. (It is expected that there will be some loss to followup and missing data, so the use of a repeated measures design is not an option.) Estimates of slope (rate of change of outcome variables) for each individual can be regressed on other variables to determine the impact of treatment on change over the year of followup. Two special analyses are also included: an assessment of whether any of the psychosocial variables are related to any acceptability measures; and a comparison of duration of treatment for home versus hospital.

COURSE OF RECOVERY FOR CLOSED HEAD TRAUMA IN ADOLESCENCE

GRANTEE University of Maryland at Baltimore

INVESTIGATOR Felix P. Heald, M.D.
University of Maryland at Baltimore
Division of Adolescent Medicine
22 South Greene Street
Baltimore, MD 21201
Telephone: (301) 528-6495

GRANT AWARD INFORMATION

Project Number:	MCJ-240510
Project Period:	10/01/84–09/30/88
Grant Year:	4 of 4
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4
Awarded:	92,464	88,327	78,632	no cost extension
Requested:	96,359	91,473	79.306	no cost extension

SUMMARY

Study Objective

The objective of this study is to investigate the physical and psychosocial effects of closed head injury in adolescents and their families. Specifically, the study seeks to investigate (1) the central nervous system deficits that are found in closed head-injured teenagers and the resulting impaired intellectual functioning; and (2) the interaction of the central nervous system deficits and subsequent impaired intellectual functioning with family adjustment, school performance, and school behavior.

Research Questions or Hypotheses

This study is designed to test the following hypotheses:

1. Closed head injury, ranging from mild to severe, adversely affects the school performance and adjustment of adolescents; and
2. With normal-appearing, closed head-injured adolescents, teachers', parents', and adolescents' misperceptions of residual dysfunction adversely affect school performance and/or adjustment, and family adjustment.

Population and Sample Description

Three groups of subjects participate in the study. Experimental subjects include all adolescents (age 13 to 19) referred to the Adolescent Trauma Recovery Project (ATRP) of the University of Maryland Medical School Hospital in Baltimore. These subjects are patients who have been referred to ATRP because of a closed head injury that included loss of consciousness, and who are enrolled in school at the time of their injury. Subjects are typically referred to the program when they are

no longer in a coma. These patients may or may not have injuries in addition to head trauma.

The two control groups are composed as follows:

1. Control group 1 (orthopedic controls) subjects are non-head-injured trauma patients. These orthopedic injury controls are drawn from patients admitted to the Adolescent Medicine Inpatient Unit of the University of Maryland Hospital. As with the experimental group, only those adolescents enrolled in school at the time of their injury are included in the study.
2. Control group 2 (normal controls) subjects are selected from among the friends and classmates of the head-injured subjects.

Approximately 33 subjects per group will be enrolled in the study.

Study Design

A matched control design is employed, consisting of an experimental and two control groups. The non-head-injured trauma group will be used to control for the possible influence of having sustained a serious injury and of hospitalization on the dependent variable. These orthopedically injured patients will be limited to those injured in vehicle accidents in order to control as much as possible for the setting variables or predisposing factors. The non-injured adolescent group is included in an effort to control for the effects of normal developmental changes which are expected to occur during the 18-month period of the study. No attempt at matching is done as it is expected that these groups of subjects are similar to experimental subjects with respect to age, neighborhood, socioeconomic status, and school. Experimental and non-head-injured control pairs are matched with respect to sex, age (within one year), initial severity of injury as assessed by the Modified Injury Severity Scale (MISS), and family type (single-parent or two-parent family).

Methods and Procedures

Prior to referral and enrollment into the Adolescent Trauma Recovery Program, results of physical examinations, neurological evaluations, and CT scans are recorded on head-injured adolescents. The Glasgow Coma Scale is administered daily until the adolescent is sufficiently alert to allow assessments of post-traumatic amnesia (PTA). At this time the teenager is referred to the Adolescent Trauma Recovery Program.

PTA is assessed daily until it has resolved, and changes in neurological status are noted. Within one week after PTA has cleared, an assessment battery consisting of measures of cognitive functioning, educational abilities, and family perceptions and adjustment are administered. Yoked controls from both the orthopedic and non-injured groups received the same evaluations at that time. This battery is repeated at six months, twelve months, and eighteen months after resolution of PTA for head-injured subjects. Both groups of control subjects receive the battery of tests 18 months after their first assessment.

In addition to the evaluation batteries, several other measures are obtained. Thirty-five days after PTA has cleared, head injured adolescents are given the

PASAT and a reaction time test. It is expected that by this time, transitory confusion should have dissipated, allowing assessment of more lasting deficits. At the time of the final evaluation (18 months after resolution of PTA), head-injured subjects are given a neurological evaluation.

School-related variables (school placement, grades, school behavior, teachers' perceptions of residual deficits, etc.) are first assessed when the head-injured subject resumes academic work. For experimental subjects and orthopedic controls, the initial resumption of "school" generally consists of in-hospital or at-home tutoring. Yoked controls from both control groups receive this assessment when their matched head-injured adolescent begins schoolwork. Subsequent evaluations of these variables are made at the same time as the previously described evaluation batteries.

Analysis Plan

Demographic data obtained in the present study is reported descriptively (means, standard deviations, percentages) in order to characterize the population studied. Subjects in each of the three groups are subsequently subdivided separately as a function of the major demographic variables: age, sex, parents' educational level and socioeconomic status, and family structure.

The responses to all standardized measures and demographic data are incorporated in a correlation matrix in order to assess the interrelationships between responses. In the event that some of the multiple measures are highly intercorrelated, one of the variables in the highly correlated set is selected to represent the common underlying dimension.

The principle method of data analysis is analysis of variance: a series of multivariate analyses of variance and analysis of variance with repeated measures. Analysis of variance with repeated measures is used to determine potential changes across time of every outcome measure.

Multiple regression analysis is utilized to determine the relationships among demographic variables, possible confounding variables (e.g., differential school absence due to injury), and the dependent variables (outcome measures).

Missing data are handled by omitting a case from analysis if its value on the independent variable or any dependent variable is missing. Thus, all means, standards deviations, and correlatives are based on the same universe of data.

IMPACTS OF FINANCING MATERNITY CARE FOR THE POOR AND UNINSURED

GRANTEE Johns Hopkins University

INVESTIGATOR Richard G. Frank, Ph.D.
Health Services Research and Development Center
624 North Broadway
Baltimore, MD 21205
Telephone: (301) 955-6546

GRANT AWARD INFORMATION

Project Number:	MCJ-240545
Project Period:	10/01/86-09/30/88
Grant Year:	2 of 2
Type of Grant:	Continuation

Costs:	Year 1	Year 2
Awarded:	124,265	150,202
Requested:	140,772	155,178

SUMMARY

Study Objective

This project studies the impact of changes that have taken place in funding policies for care of the poor, on the use of prenatal care, and the implications of these changes for an important indicator of pregnancy outcome—birthweight. The results of this research may have important implications for formulating financing policy with respect to the poor, uninsured, and indigent.

Research Questions or Hypotheses

The following questions are posed:

1. Has tightening of Medicaid eligibility criteria reduced access to prenatal care and subsequently led to decreased utilization of care?
2. Have limitations on ambulatory care benefits under Medicaid decreased the use of prenatal care?
3. Have changes in state-only Medicaid programs aimed specifically at prenatal care had an impact on the use of those services?
4. Have indigent care financing programs offset declines in Medicaid coverage and maintained use levels of prenatal care?
5. If indigent care programs have offset declines in Medicaid coverage, do programs specifically targeted to pregnant women and children more effectively improve access than indigent care financing programs that generally cover ambulatory care?
6. If Medicaid policies have decreased utilization of prenatal care, have these decreases, in turn, been associated with changes in low birthweight (LBW) rates?

Population and Sample Description

The study sample consists of all counties in the United States (U.S.) with at least 10,000 whites or 5,000 blacks in 1980. Counties are chosen as the unit of analysis because they are administratively the smallest geographic unit at which policies and services are implemented or administered throughout the U.S. In addition, counties are the smallest geographic unit for which vital statistics data are routinely tabulated and published for the entire nation.

Study Design

A pooled, time-series, cross-sectional design is employed with pretest/posttest capabilities obtained through the partition of study units (i.e., county) into those where Medicaid and other medical care financing policies changed and those where it did not.

Methods and Procedures

Information for the study is derived from existing databases available from the National Center for Health Statistics, the Bureau of the Census, the Health Care Financing Administration, and the American Hospital Association. Selected items of information are abstracted from these databases in a county-specific aggregation to create an array of independent and dependent variables with which to answer the research questions posed by the study.

The analytical strategy employed is to estimate a series of regression models which trace the linkage of health care financing for the poor to use of prenatal care services and subsequently to rates of low birthweight outcomes. Separate regressions are estimated for black and white birthweight outcomes. Separate race-specific regressions are used because race interacts with a variety of other explanatory variables. For instance, the proportion of low birthweight births for blacks is twice as large as that for whites. Race is also highly correlated with use of prenatal care and other variables which explain low birthweight rates. Thus, estimation of separate regressions reduces collinearity problems. Moreover, it allows for estimating whether the impact of the explanatory variables on prenatal care and, in turn, low birthweight, differ by race. Additional partition or post-stratification approaches are used to refine further the associations between financing mechanisms, prenatal care use, and low birthweight outcomes and to hold constant the effects of interaction variables. Multiple measures are used as indicators of key independent and outcome variables.

Analysis Plan

A series of descriptive analyses are aimed at uncovering trends in low birthweight incidence, utilization patterns of prenatal care, and changes in availability of prenatal care. Simple comparisons of LBW rates and prenatal care use between counties with generous health care financing and those with less generous programs are made.

The descriptive analyses are followed by estimation of a series of multiple regression models. The strategy is to begin estimation of regression models on the full sample of counties. Separate regression analyses are then made for the various outcome variables of the study using partition or stratification approaches based on specific modifying variables.

SMOKING CESSATION/RELAPSE PREVENTION IN LOW-INCOME MOTHERS

GRANTEE The Johns Hopkins University

INVESTIGATOR Ruth R. Faden, Ph.D.
The Johns Hopkins University
Department of Health Policy and Management
624 North Broadway
Baltimore, MD 21205
Telephone: (301) 955-3018

GRANT AWARD INFORMATION

Project Number:	MCJ-240562
Project Period:	11/01/87–10/31/91
Grant Year:	2 of 4
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4	Year 5
Awarded:	184,973	222,565			Denied
Requested:	292,934	388,528	372,066	406,973	378,954

SUMMARY

Study Objective

To test the effectiveness of inexpensive, easily administered interventions designed to assist low-income, pregnant women and new mothers who smoke, to quit or to significantly reduce their smoking levels. Specifically, the study seeks to:

1. Develop multicomponent smoking cessation/relapse prevention interventions suitable for use in health care settings that serve low-income, minority women during the childbearing years.
2. Determine the behavioral impact of the multi-component interventions on smoking cessation, relapse and reduction rates, during pregnancy, at delivery, and at 6 weeks, 6 months, and 12 months post delivery.
3. Revise, based on study findings, the interventions in a form that can be easily and widely used in "resource-poor" settings in which health care is frequently provided to low-income, pregnant women and new mothers.

Research Questions or Hypotheses

The general research hypothesis of the study is that pregnant smokers exposed to multiple smoking cessation and relapse prevention interventions will exhibit greater levels of reduction and abstinence than those not exposed. Furthermore, it is hypothesized that the sequential and additive nature of the multiple interventions will have incremental effects on smoking cessation and reduction.

Population and Sample Description

A sample of 900 pregnant women who smoke and are attending the obstetrical clinics of the Johns Hopkins Hospital in Baltimore, Maryland, will be selected for the study. About one quarter of these women will be adolescents. Patients attending the Johns Hopkins Hospital clinics are predominantly low-income women on medical assistance (80 percent); approximately 80 percent are black; most of the remaining patients are white; and this population can generally be expected to reflect the universe of women who receive obstetrical care in university hospital outpatient clinics in inner city, predominantly black communities.

Study Design

A prospective, clinical control trial design is employed. Women are randomly assigned to three intervention groups of equal size (240) as follows:

1. Women who receive prenatal and postpartum intervention;
2. Women who receive prenatal intervention only; and
3. Women who receive no intervention (this is the control group which receives only the usual clinic education).

It is estimated that 180 of the 900 women selected for the study will refuse to participate in the smoking cessation trial. Permission will be requested from these women to review charts, obtain prenatal saliva samples, and to have postnatal telephone followups to ascertain smoking status.

Methods and Procedures

All study participants (Groups 1,2, and 3) are exposed to the routine smoking cessation advice of maternity clinic medical and nursing staff. In addition, in accordance with the study design described, study Groups 1 and 2 receive the prenatal intervention. This intervention consists of six components: a self-help manual aimed at achieving initial cessation, a brief counseling session with a patient educator, staff reinforcement and support, a reinforcement and support manual for spouses and housemates, a self-help manual aimed at relapse prevention, and telephone relapse prevention counseling. The actual process for delivering these components is as follows:

At their first prenatal visit, women selected for Groups 1 and 2 meet individually with the health educator for a 10-15 minute counseling session concerning smoking cessation, program components and use of *The Pregnant Woman's Self-Help Guide to Quit Smoking*. During this session, the woman is asked to set a quit date, which is then recorded by the health educator on the Patient Smoking Checklist which is maintained in the patient's medical record. The woman is also asked to identify who in her home could be most helpful with her quitting.

Following this visit, the reinforcement and support manual for spouses and housemates, *Smoking and Pregnancy: How You Can Help*, is mailed to the individual identified by the woman, with the woman's permission

Shortly before the woman's quit date, the self-help manual aimed at relapse prevention, *The Pregnant Woman's Self-Help Guide to Staying a Non-smoker*, is mailed to the woman at her home. An accompanying cover letter reminds the woman of the availability of telephone counseling.

At each subsequent prenatal visit, the medical staff uses the Smoking Checklist in the medical record as a cue to inquire about the woman's progress toward quitting and to provide reinforcement and support.

Finally, throughout the duration of the study, a telephone relapse prevention counseling service will be in operation. Staffed by the health educators, this provides an opportunity for women in the study to obtain immediate assistance during the quitting process.

Procedures for the postpartum intervention parallel those for the prenatal intervention.

Women in the control group will receive only the usual clinic smoking education (as do all women in the study). The key elements of usual clinic education are:

At the initial visit, if the patient is identified as a current smoker, a nurse briefly discusses with the patient the risks of smoking to the fetus and the mother and recommends that the patient quit during pregnancy. Also at the first visit, the patient is given the March of Dimes smoking and pregnancy pamphlet.

Analysis Plan

Initial hypothesis testing employs Chi-square tests based on dichotomous (continuous and prevalence) abstinence vs. smoking outcomes. The association between the smoking-abstinence outcome and multivariate effects (e.g., age, family composition, parity) is examined using logistic regression models. In addition, life table survival analysis is employed to study in more depth differences in treatment effects, in particular, the effects of treatment at specified time intervals. Life table survival analysis techniques permit the identification of high-risk periods for relapse (e.g., when interventions may be particularly appropriate). Finally, longitudinal data techniques are used for smoking-nonsmoking pattern analysis. Regression models are used to identify differences in the characteristics of subgroups of subjects found to relapse at different high-risk periods.

EARLY INTERVENTION: A COLLABORATIVE STUDY OF ITS IMPACTS

GRANTEE University of Massachusetts

INVESTIGATOR Jack P. Shonkoff, M.D.
University of Massachusetts Medical School
Department of Pediatrics
55 Lake Avenue North
Worcester, MA 01605
Telephone: (508) 856-3028

GRANT AWARD INFORMATION

Project Number:	MCJ-250533
Project Period:	01/01/86–06/30/89
Grant Year:	3 of 4
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4
Awarded:	257,253	331,727	227,811	115,124
Requested:	257,253	339,076	243,046	123,548

SUMMARY

Study Objective

This study's overall objective is to analyze how child, family, and program characteristics relate to child and family outcomes for three target groups served by publicly-supported early intervention (EI) programs in Massachusetts and New Hampshire. The study investigates the differential impacts specific kinds of services have on children and families depending on the nature of the child's disability and the family's characteristics. The long-term objectives of the study are to:

1. Identify more precisely those factors (child, family, service model) that predict the best outcomes;
2. Define the most salient variables to be explored in subsequent experimental studies;
3. Facilitate the ongoing refinement of creative program models to best serve the diverse needs of this heterogeneous population of vulnerable children and families; and
4. Contribute to the development of sound, data-based policy in this area of maternal and child health.

Research Questions or Hypotheses

The study is designed to test the following hypotheses:

1. (a) Changes in child outcomes (social competence, functional behavior/play, and psychomotor/cognitive skills) are better predicted by the child's type of disability than by the level of severity of that disability.

(b) Changes in family outcomes (parental stress, effects on family life, and mother-child interaction) are better predicted by the level of severity of the child's disability than by the type of disability.

2. (a) Changes in parental stress are predicted by parents' satisfaction with their social support network.

   (b) Changes in the effects of a disabled child on family life are predicted by family functioning.

   (c) Changes in mother-child interaction are predicted by the child's temperament.

   (d) Changes in the child's psychomotor/cognitive skills are predicted by the family's level of social support.

   (e) Changes in the child's social competence are predicted by the mother's sense of control.

   (f) Changes in the child's functional behavior/play are predicted by the child's temperament.

The study also addresses the following questions:

1. How much of the variability in child outcomes can be attributed to service variables (staffing structure, service format, service intensity, locus of service, and parent support group participation), controlling for family and child characteristics?
2. How much of the variability in family outcomes can be attributed to service variables, controlling for family and child characteristics?
3. Are certain service variables better predictors of specific child and family outcomes?

Population and Sample Description

The study sample includes 217 children comprising three diagnostic groups: 60 children who have Down syndrome and were < 12 months of age at program entry; 79 children who have a primary diagnosis of motor impairment/cerebral palsy and are between 6 and 18 months of age; and 78 children who have developmental delays of uncertain etiology and are between 9 and 24 months of age. The families of each of these children also participate in the study.

Study Design

The design is non-experimental, hypothesis-guided, and exploratory. It is a detailed analytical study of the ways in which three groups of children and their families change over a 3-year period beginning with initial entry into early intervention through 12 months of service delivery. The focus of the study is on testing a conceptual model of the relationship among family, child, and service variables, and their relationship to specific family and child outcomes in order to determine the variables that are the most powerful predictors of outcomes under study. The research strategy employed reflects the combined knowledge gained

from a comprehensive literature review and an independent analysis of current client and program data for the entire publicly-supported Massachusetts early intervention system. The multivariate approach that is used represents an important prelude to a subsequent experimental study.

Methods and Procedures

Four general methods for collecting data are used in the study: structured interviews with the mother, completion of standardized questionnaires by both the mother and father individually, direct child assessment procedures, and structured data collection from the participating EI programs. The maternal interview and child assessment procedures are completed in a 2-2.5 hour session in the family's home. Standardized questionnaires and stamped, addressed envelopes are left, with instructions, at the end of the session. These are completed by the mother and father individually and then returned to the project staff. The complete protocol, including all instruments, has been pretested on 15 families.

Analysis Plan

Three sets of analytic questions are addressed in this study. In each set, the project examines the relationships between the specific child and family characteristics and a discrete set of child outcomes. The questions and hypotheses which guide the analysis have been derived from a review of the literature on developmentally vulnerable infants and their families and from knowledge of current policy issues in the provision of services to this population.

Each of the three child outcomes and the three family outcomes selected for this study are defined in terms of the amount of measured change from the beginning of a 12-month period to its end. It is important to underscore that the project is not testing whether there are statistically significant changes in each outcome over the 12-month period. Indeed, changes are expected due to maturation, history, and other non-controllable effects. The area of interest in this study is in identifying the best predictors of changes that do occur and to refining understanding of the relationship among variables which contribute to these changes. Specific hypotheses are tested for each outcome measure. Also, an exploratory approach is taken to the data analysis in order to examine the relationships between the service variables and child and family outcomes.

The statistical and conceptual issues related to measuring change are complex and have been investigated by researchers in a variety of contexts. For this study, the definition of change over time requires considerable care, in order to comply with statistical assumptions and limitations. For many of the analyses to be carried out, the use of simple or adjusted change scores may provide a clear picture of the relationships under investigation.

STRESS, BLEEDING, AND FUNCTIONAL STATUS

GRANTEE Massachusetts General Hospital

INVESTIGATOR James M. Perrin, M.D.
Children's Service
Massachusetts General Hospital
Fruit Street
Boston, MA 02114
Telephone: (617) 726-2900

GRANT AWARD INFORMATION

Project Number:	MCJ-250537
Project Period:	11/01/85–10/31/88
Grant Year:	3 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	130,891	146,460	no cost extension
Requested:	172,787	93,886	no cost extension

SUMMARY

Study Objective

This project's main objectives are to:

1. Describe the pattern and surrounding circumstances of bleeding episodes over a six-month period for a large number of boys with hemophilia.
2. Determine whether high ambient stress is correlated with increased frequency of spontaneous bleeding among boys with hemophilia and with greater use of replacement clotting factors.
3. Determine whether the psychological adjustment and competence of the boy with hemophilia affect the relationship between stress and bleeding.
4. Determine whether family factors, specifically socioeconomic status, mother's self-esteem, parenting style, and parent coping abilities, mediate the relationship between stress and bleeding.
5. Describe the relationship between bleeding and child functioning and determine the influence of child and family factors on this relationship.

Research Questions or Hypotheses

This study will test the following hypotheses:

1. Ambient stress, as reported by the boys and parents, will be associated in close proximity with the onset of bleeding episodes. This temporal relationship may work in two directions, i.e., stress produces bleeding and bleeding produces stress. Stress preceding bleeding will be more frequent than bleeding preceding stress.
2. High levels of ambient stress will predict greater use of concentrate.

3. Low maternal self-esteem and poor parental coping skills will add significantly to the effects of environmental stress in predicting the onset of spontaneous bleeding episodes.
4. Low self-esteem and diminished coping capacity in boys with hemophilia will also be predictive of spontaneous bleeding episodes.
5. Increased bleeding is correlated with decreased functional status as indicated by greater school absence and decreased participation in other daily activities.
6. Children who have better coping skills will manifest fewer of the effects of bleeding on functional status.
7. Poor parental coping skills and inappropriate child rearing patterns will increase the effect of bleeding on functional status.

Population and Sample Description

Subjects for this study are recruited from three Tennessee hemophilia programs. The Vanderbilt University Comprehensive Hemophilia Clinic presently has 46 patients under the age of 17 enrolled. The Memphis Program has about 50 children enrolled in their hemophilia program, and the Knoxville program has approximately 30 children enrolled. All families with children aged 4-16 years who attend these clinics are asked to participate in the study. The age range of subjects has been chosen so that the Child Behavior Checklist (CBC) and other child-specific measures can be used with the entire sample of children. In those families where more than one child is hemophilic, one child is randomly selected to participate in the study. Allowing for refusals and attrition, approximately 85 children will be participating in the study.

Study Design

This is a longitudinal, descriptive study, the overall goal of which is to examine the relationship between environmental stress and frequency of bleeding in hemophilic boys, and also the relationship between bleeding and the boys' functional status.

Methods and Procedures

The 85 boys enrolled in the study are followed for a period of six months. The relationship, if any, between family and child ambient stress and bleeding episodes is investigated by obtaining a daily measurement of the dependent variable (bleeding episodes and factor use). This is accomplished through means of a patient diary (or a parent diary in the case of young children). Ambient family stress is measured by the parents' completion of the Holmes and Rohe Readjustment Rating Scale, which is done on a monthly basis, and by completion of Kanner's Family Scale at the time of entry into the study. Child stress is measured by the child's completion of the Johnson and McCutcheon Life Events Checklist (completed monthly), Perrin's adaptation of Barr and Spielberger's Mood Rating Scale (completed weekly), and Perrin's Things That Bother Me Questionnaire (completed weekly).

Family and child variables that may mediate the relationship between ambient stress and bleeding are also measured. Family coping skills are assessed by means of the Health Inventory for Parents (CHIP) given at study entry. Also at study entry, parental self-esteem is measured via the Tennessee Self-Concept Scale, and parenting skills are measured through Perrin's Child Rearing Assessment Protocol. Child mediating variables are measured through use of the Child Behavior Checklist and Ellsworth and Ellsworth's Personal and Role Skills Scale, both administered upon study entry.

The relationship between bleeding and functional status is investigated by examining the correlation between bleeding episodes and factor use and the child's functional status as measured by the daily diary of school attendance and extracurricular home and recreational activities. A part-time nurse or social worker is employed at each of the three centers to enroll the patients and monitor data collection.

Analysis Plan

In the preliminary analysis, summary statistics are generated for each of the measures included in the study. Demographic data such as chronological age, race, socioeconomic status, and level of factor deficiency are also summarized for the total sample. Pearson product-moment correlations are used to determine the relationship between chronological age and frequency of bleeding episodes per unit of time, and level of factor deficiency and frequency of episodes per unit of time. Because it is likely that chronological age and level of factor deficiency are highly correlated with the measures of bleeding, it is necessary to enter these variables as covariates in further analyses of the relationship between stress and bleeding. The data contained in the diary of daily activities is summarized to determine the patterns of usual activity and stressful life events as well as the circumstances of bleeding episodes.

To examine the first hypothesis, a time-based lag sequential analysis is used to determine the temporal relationship between the occurrence of daily annoyances, stressful life events, and the onset of bleeding episodes. The analyses are conducted on the real time records of daily annoyances, life events, and bleeding activity over the six-month data collection period. The emphasis in the study analysis is on the temporal relationship between various categories of stressful life or daily events and bleeding activity. Data analyses done across subjects yield conditional probabilities for this temporal relationship.

To examine the second study hypothesis, a multiple regression technique is used to determine the influence of stress on use of factor concentrate. The factor use by boys is aggregated over the six months of the study and be expressed as factor/unit time. The daily annoyance and mood data is also summed and entered into the analysis. Control variables include chronological age and level of factor deficiency.

Hypotheses three and four are also addressed through multiple regression analyses. In the first regression analysis, bleeding onset on a given day would be conditional on whether a stressor was reported by a parent or child within time T, the chronological age of the child, the child's factor VIII level, and SES. A second analysis includes a series of control variables that may also have a role in the

prediction of bleeding episodes. This analysis scheme permits a determination of the strength of the relationship between stress and bleeding and whether other factors have a role in mediating this relationship.

Hypothesis five is addressed through regression analyses which is conducted with functional status as the dependent variable. Functional status is derived from the school absence and participation in daily activities data. The predictor variables in the first analysis include the child's chronological age, level of factor VIII deficiency, SES, and frequency of bleeds per unit of time. Hypotheses six and seven are tested by adding the child adjustment/self-esteem, the Tennessee Self-Concept Scale, CHIP, and Child Rearing Assessment Protocol data to the equation used to test hypothesis five. By adding these variables, it is possible to determine the relative contribution of these child and parent coping variables in predicting functional status as compared with bleeding.

AN INSTRUMENT TO SCREEN AND CLASSIFY PREGNANT WOMEN ACCORDING TO NUTRITIONAL STATUS

GRANTEE Harvard University School of Public Health

INVESTIGATOR Jane D. Gardner, D.Sc.
Harvard University School of Public Health
Department of Maternal and Child Health
677 Huntington Avenue
Boston, MA 02115
Telephone: (617) 732-1080

GRANT AWARD INFORMATION

Project Number:	MCJ-250553
Project Period:	05/01/87–04/30/89
Grant Year:	2 of 2
Type of Grant:	Continuation

Costs:	Year 1	Year 2
Awarded:	104,755	113,650
Requested:	108,020	92,236

SUMMARY

Study Objective

The main objectives of this study are to develop and test an instrument that can be used by non-professional personnel to screen low-income pregnant women for nutritional risk; to determine the practicality of administering a questionnaire using interactive computing; and to investigate nutrient intake patterns that are important to health service delivery.

Research Questions or Hypotheses

The study addresses four major questions:

1. Does the food frequency questionnaire (FFQ) provide a reasonably accurate means of classifying pregnant women according to nutritional risk?
2. Can the FFQ be successfully administered by nonprofessional personnel in computerized as well as print form, thereby saving on costs?
3. How is estimated nutrient intake from food and supplements associated with selected demographic and medical variables?
4. Which methods used for testing the instrument in this study would be useful in other investigations involving low-income populations?

Population and Sample Description

The study population is English- and Spanish-speaking pregnant teens and women (any parity, any gravity) receiving care in any of five designated Community Health Centers receiving Maternal and Infant Care funds in Massachusetts. Most of the

clients served by the clinics are at risk from one or more characteristics. They may be:

1. Less than 3 years post-menarche;
2. Either black or Hispanic;
3. Low income (≤ 185 percent of poverty level);
4. Poorly educated (less than high school education);
5. Underweight or overweight (<90 percent or >120 percent of standard) pre-pregnant weight for height;
6. Previous adverse pregnancy outcome;
7. Pregnant within one year of their last term pregnancy;
8. Involved in or were previously involved in alcohol or substance abuse;
9. Disadvantaged in terms of social support; or
10. Multiparous.

Study Design

This study is primarily evaluative in nature, and it provides for:

1. The development and evaluation of an instrument for use in classifying low-income pregnant women according to nutritional risk;
2. Testing the practicality of questionnaire administration via computer or ordinary print medium, both for self-administered and staff-administered cases;
3. Consideration of methodological issues pertaining to the evaluation of the instrument and;
4. Exploration of associations between food/nutrient intake (obtained by using the instrument) and selected demographic and medical variables.

The proposed instrument is the FFQ with supplementary questions relevant to prenatal nutrition. The FFQ is designed to be self-administered or administered by non-professional personnel. It is available both in print form and as a user-friendly software package for use in a low-cost microcomputer.

The instrument is used to determine the pregnant woman's approximate position on the continuum of nutrient intake, ranging from poor to excellent. Use of the FFQ will facilitate appropriate referral and treatment of those at greatest risk for nutrition problems. A long range goal is to use the FFQ for collecting dietary data in wide-scale epidemiologic studies of associations between nutrition and pregnancy outcomes.

This research evaluates the instrument by investigating the FFQ's stability as well as selected aspects of its validity, and by determining how reproducibility and validity measures are associated with methods of questionnaire administration and characteristics of the mothers. Pertinent data on the practicality of administering the instrument in the clinic setting by each of the methods (self-print, self-computer, clerk-print, clerk-computer) are collected, analyzed, and interpreted.

Methods and Procedures

The study examines factors affecting test-retest correspondence; and also trade-offs in number of subjects versus number of replications of diet recalls from the same subject when validating an FFQ by the means of diet recalls.

The instrument (FFQ) is used to identify patterns of self-reported intake of nutrients from foods and supplements by selected demographic and health groupings, by clinic site, by participation in the Supplemental Food Program for Women, Infants, and Children (WIC) and by method of payment. This allows exploration of the extent to which adherence to recommended food and supplement intake is influenced by prenatal care delivery practices and by whether or not dietary supplements are available without charge. It will also provide baseline data and generate hypotheses for subsequent investigation of any associations that might affect health care delivery.

In the past, many studies of methods for gathering dietary data have used well-educated subjects because a high level of cooperation was assumed present in such a population. It cannot be assumed that instruments tested in such populations will yield the same results when used with a less literate, less advantaged population. Methods used in this research are adapted from "standard" evaluative methods in order to make them suitable for a population with below-average literacy.

Study site selection is based on size of prenatal population served and on the willingness and ability of the clinic to cooperate with the study design. Consent of each of the local boards of directors is required. In order for a clinic be included in the study, the clinic needs to be equipped to accomplish the following:

1. Designate clinic personnel to participate in a training session to learn proper administration of the FFQ in both print and computerized forms;
2. Ask all English- and Spanish-speaking pregnant females to complete the FFQ as a part of routine clinic care for a specified time period;
3. Provide clients with information about the study; ask clients for signed consent to release data from the client's medical record to the investigator; obtain client's permission to be contacted by the investigator for the purpose of scheduling appointments to obtain a second completed FFQ or four 24-hour recalls and a second FFQ; and
4. Obtain permission to release the client's phone number and address to the investigator; obtain signed forms from consenting clients; compile lists of consenting subjects for repeat FFQ and/or 24-hour recall; and make medical record data available to the investigator.

Analysis Plan

Data analysis procedures to address the major questions of the research include several components: descriptive statistics for the variables, correlations between selected variables, investigation of intra- and inter-individual variation via analysis of variance, use of multivariate models, and investigation of the extent of misclassification resulting from different dietary data collection methods.

Certain nutrients (calcium, iron, zinc, Vitamin A, and Vitamin B-6) are given a detailed analysis. Among these, zinc, while not generally considered an index nutrient, is studied here because of its suspected association with human pregnancy outcomes.

Because it is has been anticipated that estimated nutrient intake scores will include a few unreasonable data points and may not be normally distributed, analysis methods which provide increased robustness and resistance are used, for example, stem-and-leaf and boxplots. If, after appropriate transformations (as needed) are applied, distributions are close to normal, then Pearson's product moment correlations are used. Otherwise, nonparametric correlations are used, for example, Spearman's rank order correlation.

Regression is used to control for possible confounding variables when investigating t' ssociation between two diet scores. Ordinary least squares regression (OLS) i. ed to identify those non-dietary variables with coefficients significantly different from zero and those that produce the model that best accounts for variation in a given nutrient score, considering trade-offs between bias and variability. Regression diagnostics are used to identify questionable observations, and results are compared when suspect points are removed versus retained in the regression. In addition, biweight regression is used for "best models" describing associations between non-dietary variables and nutrient scores. Coefficients obtained from biweight regression are compared with those obtained from OLS.

THE INFANTS OF DEPRESSED ADOLESCENT MOTHERS

GRANTEE Trustees of Health and Hospitals of the City of Boston, Inc.

INVESTIGATOR Howard C. Bauchner, M.D.
Boston City Hospital
818 Harrison Avenue
Boston, MA 02118
Telephone: (617) 424-4235

GRANT AWARD INFORMATION

Project Number:	MCJ-250559
Project Period:	12/01/87–02/28/90
Grant Year:	2 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	79,550	80,673	
Requested:	79,550	80,673	18,642

SUMMARY

Study Objective

The objective of this study is to determine whether or not infants of depressed adolescent mothers have poorer outcomes than infants of nondepressed adolescent mothers.

Research Questions or Hypotheses

This study examines the following hypotheses:

1. Approximately 40 percent of adolescents who have children will be depressed during the first year of their infants' lives.
2. Other maternal characteristics which place young children at risk, such as drug use, cigarette smoking, alcohol consumption, and lack of social support, will be significantly associated with maternal depression.
3. Infants of depressed adolescent mothers will have poorer development, decreased growth, and more accidents than infants of adolescents who are not depressed, after controlling for confounding variables.

Population and Sample Description

The Maternal Health Habits Study, which began in July 1984 and is being conducted at Boston City Hospital, is the source of patients for this study, as well as the Drug Use Patterns Study. In this study approximately 120 adolescent mothers and their infants are followed for a period of one year. Maternal criteria for enrollment into the study are:

1. The mother consents to participate in the study.
2. The mother speaks either English or Spanish.
3. The mother has a telephone or address where she can be contacted.
4. The mother is less than 18 years of age when she registers for prenatal care.

The actual subjects of the study are the healthy newborn infants of these mothers.

Study Design

The study uses a prospective, cohort design. The independent variable is maternal depression as measured by the Beck Depression Scale, administered at six and twelve months postpartum. Infant outcomes, including growth, development, and infant temperament, are the dependent variables and are measured at 6 and 12 months of age. Other known correlates of the outcomes of interest such as maternal use of drugs, age, ethnicity, and social networks are also measured in this study.

Methods and Procedures

The 120 adolescent mothers participating in the study are evaluated for presence or absence of the independent variable, maternal depression, by means of the Beck Depression Inventory which is administered twice. The first testing occurs at the six-month, well-baby clinic visit, and the second test is administered at the one-year clinic visit. The scale is administered twice so that the chances of detecting infants of depressed mothers can be increased, and to allow the investigators the opportunity to track the course of depression over a six-month period.

The outcome variables to be measured are infant growth, development, health, and temperament. In the case of infant growth, there are a number of difficulties in terms of attribution of growth decrements to either adolescent pregnancy or maternal depression. This study hopes to address these difficulties by means of a "value-added" approach to the traditional statistical methodology. The procedure in the value-added approach is to estimate expected growth in the absence of any intervening condition (in this case, a depressed mother), and then to subtract this expected growth from the actual growth. The result is the value added or lost due to exposure.

A questionnaire designed specifically for this study is used to evaluate the second infant outcome variable, health, and is administered at the six-month and one-year clinic visits. The mothers will fill out the questionnaires at these visits and, with maternal permission, a subsample of those questionnaires which mention surgery, hospitalizations, or emergency room visits will be further documented. Also, inquiries are made concerning routine health care for the infant, including number of immunizations, and again, a subsample of these responses are verified.

To measure infant development, the Bayley Scales of Infant Development (Mental and Motor Scales and Infant Behavior Record) are administered to each infant at one year of age. Infant temperament is measured at the six-month clinic visit using the Carey Infant Temperament Questionnaire. It is believed that if distinct

differences emerge between the infants of depressed and nondepressed mothers, the Carey may provide the basis of an educational intervention that would foster adaptive behavior between mothers and their infants.

The last category of variables which the study examines are the maternal sociodemographic characteristics including: age, family income, education, marital status, life stresses, social network, and the use of drugs and alcohol during and after pregnancy. Information on these characteristics is obtained from data collected in the Drug Use Patterns and Maternal Habits Study.

Analysis Plan

The goal of this study's statistical analysis is to define the prevalence of depression among adolescents who have children, and to determine if there is an independent relationship between maternal depression and infant outcome. Initially, the study examines the univariate associations between maternal depression and the outcomes. Maternal depression is treated as a categorical variable. The mothers are scored as either depressed or nondepressed, at first, but all analyses are investigated with the mothers scored as depressed, moderately depressed, or nondepressed.

Infant growth rates and the Bayley scores are treated as continuous variables, while infant health and temperament are treated as categorical variables. For the continuous variables, ANOVA is used to test for differences, and for the categorical variables, Chi-square is used to test for between-group differences. Univariate associations between potential confounding variables such as age or socioeconomic status and maternal depression are then explored. The variables that are found to be significantly associated with depression or study outcomes will subsequently be controlled for as confounders in the final data analysis.

Multiple regression analysis is used to test for between-group differences on the continuous outcome variables, while controlling for the confounders. In these analyses, categorical confounders such as social support are represented by a series of indicator variables. On outcomes that are categorical, multiple regression techniques are used to test for differences between infants of depressed and nondepressed mothers while controlling for confounding variables.

GRANDFATHER INFLUENCE ON YOUNG CHILDREN OF TEENAGE MOTHERS

GRANTEE University of Michigan

INVESTIGATOR Norma E. Radin, Ph.D.
University of Michigan
School of Social Work
1065 Frieze Building
Ann Arbor, MI 48109-1285
Telephone: (313) 763-6257

GRANT AWARD INFORMATION

Project Number:	MCJ-260543
Project Period:	10/01/86–09/30/89
Grant Year:	2 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	190,957	190,052	no cost extension
Requested:	213,019	195,908	no cost extension

SUMMARY

Study Objective

To investigate whether the father of an adolescent mother can, through his active parenting:

1. Fill the role of surrogate father to his grandchild and foster the child's development;
2. Reduce the stress on the adolescent mother and reduce burdens on the grandmother; and
3. Reduce competition between the mother and grandmother for the role of primary caretaker.

Research Questions or Hypotheses

Two central hypotheses guide the study:

1. The greater the *quantity* of grandfather involvement with the young child of the teenage mother, the higher the level of cognitive development and the more adaptive the socio-emotional functioning of the young child at 12 months and at 24 months of age.
2. The better the *quality* of the grandfather involvement with the young child of the teenage mother, the higher the level of cognitive and socio-emotional functioning of the young child at 12 months and at 24 months of age.

Population and Sample Description

One hundred and sixty teenage mothers are selected from a population of school-age mothers who are enrolled in the Teenage Parent Alternative School Program (TPASP) of the Wayne County Intermediate School District in Lincoln Park, Michigan. One hundred live with both their mother and their father; and 60 live with their mother only. It is estimated that of the 211 students enrolled in TPASP during the 1984-1985 school year, all but seven were female, and almost all were white, a reflection of the blue-collar to middle-class composition of the community served by the program. Approximately one-half of the mothers will have one-year-old children and approximately one-half will have two-year-olds when the child assessment is made. Additional criteria for participation in the study are that no other adult male is living in the home, that the baby is a first-born, and is not low birthweight.

Study Design

A descriptive correlational design is employed.

Methods and Procedures

All teenage mothers and parents who meet the criteria for inclusion in the two study groups are sent a letter signed by the Director of TPASP inviting them to participate in the study. The study involves interviews at home with the grandparents of the child and a 10-minute videotaped session of grandparent-child interaction, plus an assessment of the child and interviews with the mother (at home or school, and at a separate site). If acceptances are received from more than the required number of mothers in either or both of the two groups, a random sample will be selected from within each age-of-child group. The remaining teen mothers will be put in a reserve group to be used only if a mother in either group leaves the program prior to completion of the assessment.

Mothers and their children are seen for two sessions. In the first session, mothers are interviewed at home for approximately one hour on the subjects of their relationship and involvement with their child. At the conclusion of the interview, the Bayley Scales of Infant Development are administered to the child in the presence of its mother. Interviewers are extensively trained in both the administration of the interview and the Bayley Scales.

Following the first session, mothers and their children are scheduled to come to the Merrill-Palmer Institute for a 68-minute semi-structured laboratory play procedure. These procedures are slightly modified from the procedures used to measure the grandparent-child relationship and are incorporated in the laboratory session to maximize efficiency of data collection. At the conclusion of the interview, mothers complete a 100-item Q-sort.

Analysis Plan

Data reduction activities precede the planned analyses which, for the most part, utilize hierarchical multiple regression procedures. Hierarchical multiple regression

procedures are employed to control the influence of demographic variables and to determine whether variables suggested as mediators in the causal model guiding the study mediate the influence of the independent variables on the dependent variables. If the hierarchical multiple regression analyses suggest direct as well as indirect effects for the independent variables, a path analytic model will be employed. A manifest path model rather than a latent one will be used as the study will create its own indices for the mediating variable on an a priori basis. It will not be possible to evaluate the fit, however, because of the large number of paths proposed in relation to the number of correlations and the relatively small sample size.

IMPROVING MEMORY OF EMR CHILDREN

GRANTEE Wayne State University

INVESTIGATOR Hilary H. Ratner, Ph.D.
Psychology Department
71 West Warren
Wayne State University
Detroit, MI 48202
Telephone: (313) 577-5244

GRANT AWARD INFORMATION

Project Number:	MCJ-260554
Project Period:	07/01/87–12/31/89
Grant Year:	2 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	85,095	89,429	
Requested:	127,957	134,646	33,689

SUMMARY

Study Objective

The study's objective is to develop instructional strategies for educable mentally retarded (EMR) children that are embedded in a social context and which would enhance children's memory performance across time and situation. Specifically, the project tests the use of a 12-week training program in which the subject children's memory skills will be exercised and developed through the use of demand conditions and self-generated memory strategies. With the accomplishment of this objective, it is hoped that EMR children will reach a more nearly normal level of functioning in society.

Research Questions or Hypotheses

The study was designed to test the following hypotheses:

1. Stimulation by means of memory demands increases the memory capabilities of both EMR children and children in the normal I.Q. range.
2. Relative to the control conditions involving no demand, EMR children show significantly greater improvement than children in the normal range.
3. Prior demand plus prompting is superior to prior demand without prompting—and the no-demand condition proves the most inferior (in fact, it is the control condition).
4. Demand conditions that promote self-generated strategies facilitate memory development more than those that promote other-generated strategies.
5. While there is a significant main effect for self- over other-generated, there is no reason to believe that this superiority appears in the no demand control conditions—indeed, if there is any difference between these two control

conditions, it could be in the direction of superiority of other-generated over self-generated.

6. If the internal dialogue initiated by prompting proves to be a more powerful predictor of success than locus of strategy, *vis à vis* later retention, both demand-plus-prompting conditions may show extremely great pretest-posttest differences, irrespective of locus of strategy generation. In that case, the superiority of self- over other-generated strategies may appear most strongly in the demand-without-prompting condition, and be relatively small in the demand-plus-prompting condition.

Population and Sample Description

Twenty EMR and 20 "normal" children, who are from the population of Detroit public school children, are randomly assigned to each of the six conditions, with the restrictions that: (a) subjects in the various conditions are matched for SES using the Hollingshead Two-Factor Index of Social Position; (b) both black and white children residing in the metropolitan Detroit area are included in the study and are assigned in equal proportion to all conditions; (c) an approximately equal number of girls and boys are assigned to each condition. Sixty EMR and 60 "normal" children participate each year for the two-year duration of the project.

Previous preschool/early intervention experiences are noted and documented for later analysis if warranted. In addition, the etiology of the retardation is assessed from school records as either familial/cultural or organic. Those whose retardation occurs because of inadequate early learning environments would be expected to profit more from the intervention program than those with organic problems.

Children in the EMR target group must meet three criteria: (1) Stanford-Binet assessed I.Q. of between 50 and 70; (2) identification as EMR by the local school district and eligible for special education services in that category; and (3) parents' and teachers' approval for participation in the study.

Children included in the "normal" comparison group must meet four criteria: (1) Stanford-Binet assessed I.Q. of between 90 and 110; (2) ineligibility for any special education services as determined by the local school district; (3) age between 4.5 and 6 years; and (4) parents' and teachers' approval for participation in the study.

Study Design

This study is experimental and uses a pretest–intervention/treatment–posttest design. It is essentially a 3 x 2 design in which there are a total of six treatment conditions. There are three levels of memory demands (demand and prompt; demand only; and no demand). Then there are two types of strategy acquisition (self-generated and other-generated). These conditions and strategies are crossed to yield the 3 x 2 design.

Methods and Procedures

The study procedures begin with a pretest which assesses the children's I.Q.'s as well as the children's memories. On the basis of this information, children are randomly assigned so that groups are matched across the six treatment conditions. Following enrollment into these six groups, training takes place over a 12-week period. The training sessions consist of the presentation of a variety of experiences that may or may not involve remembering, depending on the nature of the particular treatment group. Children are assigned to one of two general treatment strategies: self-generated or other-generated. These strategies are crossed by the three conditions: no demand, demand only, and demand plus prompt, thus yielding the six overall treatment conditions. Children assigned to the no-demand treatment groups experience the same instructional materials but do not have demands placed on them to remember. By experimentally introducing an increase in the memory demands that children encounter, and comparing posttest performance to essential control groups, the project conducts the strongest test of the hypotheses possible. In the control conditions, children are never asked to remember until the posttest sessions. However, they spend the same amount of time with an experimenter as do children in the experimental conditions, and they are exposed to the same tasks and materials. These are the most critical aspects to control in an intervention program because the variables of increased social stimulation (e.g., time, attention, enjoyment) and increased task familiarity are strong potential confounders of the intervention's effect.

Following the 12 weeks of training, the children are posttested on a series of memory assessments that are particularly like the instructional tasks they have experienced during the training, as well as on tasks which are distinct from those they have experienced. At posttest, an evaluation is made not only of memory improvement but of whether or not memory strategies that have been learned are deployed in novel situations.

Analysis Plan

The data collected on the children's memory performance and their utilization of strategies is examined in a 3 x 2 analysis of variance model representing three conditions and two strategies. Gender of the child is also a factor in this analysis, as is whether the child is an EMR or a control ("normal") child. In the analysis of variance, pretest scores are used as covariates. This procedure eliminates the possibility that between-group differences at posttest are simply chance resulting from between-group differences in characteristics. For transfer tasks in which there are no pretest measures, the covariate is performance on the pretest task which is most highly correlated at the post-test.

The choice of univariate or multivariate analysis depends on the intercorrelations among the dependent measures for each recall test. Separate analyses are conducted for each of the recall tasks unless performance is correlated across tasks as well as within tasks. For tasks involving multiple trials, performance on each trial is considered as a separate dependent measure.

ANTHROPOMETRIC STANDARDS FOR THE EVALUATION OF GROWTH AND NUTRITIONAL STATUS

GRANTEE University of Michigan

INVESTIGATOR Roberto A. Frisancho, Ph.D.
University of Michigan
Center for Human Growth and Development
Ann Arbor, MI 48109
Telephone: (313) 764-8577

GRANT AWARD INFORMATION

Project Number:	MCJ-260560
Project Period:	10/01/87–09/30/89
Grant Year:	1 of 2
Type of Grant:	Continuation

Costs:	Year 1	Year 2
Awarded:	90,144	no cost extension
Requested:	91,561	no cost extension

SUMMARY

Study Objective

The aim of this project is to establish new anthropometric standards that give information on height, weight, skinfold thickness, body circumferences, and estimates of body muscle for children and adults.

At present, evaluations of growth and nutritional status of children and adults are done with reference to growth curves and height. These growth curves, because they do not provide information on body fat and body muscle, are ineffective in accurately distinguishing the truly malnourished child from the merely underweight. Likewise, they are ineffective in distinguishing the truly obese from the normally heavy child. Thus, there is a critical need for an anthropometric standard that can permit evaluations of growth not merely in terms of height and weight but also in terms of the components of excessive weight and underweight and thus accurately determine the nutritional status of children. This kind of information is necessary for the implementation of health programs addressed at improving the health and nutritional status of children and mothers.

Research Questions or Hypotheses

A general assumption in the evaluation of human growth and nutritional status is that the evaluation standard embodies desirable qualities which the individual or population aims to reach. In terms of nutritional status it is now generally accepted that both excessive fatness and excessive leanness are associated with negative risk factors. Therefore, in order to be considered desirable, an anthropometric standard should be based upon individuals who are neither excessively fat nor excessively lean. Since the NHANES I and II data were obtained in order to derive representative samples of all segments of the U.S. population from the

anthropometric point of view, it includes individuals with undesirable traits as well as those with desirable traits. Therefore, these anthropometric data cannot be used as standards, although they have been so used previously.

Population and Sample Description

This study is based upon a desirable sample selected from the combined data sets of the first and second National Health and Nutrition Examination Surveys (NHANES I and II) of 1971–1974 and 1976–1980, including 44,130 individuals ranging in age from 1 to 74 years.

Age- and sex-specific percentiles for triceps and subscapular thicknesses are established. Then all those individuals whose tricep and subscapular skinfolds are either above the 85th or below the 2nd age- and sex-specific percentiles are excluded from the sample. This procedure leaves a total sample of 31,282 desirable examinees ranging in age from 1 to 74 years.

Study Design

This study is synthetic in nature; it synthesizes standards from available, existing data. Standards are designed that permit evaluations of growth and calorie and protein reserves of children and adults. The project publishes these new standards as a monograph in one of the journals devoted to health and nutrition. The book also includes methods and techniques for the collection and interpretation of anthropometric data on both children and adults.

The study is based upon measurements of weight, stature, triceps skinfold thickness, subscapular skinfold thickness, upper arm circumference, and elbow breadth. In addition, anthropometric indices such as body mass index, sitting height index, upper arm muscle area, and arm fat index are also included. Standards are constructed with the exclusion of those individuals who were either excessively fat or excessively lean as evaluated by triceps and subscapular skinfold thicknesses.

Methods and Procedures

In order to determine the health significance of this approach the blood pressures and serum cholesterols of the excluded obese individuals (above the 85th percentiles for triceps and subscapular skinfolds) are compared to ... non-obese sample. If this comparison shows significant differences, then the rationale for excluding the excessively fat and excessively lean individuals is accepted as correct.

Analysis Plan

The analysis is carried out in three stages:

1. First, age- and sex-specific percentiles of triceps and subscapular skinfold thicknesses are calculated. Then, the subjects who are excessively lean

(skinfold thicknesses at the triceps and subcapular below the 2nd age-, sex-, and race-specific percentile) or excessively fat (skinfold thickness at the triceps and subscapular above the 85th age-, sex-, and race-specific percentile) are excluded from the total sample. In this manner, the sample to be included in the standard are based upon a sample whose characteristics are considered healthy and desirable.

2. Tabular data are constructed, to include calculations of means, standard deviations, 5th, 10th, 15th, 25th, 50th, 75th, 85th, 90th, and 95th percentile of the anthropometric dimensions. These data are presented by age and sex groups both in tabular and graphic form using the dimensions of age, sex, height, frame size, weight, stature, body mass index, sitting height, sitting height index, elbow breadth, upper arm circumference, triceps skinfold thickness, subscapular skinfold thickness, sum of skinfold thicknesses, total upper arm area, upper muscle area, upper arm fat area, and arm fat index.

3. Various approaches have been used to evaluate the growth and nutritional status of children and adults. Since this method does not take into account the fact that variability in the relative width for age does not have the same meaning across ages, this study uses Z-scores, which permit cutoff points to be defined by extrapolation beyond the observed outer percentiles of the original reference data, to establish five anthropometric categories based on both standard deviation units and percentile ranges of upper muscle area by stature.

COST OF FOLLOWUP CARE FOR PREMATURES

GRANTEE University of Rochester Medical Center

INVESTIGATOR Klaus J. Roghmann, M.D.
Department of Pediatrics
University of Rochester Medical Center
Box 777
601 Elmwood Avenue
Rochester, NY 14642
Telephone: (716) 275-2995

GRANT AWARD INFORMATION

Project Number:	MCJ-360511
Project Period:	10/01/84–09/30/88
Grant Year:	3 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	84,688	102,626	91,138
Requested:	86,604	101,959	93,010

SUMMARY

Study Objective

The objective of this study is to document the cost of followup care (inpatient and outpatient) for premature infants born in a multi-county area in the state of New York, and to disaggregate what portion of that followup care derives from prematurity status per se and from pre-existing risk factors present in the population from which premature births come.

Research Questions or Hypotheses

Several expectations guide the study:

1. Rehospitalization and minor morbidity cared for in ambulatory settings is much more frequent in prematures than in full-term infants. A major part of this excess or differential derives not so much from prematurity status but from the fact that prematures come from a population that is generally at higher risk (i.e., socioeconomic status, parity, etc.) than non-prematures.
2. When the additional higher risk alluded to above is controlled, either statistically or by study design, a significant proportion of the difference in care use and cost of care between prematures and non-prematures is eliminated.
3. Morbidity differentials between prematures and non-prematures decline rapidly with increasing age.
4. Only a minor portion of the cost of care for prematures is paid out-of-pocket.

Population and Sample Description

Study subjects are all prematures seen at the neonatal intensive care unit of Strong Memorial Hospital in Rochester, New York, during the calendar years 1980, 1981, 1982, and 1983. Most, but not all of these, are born at Strong Memorial with the rest being transports from other hospitals in the region. Nearly 700 cases and 700 controls are expected to enter the study each year. Controls are matched for sex and corrected age; area of family residence; age, race and education of mother; hospital initially chosen for the delivery; category of pediatric care provider chosen; and insurance status. Multiple births are excluded. The first two cohorts, born in 1980 and 1981, will enter school during the three-year study period.

Study Design

An overall prospective matched cohort design is employed, custom fitted to the databases that are to be utilized and the research questions that are to be answered.

The designs needed to respond to the hypotheses posed in this study are multivariate study designs which can be customized to fit the given database. Within this design category, this study will use what is known as "implication studies." In terms of medical care research, this study would be termed a prospective cohort design with multiple outcome measures for the utilization components. The focus in this study is on absolute and relative risks, or the attribution of various risks to various sources. Economic evaluations and the elaboration of implications for service planning are the appropriate higher level analyses. A special strength of the design for the utilization component is the use of matched controls. Followup studies of prematures have rarely used controls. If only the excess mortality, morbidity, and utilization due to prematurity are to be assessed, then it is extremely important to control for possible confounding factors preceding prematurity, such as poverty and low educational status.

Methods and Procedures

The costs of medical care for premature infants through the age of six are analyzed using two interrelated studies, the first focusing on inpatient care and the second on outpatient care. The study uses the following databases: the Rochester Area Hospital Corporation's cost experimental database, the Blue Cross of Rochester Area database, the local health department's vital statistics files, and a Perinatal Data Bank and Neonatal Continuing Care database. Using these databases, relevant information will be gathered for infants admitted to the NICU and also for a group of matched controls, covering birth cohorts from 1980 to 1983. The medical care experience of these infants will be followed through 1986.

For a period of four to seven years, the first study tracks nearly 2,800 premature infants and their matched controls, recording all charges for their medical care in Rochester area hospitals and recording all their Blue Cross claims. The second part of the study examines the ambulatory care experience of a subset (approximately 15 percent) of the premature infants. These infants have matched controls, chosen according to a strict protocol from among their pediatricians'

regular patients. Through these procedures, it is hoped that precise data on the cost of later pediatric care for premature and the correct attribution of these costs, either to prematurity or to pre-existing risk factors, may be determined.

Analysis Plan

A two-step approach to data analysis is planned. The first step is descriptive in focus and will include the production of summary statistics such as admission rates, days admitted rates, and average charges by service and by diagnostic category. Standard errors are computed to allow easy testing for significance. The second step focuses on the economic evaluation of the medical processes utilizing effectiveness, efficiency, benefit, and utility arguments. Multiple regression techniques are used in this part of the analysis. Since individual data are organized as event sequences, this allows for dynamic analysis using survival techniques.

A LONGITUDINAL STUDY OF SERVICE USAGE BY A RUBELLA COHORT

GRANTEE Research Foundation for Mental Hygiene, Inc.

INVESTIGATOR Patricia R. Cohen, Ph.D.
Research Foundation for Mental Hygiene, Inc.
New York State Psychiatric Institute
722 West 168th Street
New York, NY 10032
Telephone: (212) 928-0631

GRANT AWARD INFORMATION

Project Number:	MCJ-360528
Project Period:	10/01/85–09/30/88
Grant Year:	3 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	159,557	179,648	150,769
Requested:	192,804	188,874	172,760

SUMMARY

Study Objective

To study the transition to adulthood of a cohort of children who are deaf and multihandicapped because they were born with congenital rubella. The proposed study seeks to assess the consequences of alternative educational and institutional treatment methods on these handicapped young adults, and to investigate barriers to services based on ethnicity and social class.

Research Questions or Hypotheses

Five broad questions guide the investigation:

1. What have been the mechanisms of the differential access accorded minority children with hearing and other handicaps with respect to treatment and to residential and educational alternatives?
2. What are the reactions, problems, and suggestions of families with regard to experienced and desired services for their handicapped children?
3. What have been the effects of the alternative services models for handicapped children and youth—including mainstreaming for deaf children and normalization for retarded children?
4. What are the life situations, problems, and future expectations of handicapped youth as they enter adulthood, and what are the service implications of their current status?
5. What are the long-term effects on families of having a rubella-handicapped child, and how are these effects modified by the family's experiences with varying service options?

Population and Sample Description

The subjects of the study are former participants of a longitudinal investigation which studied a group of New York City children who were assembled in a citywide effort to assess and counsel families with children who had contracted congenital rubella during the rubella epidemic of the early 1960s. Of the confirmed rubella children, 80 percent of the families agreed to participate in the original study. Most of the children were between the ages of three and five at the time of the initial study.

The present study sample consists of 248 children: 158 white, 39 black, and 51 Puerto Rican; 125 girls and 123 boys; 150 with older siblings and 158 with younger siblings. The group has a mean Hollingshead score of 3.3, with 26 in class I, 38 in class II, 69 in class III, 66 in class IV, and 49 in class V. One hundred and seventy-three children live with both natural parents; 44 live with a mother who is either separated or divorced; 315 live with a mother and stepfather; three live with a widowed mother; and nine live with foster parents or family members other than parents. Four children are adopted.

Study Design

A longitudinal, comparative design is used. Its longitudinal aspect is reflected in the fact that major data collection efforts have taken place at three previous points in time, the first nearly two decades ago. The study is comparative in two respects. First, children were unselected for the level and type of handicap. Second, the study design itself calls for interviews of mothers and youth on instruments substantially overlapping with those that will be employed concurrently with a geographically-based, random cohort of youth of the same age.

Methods and Procedures

Since the current investigation is a continuation of earlier long-term followup activities, the first task undertaken was to transfer the trust and loyalty of the families to the ongoing study. One important part of this has been to assure families of the continued association of the study with the original investigators, and another is to continue the study with the same understanding of service provision needed.

For the most part, new data are obtained through interview and then merged with information already collected by the study of the cohort through childhood and adolescence. There are essentially two kinds of interviews: parent and youth.

Parent interviews are conducted by a trained lay interviewer. Some interviews may be conducted in whole or in part in Spanish, as was done in the earlier phases of the study. The content of the interview overlaps substantially with what was used in the coordinated epidemiological study of a random sample of youth. Modifications in this interview for parents of severely retarded children are made as needed, with substitution of more appropriate assessments of current functional level of these youth. In addition, special sections designed to measure problems, barriers, and satisfaction with service have been added.

Service usage questions cover information regarding availability, use and satisfaction or dissatisfaction with services, and unmet needs of handicapped youth. Services are defined as contact with any medical, psychological, social, educational, or other agency or professional for the purpose of seeking information or help regarding the child.

The impact-on-the-family section of the interview involves parents' or guardians' reports of the following: satisfaction with the child, affectional relationship, quality of parent-child communication, and the child's resistance to parental control. Although these measures describe the interactions, rather than the consequences of the interactions, they are of critical importance in determining the mechanisms or mediating variables accounting for impact as measured by the parents' own status. The parents' own personality and attitudes, ability to cope, and symptomatology are measured as above.

The youth interviews are conducted at the residence of the youth or, at the youth's option, at the study office. These interviews are conducted by a trained signing interviewer, in sign or orally, as appropriate and preferred by the youth.

The interviews are designed to be completed in a maximum of two to three hours, including time for sign interpretation. The following sections are covered in the interviews: quality of the environment, quality of life, satisfaction with aspects of life, and the Child's Priority Sort.

The interview also includes measures of self-concept, personality, family relationships, and the Diagnostic Interview Schedule for Children (DISC). This diagnostic interview schedule is designed to produce DSM III psychiatric diagnoses on the basis of responses to structured questions. Although not originally designed for youth as old as this cohort, it is preferred because:

1. No adult instrument has been established for parallel information from self and from an informant such as a parent;
2. There is a psychometric advantage to an instrument that includes multiple questions for each diagnostic criterion; and
3. The DISC allows assessment of certain problems that are historically linked to deafness.

Analysis Plan

The overall strategy for data analysis is consistent with the following particulars: first, all other operations on the data are preceded by a careful inspection of univariate, bivariate, and conditional relationships; and second, all the analyses are carried out by means designed to maximize the subject to statistical test ratio and the power for finding real effects. One means of doing both is condensation of single questions into more robust composites. The many questions included in the past wave of the large epidemiological study have been entirely condensed into a much smaller number of psychometrically sound scales, and these scales have been subjected to "higher order" factor analyses so that even fewer, less redundant measures may be used for many analyses. Another way of reducing the total number of statistical tests is to measure critical independent variables as single ordinal variables rather than as categorical variables.

In addition, the analyses will employ omnibus significance tests for the hierarchical contribution of sets of variables to the estimation of multiple dependent variables.

The third major data analysis approach to be used is the employment of structural equation causal models. The latent variable approach is one particularly suited to the study. It has the ability to take reliability into account when multiple indicators of major constructs are available, as they will be in this study.

NEONATAL OUTCOME AND WEIGHT GAIN OF BLACK ADOLESCENTS

GRANTEE University of Rochester

INVESTIGATOR Elizabeth R. McAnarney, M.D.
University of Rochester
Strong Memorial Hospital
601 Elmwood Avenue
Rochester, NY 14642
Telephone: (716) 275-4673

GRANT AWARD INFORMATION

Project Number:	MCJ-360534
Project Period:	01/01/86–12/31/88
Grant Year:	3 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	168,627	187,184	103,371
Requested:	168,627	183,585	98,849

SUMMARY

Study Objective

The objective of this study is to investigate the relationship between maternal weight gain, maternal age, and neonatal outcome (primarily birthweight and gestational age) in two populations of black primiparous adolescents and adult women of lower socioeconomic status.

Research Questions or Hypotheses

Three general hypotheses are posed in the study:

1. Younger adolescents will require greater weight gain during pregnancy than older adolescents or adults in order to have appropriate-size term infants.
2. Younger adolescents will gain more weight in the first trimester than do older adolescents and adults.
3. Difference in maternal weight gain curves for women who have low birthweight infants will be most marked in the first trimester, especially for young adolescents.

Population and Sample Description

There are two study populations. The first consists of 210 subjects entered prospectively into the study and for whom precise measurements are undertaken using a standardized protocol; the second consists of approximately 900 subjects from a retrospective sample already entered into an existing clinical database where information was routinely gathered as the by-product of the process of rendering care. Both population groups are cared for at the perinatal center of

Strong Memorial Hospital of Rochester, New York, which provides high-risk perinatal services for a 10-county region.

The first population contains 210 black primiparous unmarried adolescents and adults of low (Hollingshead IV/V) socioeconomic status: 140 adolescents of less than 19 years of age (70 are less than 17 years old) and 70 adults (19 to 30 years of age).

The second study population includes 900 black primiparous unmarried adolescents and adults (under 30 years of age) of low (Hollingshead IV/V) socioeconomic status on whom there are extant clinical data in the perinatal center's database. The second population group will be used only if its maternal weight gain measurements compare favorably in degree of precision with that derived from the prospective sample.

Study Design

A prospective, observational cohort design is used with provisions to retrospectively use another cohort from an existing database if the quality of the weight gain information for the latter group compares favorably with the former.

Methods and Procedures

All potentially eligible black, primiparous, unmarried adolescent and adult women of lower socioeconomic status registering for prenatal care at Strong Memorial Hospital during January 1, 1986, through October 31, 1987, are asked to participate in the study. If subjects choose not to participate, permission will be requested to review their medical records after delivery to extract pertinent clinical data regarding maternal weight gain during pregnancy, maternal and infant data, laboratory determinations, and sociodemographic characteristics. This record review will allow the investigators to compare data of the participants and non-participants.

For the prospective component of the study, each study subject is followed longitudinally from entry into prenatal care through delivery.

A researcher working under the direction of the principal investigator weighs the study mothers at frequent intervals during pregnancy and weighs and measures the infants after delivery. During pregnancy, nutritional and laboratory assessments are performed and social support interviews and home visits are made.

In addition to routine prenatal care, the study subjects have three-day diet records collected at three intervals during pregnancy, have serial laboratory determinations performed, and several times throughout the course of pregnancy, have their weights determined in a standardized fashion by one of the investigators. Skinfold measurements are taken as well as scores related to medical and obstetric complications and lifestyle factors such as cigarette smoking and drug use. Two ultrasound examinations are planned during the pregnancy. Neonatal anthropometric data are obtained and gestational age assessments are performed.

For each infant the gestational age is established by utilizing a combination of obstetric, ultrasonographic, and neonatal assessment. The birthweight of the

infants is adjusted for gestational age according to a growth curve developed at Strong Memorial Hospital. These data items form the essential outcome data. The independent variables of interest are total maternal weight gain and amount of weight gain the first, second, and third trimester of pregnancy. The independent variables are related to the outcome data by age groupings in order to answer the study hypotheses.

Analysis Plan

Means, standard deviations, ranges, and distribution descriptions are computed for all maternal variables, laboratory determinations, and infant medical data. These descriptive statistics are computed separately for three age groups: under 17 years of age, 17 through 19 years of age, and 19 to 30 years of age. Bivariate correlations among the variables are generated. The major study hypotheses are then analyzed using multiple regression techniques of the general, logistic, and log-linear varieties, depending on the level of measurements of the variables of concern.

OUTCOME EVALUATION OF A PEDIATRIC HEALTH CARE MODEL

GRANTEE Medical and Health Research Association of New York, Inc.

INVESTIGATOR Jack Elinson, Ph.D.
Medical and Health Research Association of New York, Inc.
40 Worth Street, Room 720
New York, NY 10013
Telephone: (212) 285-0220

GRANT AWARD INFORMATION

Project Number:	MCJ-360539
Project Period:	01/01/87–12/31/90
Grant Year:	3 of 4
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4
Awarded:	154,553	190,357	277,441	
Requested:	155,415	202,770	167,018	61,202

SUMMARY

Study Objective

The objective of this study is to test a model of pediatric health care delivery, the Pediatric Resource Center (PRC), designed to reach low-income, high-risk children. The study is focused on the model as implemented at seven clinic sites in New York City. The PRC model provides comprehensive care in a team setting, maintaining continuity and linkages to a network of health and social services.

Research Questions or Hypotheses

The hypothesis under examination is that children, after receiving PRC services for a specified period of time, have better health outcomes than a comparison group, and that mothers of PRC children have more knowledge and better attitudes with respect to health care.

Population and Sample Description

The overall sampling frame is based on computerized New York City birth certificate records for a three-year period. Eligibility is based on membership in selected high-risk groups and residence in a high-need health area. Group one includes children born at a weight of 2500 grams or less; group two includes children born to mothers under age 17; and group three includes the mothers of the children in group two. A probability sample is drawn from the enumerated population, stratified by risk group, Medicaid eligibility, and area of residence. The total number of subjects is expected to be 950; a comparison group of 950, not enrolled in a PRC, is drawn from the same high-risk groups and residential areas.

Study Design

This study uses a quasi-experimental design, incorporating two main features: first, a pretest-posttest examination of the impact of the PRC program on a sample of enrolled children from each of the identified high-risk groups; second, an examination of the relationship between degree of adherence of each PRC site with each of four model components and specific child outcomes; and, finally, a comparison of the PRC children with comparison children in the same three high-risks groups.

Methods and Procedures

Following their initial recruitment and signing of informed consent, subjects agree to be tested at two points in time, approximately one year apart. The comparison group is also tested at two points in time. Each study child receives a complete health examination, and each mother is interviewed. As the purpose of this study is not to develop new measurement tools, existing relevant research instruments and question formats already field-tested by others in similar studies are used whenever possible.

Analysis Plan

The data analysis has four aspects: preparation of variables for analysis; descriptive analysis; analyses to assess group equivalence and potential biases; and hypothetical testing. Techniques include analysis of covariance and/or multiple regression, as appropriate for interval level outcome variables, and McNemar and/or Stuart-Maxwell tests for dependent groups for nominal outcome variables.

There are seven broad categories of outcome variables to be analyzed: health status; development; nutrition; preventive health behavior; health attitudes and knowledge; unmet needs; and utilization of health services. These variables were selected based on the following three criteria:

1. The variables address areas of key policy concern;
2. The variables can reasonably be expected to be affected during the study time period; and
3. The variables have been used by other studies as outcome measures.

DETERMINANTS OF ADVERSE OUTCOME AMONG TODDLERS OF ADOLESCENT MOTHERS

GRANTEE Research Foundation for Mental Hygiene, Inc.

INVESTIGATOR Gail A. Wasserman, Ph.D.
Research Foundation for Mental Hygiene, Inc.
New York State Psychiatric Institute
722 West 168th Street
New York, NY 10032
Telephone: (212) 960-2298

GRANT AWARD INFORMATION

Project Number:	MCJ-360540
Project Period:	11/01/86–10/31/89
Grant Year:	2 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	101,527	179,648	
Requested:	130,970	208,921	220,548

SUMMARY

Study Objective

The study objective is to prospectively examine the contribution of selected psychosocial and environmental factors to the developmental risk status of adolescent mothers and their children. Specifically, the study concentrates on three main areas of interest:

1. Comprehensive assessment of child health outcome, including multiple indicators of competency extending beyond the early infancy period;
2. Systematic study of the role of well-defined dimensions of the social environment as they interact with maternal characteristics to influence child outcome; and
3. Application of methodological advances in the measurement of mother-child interactive behaviors to the study of adverse outcomes in the population of adolescent mothers and their children.

Research Questions or Hypotheses

The following hypotheses and subhypotheses are tested:

1. Mother-child interactive behaviors and child outcome are moderately compromised in a group of adolescent mothers as compared to a group of older mothers, when the effects of social class, parity, marital status, and maternal I.Q. are controlled.
2. Developmental outcome in the child is not explained by maternal age alone; there are significant main effects of contributory variables—maternal psychological well-being, low maternal self-esteem, and low social support—

as mediated by mother-child interaction and the quality of the home environment.

(a) Maternal psychological well-being (fewer depressive symptoms) is negatively associated with compromised development, as mediated by the mother's interactive behaviors and home environment at 12 and 24 months.

(b) Low maternal self-esteem is associated with compromised development, as mediated by the mother's interactive behaviors and home environment at 12 and 24 months.

(c) Low social support is associated with compromised development, as mediated by the mother's interactive behaviors and home environment at 12 and 24 months.

(d) There are significant interrelationships among the above-mentioned variables.

3. Maternal age interacts with the contributory variables to affect child outcome.

   (a) The children of adolescent mothers who have low levels of support, poor self-concepts, and a high number of depressive symptoms, are at highest risk for adverse outcomes.

   (b) The children of older mothers with high levels of support, good self-concept, and low number of depressive symptoms, are least likely to have adverse outcomes.

4. The quality of the alternate caretaker's interactive behaviors with the child is a significant correlate of child development.

Population and Sample Description

The population is limited to those mothers (and their infants) who delivered at Columbia Presbyterian Hospital, on the service ward, during the nine-month period from September 1, 1986 to May 31, 1987. The population is largely black (47 percent) or Hispanic (52 percent) and lives in the surrounding lower-class to working-class urban community of Washington Heights. From this population, in two stages of selection, samples of 144 adolescent mothers, and 109 older mothers who serve as a comparison group, have been selected. The samples do not include mothers and infants whose perinatal conditions (e.g., low birthweight, congenital anomalies, maternal drug use) have potential impact on maternal adjustment and child development. Portions of the study also include grandmothers, defined as any female older than the mother who regularly assists in unpaid child care.

Study Design

This is a prospective study. Assessment of selected demographic, psychosocial, behavioral, and developmental variables occurs at three time points: delivery (during the lying-in period), 12 months following delivery, and 24 months following delivery.

Methods and Procedures

Initial interviews include demographic information about the mother and her family, and questionnaires to measure social support, self-esteem, depression, and attitudes towards child rearing. At the same time, perinatal information is also collected. A 12-month evaluation involves a visit to the mother's residence, where questionnaires used in the initial interview are repeated and the home environment is assessed. Mother-child and grandmother-child interactions are also observed. This home visit is followed within two weeks by a videotaping session at the Institute's observation laboratory. The home visit and taping are repeated at 24 months.

The following instruments are used: Inventory of Socially Supportive Behaviors, Maternal Social Support Index, Division of Responsibilities for Child Care and Household Scale, Parental Attitudes towards Childrearing Questionnaire, Home Observation for Measurement of the Environment, Center for Epidemiologic Studies Depression Scale, Bayley Scales of Infant Development, Sequenced Inventory of Communicative Development, Child Behavior Checklist, Rosenberg Self-Esteem Scale, and Wechsler Adult Intelligence Scale-Revised (WAIS-R) tests to estimate maternal intelligence.

Analysis Plan

Analysis begins with frequency distributions and measures of central tendency and variation of all variables. The distributional properties of maternal age, parity, and social class among teenage mothers is of particular importance and so is reexamined prior to the second interview (at the infant's 12-month anniversary) in order to guide the matching of the teenage and adult mothers.

After the examination of the univariate and bivariate distributions has taken place, attention is given to the relationships among the "independent" variables. In this phase of the analysis, multiple regression/correlation techniques are used. It is possible that some significantly intercorrelated variables may be combined into sets of variables. In order to evaluate the possible compensatory role of interactions between the alternate caretaker and the child, regression models with and without this factor are tested.

Before beginning the regression procedure, it may be advantageous to combine a number of significantly intercorrelated variables into sets of variables. Ultimately, omnibus significance tests for the hierarchical contribution of sets of variables to the estimation of multiple dependent variables are planned to minimize Type I errors.

The study design controls for the effects of certain factors (social class, parity, and ethnicity) by treating them as covariates (either singly or in a set) and testing the significance with the appropriate statistic.

Although the study design does not provide for group matching on certain variables (maternal I.Q., marital status, and depressive symptoms), they are factors which are possible confounders or causative agents and are considered as covariates for purposes of data analysis.

The major study factors of maternal self-esteem, depressive symptoms, social support, and dimensions of mother-child interaction are entered into the regression, according to a priori hypotheses, and the significance of all partial effects is determined. Because of the complexity of the data and repeated assessments procedures, estimation of a single overall model, in which all variables are entered, is not possible. Instead, an attempt is made to model child outcome at 12 months and child outcome at 24 months. In addition, an estimate of a model to account for change (or effects over time) of various factors that may be important during the first year of life, but which have cumulative effects over time, is planned.

Assessment of the contribution of alternate caretaker-child interactions to developmental outcome in the child requires special attention in the data analysis procedure. In order to evaluate the possible compensatory role of such interactive behaviors, regression models with and without this factor (or set of variables) are tested. Finally, the adequacy of the regression models is examined, looking in particular for outliers, heterosuedasticity, and curvilinearity testing.

PILOT SCREENING PROGRAM FOR BIOTINIDASE DEFICIENCY IN NEWBORNS

GRANTEE New York State Department of Health

INVESTIGATOR Kenneth A. Pass, Ph.D.
New York State Department of Health
Newborn Screening Program
Wadsworth Center for Laboratories and Research
Room E-275, Empire State Plaza
Albany, NY 12201
Telephone: (518) 474-3180

GRANT AWARD INFORMATION

Project Number:	MCJ-360542
Project Period:	10/01/86–10/31/88
Grant Year:	2 of 2
Type of Grant:	Continuation

Costs:	Year 1	Year 2
Awarded:	61,768	65,110
Requested:	61,768	65,110

SUMMARY

Study Objective

To ascertain the incidence of biotinidase deficiency and to determine whether it is appropriate to include the test for identifying the condition in the existing mass screening program of New York State that currently focuses on PKU, hypothyroidism, and six other inherited metabolic diseases.

Research Questions or Hypotheses

Several predictions guide the study:

1. The laboratory methods employed for biotinidase screening are reliable for use in a large screening program;
2. The incidence of biotinidase deficiency in New York State is about the same as was reported in a Virginia study—1:12,000 to 1:240,000; and
3. It is advantageous to locate affected infants before onset of symptoms because early diagnosis will lessen parents' emotional and financial burden.

Population and Sample Description

Every infant born in New York State during 1986 and 1987 is screened for biotinidase deficiency utilizing the blood specimen routinely collected to screen for other metabolic diseases. It is estimated that one-half million of New York State newborns are tested for this disease over a two-year period.

Study Design

A descriptive design is employed whereby incidence rates are estimated and false-positive and false-negative rates are ascertained.

Methods and Procedures

Testing is performed by the method of Heard, McVoy, and Wolfe. Test specimens are placed in plastic dimple trays, buffer and substrate are added with a repeater pipet and the trays incubated for 4-16 hours at 37 degrees Centigrade in a humidity-controlled incubator. Four separate pipetings are done sequentially to add the following: trichloroacetic acid (TCA), sodium nitrite, ammonium sulfamate, and naphthylethylendiamine dihydrochloride. Specimens exhibiting abnormal results are retested to verify test results and specimen identity. Physicians are notified by telephone of abnormal results within two working days of specimen receipt and a repeat specimen is then requested. A certified letter noting these laboratory findings is sent within two working days after telephone notification. Utilization of well-established mechanisms for followup and repeat specimen retrieval should eliminate the problems noted in the Virginia study. Spectrophotometric measurements of tests results are made at 546 nm even though the test is reported to be qualitative rather than quantitative and the difference between normal and abnormal test results can be easily discerned.

The child determined to be "at risk" based on the screening test results via filter-paper analysis is to be referred to one of the six New York State-approved Inherited Metabolic Disease Treatment Centers for confirmation testing, clinical evaluation, diagnosis and treatment. This group of high-risk infants is tested by more sensitive methods to aid in early diagnosis. Treatment by biotin supplementation is to be initiated before clinical signs of biotin deprivation develop. By avoiding organic acidurias and metabolic crises, permanent damage is to be prevented.

Analysis Plan

Frequency counts are computed on the number of newborns tested, number found to be at-risk, number of repeat specimen tested, number of infants referred, number of confirmed diseases, number of children treated, etc. Based on these information, a decision will be made whether to include the test as part of the routine screening assessments performed on newborn blood specimens in New York State.

STRESS AND SOCIAL SUPPORT IN ABUSE OF HIGH-RISK INFANTS

GRANTEE University of North Carolina

INVESTIGATOR Jonathan B. Kotch, M.D.
University of North Carolina
School of Public Health
Rosenau Hall 201H
Chapel Hill, NC 27514
Telephone: (919) 966-2017

GRANT AWARD INFORMATION

Project Number:	MCJ-370521
Project Period:	06/01/85-05/31/89
Grant Year:	4 of 4
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4
Awarded:	208,288	201,586	108,750	134,531
Requested:	240,408	204,974	100,167	134,531

SUMMARY

Study Objective

The objective of this project is to identify factors in the individual, family, social, and cultural domains which are associated with increased rates of child abuse and neglect reports using an ecological model.

Research Questions or Hypotheses

This study is designed to test the following hypotheses:

1. The *quality* of support from primary intimate relationships is a stronger predictor of reports of child maltreatment than the *quantity* of social network ties.
2. Chronic stress is a stronger predictor of reports of child maltreatment than are life events.
3. High levels of social networking and social support interact with precipitating factors so as to mitigate the effect of chronic stress and of life events on child maltreatment.

Population and Sample Description

One thousand infants are selected from those identified by North Carolina's High Priority Infant Program (HPIP). HPIP picks up infants with such physical problems as low birthweight, congenital anomalies, and neonatal illnesses. These characteristics have been found to be associated with child abuse and neglect. It is expected that of the 1,000 study infants , 70 (+ 30) will be referred for child abuse and neglect. This number constitutes the study cases. In addition, 125 non-abused infants are selected from the HPIP cohort as the first of two control groups. These

non-abused HPIP children are matched to cases on pertinent characteristics. The second control group selected is composed of normal, non-HPIP infants. No matching is possible for this latter group, since the infants are determined independently from the HPIP study cohort.

Study Design

A prospective case-control design is used.

Methods and Procedures

All mothers of the 1,125 infants are interviewed soon after birth. Mothers of HPIP infants reported for abuse and neglect, mothers of matched HPIP infants not so reported, and mothers of non-abused normal infants are re-interviewed when their infants reach one year of age.

After interviewers have been hired and trained, study families are referred to the appropriate interviewer who immediately sets up an appointment for the interview. The total interview is expected to take no more than one and one-half hours to administer. During the 12 months following each initial interview, child abuse and neglect Central Registry data are reviewed to identify study children who have been reported for child abuse and/or neglect.

Analysis Plan

Conditional logistic regression is utilized to assure comparisons within the matched sets for the first control group of non-abused HPIP infants. Unconditional logistic regression is employed to analyze the data with the non-HPIP infant controls. Adjustment for the matching and other relevant independent variables is accomplished by regression techniques.

IMPROVING AUDITORY TESTING OF MULTIHANDICAPPED CHILDREN

GRANTEE Kent State University

INVESTIGATOR Donald P. Gans, Ph.D.
Kent State University
School of Speech Pathology and Audiology
Kent, OH 44242
Telephone: (216) 672-2672

GRANT AWARD INFORMATION

Project Number:	MCJ-390548
Project Period:	10/01/86–09/30/88
Grant Year:	2 of 2
Type of Grant:	Continuation

Costs:	Year 1	Year 2
Awarded:	68,942	68,702
Requested:	81.434	75,668

SUMMARY

Study Objective

The project's objective is to create a battery of hearing tests for multihandicapped children, combining behavioral observation audiometry (BOA) and objective testing methods, and to refine this test battery for use in non-experimental settings. Specifically, there is an emphasis on reducing the number of people required to perform the testing, and on modifications of test procedures that will enhance the attainment of reliable results and interpretations, and, further, that will aid parents, teachers, and other professionals in understanding the ramifications of test results.

Research Questions or Hypotheses

The following questions are being investigated:

1. Is a battery approach necessary in estimating hearing thresholds?
2. Which test provides the best (lowest) prediction of hearing threshold?
3. What limitations of each of the objective tests apply specifically to the handicapped?
4. What information can be provided by BOA in addition to estimates of hearing threshold?
5. Can BOA be made a reliable and valid tool for evaluating hearing?
6. Can BOA be made easy and practical to employ in normal audiology settings?
7. Do severely and profoundly multihandicapped children follow the same auditory developmental landmarks as do non-handicapped children?
8. Can the developmental landmarks be used as prognostic indicators of eventually useful hearing?

Population and Sample Description

The study sample consists of all severely and profoundly multihandicapped (S/PMH) children who have been referred to the Kent State University Speech and Hearing Clinic for hearing testing. All referred children, regardless of age, sex, race, or type of disability, are eligible for study participation. Typically, those multihandicapped children referred to the clinic are between 4 months and 17 years of chronological age, with an approximate range of developmental age of 2 weeks to 24 months. In addition to severe to profound mental retardation, referred children may have other conditions, including sensory disorders, epilepsy, cerebral palsy, or maladaptive behavior.

So far, 316 children have been identified for inclusion in the longitudinal study, and archival information has been gathered for 209 children.

Study Design

This is a longitudinal study which utilizes the inquiry-practice format. The first year of the study focuses upon the components and relationships in the test battery. The second year takes some of the findings from that inquiry and puts them to use, further testing the soundness of the project's conclusions. The inquiry-practice format is used in the longitudinal portion of the investigation. In the first year, an auditory checklist is compiled, and group profiles are constructed. In the second year, the group profile is used in establishing prognoses and recommendations for individual clients.

Methods and Procedures

The developmental ages of the subjects are of interest in the interpretation of the peripheral hearing system, as well as for comparisons with the auditory developmental levels. There are three main evaluative tools used with the subjects: the Bayley Scales of Infant Development, the Kent Infant Development Scale, and the Index of Developmental Abilities for Teachers.

Study subjects are accompanied to the clinic by a parent or other caregiver. Prior to the auditory testing, each child's medical, educational, and habilitative records are reviewed, and any pertinent data are collected. Also, any other information relating to auditory behavior is obtained from a brief interview with the accompanying adult.

In a typical day, two children are tested each morning. While one child is being tested with BOA, the other child is given immittance testing. Following completion of the immittance testing, the child is tested by auditory brainstem evoked response mechanism (ABR). Then each child undergoes the other testing procedure(s). The testing is done by audiology graduate students. Those students who are new to the procedures receive training in the scoring of BOA responses using the video and audio recordings of previous BOA testing sequences. The tapes contain examples of each of the response types, plus examples of very obvious and very subtle responses. The tape is stopped periodically for discussion regarding the response behaviors. Next, the training procedure for BOA involves the viewing and scoring of videotapes from four children previously tested.

Immittance testing consists of tympanometry and noise-tone difference testing (NTD). Only a 220 Hz tone will be used for immittance testing during the first year, to provide preliminary findings for comparison with the other tests. During the second year of the study, each child will be tested twice, once with the 220 Hz tone and once with a 660 Hz tone.

In order to determine the progression for which S/PMH children attain auditory skills, the testing records extending from 1977 through the duration of this study period are examined. All children who have been tested at least twice are included in the longitudinal portion of the study. A developmental checklist, based on the auditory responses of three normal children, will be applied to each multihandicapped child's hearing test record. Information from the record will include responses for the BOA, COR, ABR, NTD, the child's chronological age, developmental age, medical diagnoses, and auditory conclusions and recommendations. The results of these individual profiles are combined to create a group profile which should provide a developmental picture of the progression of auditory skills followed by the S/PMH child. In order to test the validity of this profile, the individual profiles of S/PMH children tested the summer of 1985 and the fall of 1986 will be applied to the group profile.

Because considerable variability is expected in the rate of development for the S/PMH population, and because some of this variability may be determined by whether or not the child's primary disability is congenital, the profiles of children in these two groups will be compared. Also, group profiles of children with conductive, sensori-neural, and mixed hearing losses, and with normal hearing, will be constructed and compared.

The information derived from the longitudinal portion of this study will form the basis of a functional profile intended for use in a clinic. Hearing test results obtained during the final quarter of this investigation will be applied to this profile to assess its practicality, reliability, and validity on an individual basis.

Analysis Plan

The mean rating score for each of the 72 trials are computed across the five judges such that the resulting data includes 36 mean sound ratings and 36 mean no-sound or catch ratings. For the 36 sound trials, therefore, there are nine data trials for each of the four intensities (30, 50, 70, and 90 dB). Because there is only a limited amount of data for each child (nine data trials at each of four intensities), several assumptions have to be made. First, it is assumed that response decrement to the sounds is inconsequential and for the acoustic brainstem evoked response (ABR) test, it is computed by two methods: visual and objective. The thresholds vary between 30 and 90 dB HL in 10 dB steps.

In order to estimate hearing threshold, simple t-tests are computed between the sound and catch trials at 90, 70, 50, and 30 dB for each child. The analysis of the results of the t-tests has to follow strict rules to reduce the chance of error in interpretation. The results of the t-test provide a statistical measure of certainty that the child responds to sound.

Correlated t-tests are performed to determine if estimated thresholds for the three tests differ significantly. An alpha level of less than .05 is considered significant for

this and all other analyses. Pearson correlation matrices are also performed to check for reliability of changes in thresholds from child to child between the three tests.

The children are separated by the condition of their middle ear mechanism. The categories of this separation are based on results obtained by tympanometry. A one-way repeated analysis of variance is conducted between severity of middle ear function and estimated hearing threshold.

A correlated t-test is used to compare estimated thresholds between NTD results for the 220 Hz and 660 Hz probe tones. The children are categorized by severity of brain damage as well as by the noisiness of the tracings. A two-way repeated measure analysis of variance is conducted between severity of brainstem involvement and noisiness of ABR tracing as a function of estimated threshold. An uncorrelated t-test is conducted for estimated ABR thresholds obtained under conditions where subjects were told results of BOA and NTD and where they were not. The comparison of the estimated thresholds between the objective analysis methods and the visual method is performed with use of a correlated t-test. Finally, a correlated t-test is also used to compare estimated thresholds obtained with the ABR test and the "40 Hz potential" procedure.

Children are ranked on the basis of their developmental level using the KID scale. They are also ranked on the basis of estimated hearing threshold, meaningfulness of sound, and response decrement. To evaluate whether there is a relationship between developmental level and estimated threshold, meaningfulness of sound, and sound decrement, a Spearman Rank Order Correlation Coefficient is computed. Because so few children are likely to be conditioned, only descriptive statistics are used to compare conditionability as a function of developmental level.

For the longitudinal portion of the study, if statistical procedures beyond frequency counts, measures of central tendency, and variability are indicated, nonparametric statistics are used. If the requirements for performing statistical procedures are satisfied in number, variability, etc., the following tests are used: (1) descriptive statistics; (2) the Cox and Stuart Test for Trends; (3) the Mann-Whitney U procedure; and (4) Multiple Regression Analysis or Discriminant Function Analysis.

PREDICTION OF OUTCOME OF EARLY INTERVENTION IN FAILURE TO THRIVE

GRANTEE Case Western Reserve University

INVESTIGATOR Dennis J. Drotar, Ph.D.
Case Western Reserve University
University Hospitals
2065 Adelbert Road
Cleveland, OH 44106
Telephone: (216) 844-3230

GRANT AWARD INFORMATION

Project Number:	MCJ-390557
Project Period:	11/01/87–10/31/90
Grant Year:	2 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	91,958	72,014	
Requested:	91,958	75,525	78,639

SUMMARY

Study Objective

This study's objective is to accomplish:

1. A controlled assessment of the psychological and physical health outcomes of a cohort of 42- and 48-month-old children who were initially hospitalized for environmentally based failure to thrive (FTT) as young infants and who received time-limited early intervention following hospitalization; and
2. The identification of predictive models concerning the psychological and health outcomes of preschool children with FTT who received intervention as infants in comparison groups.

Research Questions or Hypotheses

Overall, the research hypotheses are concerned with:

1. A description of psychological and health outcomes between children diagnosed with FTT during early infancy at an average age of five months and a comparison group of physically healthy children ; and
2. The prediction of psychological outcomes among preschool-age children with early histories of FTT and a comparison group of physically healthy children.

The hypotheses tested are:

1. FTT children have a higher frequency of insecure attachment than do healthy children, and the incidence of insecure attachment increases with earlier-onset and longer-duration FTT;
2. FTT children have lower ego resiliency;

3. Family environments of FTT children show higher levels of conflict and less cohesion;
4. FTT children have a higher frequency of behavioral problems; and
5. Behavioral maladjustment is predicted by family conflict and lack of cohesion and by insecurity of attachment.

Population and Sample Description

The sample consists of 64 children diagnosed as FTT during their first year of life (at an average age of five months) and a matched sample group of 64 physically healthy children. The children are matched on child, maternal, and family characteristics as follows:

1. Child characteristics: age, sex, race, birth order, and whether or not the child was premature.
2. Maternal characteristics: age and educational level.
3. Family characteristics: income, family size, and family structure.

FTT children with a representative range of ethnic, racial, and demographic characteristics are recruited from seven Cleveland hospitals. The majority (80 percent) come from two major tertiary care centers, Cleveland Metropolitan General and Rainbow Babies and Children's Hospital. The study coordinator insures that selection criteria are applied in a uniform manner across different settings. Parents whose children fit study criteria are asked to give their consent.

Criteria for inclusion in the FTT group include: weight at or below fifth percentile; deceleration in rate of weight gain from birth to study intake; head circumference at or above the fifth percentile and above the level of weight percentile; age between one and nine months; no identifiable organic cause of growth retardation; weight gain of at least one-two ounces in hospital over three-five days; birthweight of at least 1,500 grams and birthweight appropriate for gestational age; no identifiable chronic illness, physical disability, brain damage, or neurological condition; absence of overt physical abuse by parents; infants in custody of families, not foster caregivers; and family living less than one hour from hospital.

Mean values for the FTT sample included: age at intake—4.9 months; birth order—2.5; maternal education—10.9 years; maternal age—21.9 years; maternal I.Q.—82.4; family size—4.9; number of children—2.6. Mean values for the comparison group included: age at intake—5.0 months; birth order—2.5; maternal education—11.4 years; maternal age—22.3; maternal I.Q.—80.5; family size—4.8; number of children—2.

Study Design

This is a controlled study which analyzes data already collected for the FTT sample and completes the followup assessment for the comparison group at 42 and 48 months of age. Major predictor variables analyzed include the security of attachment as assessed by the Ainsworth Strange Situation procedure, and family conflict and cohesion as assessed by the Family Environment Scale. Outcome

measures include psychological competence, observation and experiment-based measures of ego control and ego resiliency, family functioning (Family Environmental Scale, Family Inventory of Life Events), and behavioral adjustment (Achenbach Behavioral Checklist).

Methods and Procedures

This study analyzes data that has already been gathered for the sample of FTT children, and in addition, it completes followup assessments of the control group at 42 and 48 months of age. The control children, as well as the FTT children, had been assessed prior to the start of this study, at 12 and 18 months of age. The FTT children and the control children are not from the same cohort, but the same assessment measures are done at the prescribed ages (at entry into the study, at 12 months, 18 months, 42 months, and 48 months).

At all ages up to and including 42 months, physical growth, as indicated by height, weight, and head circumference, is measured. At the 42-month physical exam, information about hospitalizations is added to the physical data. No physical data are gathered at 48 months.

At all ages up to and including 42 months, the psychological measures include intelligence tests. At 12 months there is an examination of attachment; at 42 months there is an evaluation of ego-control and ego-resiliency; and at 48 months there is an evaluation of behavioral problems.

The family environment is assessed at entry into the study and again at 12, 18, and 42 months. At intake and at 42 months, the information gathered is more detailed and uses four different assessment measures.

Analysis Plan

Data are analyzed by analysis of variance and hierarchical multiple regression. Data analyses include the following: (1) data reduction and additional reliability studies; (2) descriptive analyses of both FTT and comparison groups; (3) assessment of group differences; and (4) hypothesis-guided predictions of psychological outcomes.

ADENOIDECTOMY, EUSTACHIAN TUBE FUNCTION AND OTITIS MEDIA

GRANTEE Children's Hospital of Pittsburgh

INVESTIGATOR Charles D. Bluestone, M.D.
School of Medicine
Children's Hospital of Pittsburgh
125 Desoto Street
Pittsburgh, PA 15213
Telephone: (412) 647-5465

GRANT AWARD INFORMATION

Project Number:	MCJ-420512
Project Period:	10/01/84–06/30/88
Grant Year:	4 of 4
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4
Awarded:	143,040	152,910	175,998	198,260
Requested:	173,941	185,939	198,954	214,623

SUMMARY

Study Objective

This study tests the effect of adenoidectomy on eustachian tube function (ETF) and relates these findings to the efficacy of the operation in reducing morbidity from otitis media (OM) in children who have tympanostomy tubes previously inserted due to chronic otitis media with effusion (OME), or frequently recurrent acute otitis media (AOM), or both.

Research Questions or Hypotheses

This study investigates three hypotheses, based on four assumptions. The hypotheses are:

1. Adenoidectomy changes ETF.
2. These changes in tubal function are related to otitis media effusion (OME) status.
3. There will be a group of children who will benefit from adenoidectomy and can be identified by tubal function testing prior to consideration for surgery.

The four underlying assumptions are:

1. Tubal function testing methods and parameters are sensitive enough to reveal changes.
2. Interaction between nasal obstruction and tubal function can be identified.
3. Some patients will have improved tubal function, and some will have worse tubal function following surgery.

4. These favorable and unfavorable changes in tubal function will determine the course of postoperative ME status.

Population and Sample Description

During a three-year period, 330 children, aged 3 through 12, who have had bilateral tympanostomy tubes inserted during the previous 3 months because of chronic OME or frequently recurring AOM, or both, are recruited for this four-year study. Patients are recruited from among those who are referred by any physician staffing any outpatient clinic at Children's Hospital; from among referrals sent by cooperating family physicians, pediatricians, and otolaryngologists in private practice in our community; and from among those recruited through our advertising campaign. In addition, children who complete their treatment/observation in other clinical trials in our center, if they meet entry criteria, can be candidates for this study.

Study Design

This is a prospective, randomized, controlled clinical trial.

Methods and Procedures

Once informed consent has been obtained for those children considered initially eligible for the study, a comprehensive, detailed initial history and physical examination is completed by the pediatrician-investigator and the research nurse. A series of diagnostic test procedures are then carried out. All children have ME impedance tests to assess objectively the patency of the tympanostomy tube, or, if one tympanic membrane is intact, to assess the condition of the middle ear. A behavioral audiogram also is obtained. Next the child is scheduled for ETF tests and a standardized lateral cephalometric radiograph. Finally, in those subjects who have a history of, or upon examination, have a finding of upper respiratory allergy, a battery of screening skin tests employing common inhalant and food allergies is administered. If the child is still eligible for the study, he/she is randomly assigned to one of two groups, adenoidectomy or control. Subjects assigned to receive adenoidectomy have the procedure performed approximately one week after randomization. All children are re-examined by the pediatrician-investigator and research nurse at monthly intervals after randomization, for one year. Another lateral cephalometric radiograph is taken two months after surgery for those subjects in the adenoidectomy group, in order to obtain objective confirmation of the completeness of adenoidectomy. Also at that time, and every two months thereafter, the ETF tests are repeated on *all* children.

At the end of the one year treatment/observation the most important outcome measures will be: ETF test findings; number of episodes of ear disease, i.e., AOM, OME, otorrhea (through the tube); duration of ear disease, number of myringotomies with insertion of a tympanostomy tube (M&TS); hearing; and complications and sequelae of both ear disease and the surgical procedures.

Analysis Plan

The comparison of change in closing pressure in the surgery and nonsurgery groups is done using standard analysis of variance (ANOVA) procedures, assuming the data are not too highly skewed. In the case of skewed data, either a lognormal transformation or nonparametric procedures are used. Formal tests for interaction of surgical procedures with ETF are conducted because the investigators believe such a test to be an important aspect of the present study. In the analysis, certain designated independent variables are investigated as possible confounders since only age was controlled for in the randomization.

The important clinical variable is number of months with OME after removal of the tube. Since visits occur at discrete time points, we estimate this by assuming that the outcome at each visit represents an outcome for a continuous interval. These intervals are constructed by using half the difference between two consecutive visits as the endpoint for an interval. The response at points within the interval is assumed to be the same as observed at the closest visit.

Once the number of days with OME is determined for each child, standard statistical procedures are used to test for differences among the surgical and nonsurgical groups in the number of months with OME. To adjust for confounders, analysis of variance or analysis of covariance is used, depending on whether the adjusted-for variable is discrete or continuous. We will also test formally for an interaction of treatment and initial closing pressure of the eustachian tube.

In addition to testing related to the primary hypothesis, analysis is done on other outcome variables. Number of episodes of OME and AOM are compared in the two treatment groups. Also, the hearing distribution of the children at the end of the year is compared in the surgical and nonsurgical groups.

ACCULTURATION, PSYCHOSOCIAL PREDICTORS, AND BREASTFEEDING

GRANTEE University of Texas Medical Branch

INVESTIGATOR David K. Rassin, Ph.D.
University of Texas Medical Branch
Department of Pediatrics
Galveston, TX 77550-2774
Telephone: (409) 761-1139

GRANT AWARD INFORMATION

Project Number:	MCJ-480555
Project Period:	04/01/87–03/31/90
Grant Year:	2 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	254,598	320,565	
Requested:	254,534	380,585	276,607

SUMMARY

Study Objective

The study objective is to delineate the social, environmental, and cognitive factors that influence breastfeeding behavior across a spectrum of acculturation from the Mexican to the United States culture. The specific aims are to gather data on these factors in a border area (Brownsville, Texas) which has a primarily Hispanic/Anglo population. It is expected that the study's analysis of the data will define why mothers elect to breastfeed, factors important to the maintenance of breastfeeding, infant health and nutritional status as a function of breastfeeding, ultimately leading to improvement in the incidence of breastfeeding in the target population.

Research Questions or Hypotheses

Based upon previous research conducted by the investigators, psychosocial factors which influence breastfeeding are expected to vary in importance depending upon maternal ethnicity. The primary hypothesis is that social, environmental, and cognitive factors are differentially related to the initiation and maintenance of breastfeeding across the spectrum of acculturation from the Mexican culture to the predominant culture of the United States. More specifically, breastfeeding initiation is expected to be highest among Anglo- and highly acculturated Mexican-Americans, low among Mexican-Americans in the middle of the acculturation continuum, and somewhat higher among the least acculturated Hispanics.

Population and Sample Description

The study sample is drawn from the population of all women who become pregnant in Brownsville, Texas. Approximately 5,200 women give birth every year in Brownsville, with roughly 50 percent giving birth in one of two private hospitals, 25

percent in the Brownsville Community Clinic Birthing Center, and 25 percent at home, assisted by lay midwives. All obstetricians, family practitioners, and pediatricians in Brownsville are contacted to identify mothers who give birth in the two hospitals. Mothers who give birth in the Community Birthing Center are required to obtain care at the Community Clinic for nine prenatal visits and those women are recruited at clinic. All registered lay midwives are contacted so that their patients can be recruited prenatally. The initial sample size is approximately 1,250 subjects.

Study Design

This study employs a longitudinal design with respect to three critical periods in the decision to initiate and maintain breastfeeding: 2-3 months before delivery (to assess beliefs and influences unaffected by the actual decision); 1-2 days postdelivery (to assess the attempt at initiation of breastfeeding); and 2-3 weeks postnatal (to assess the successful initiation of breastfeeding at home). Ethnicity is used for stratification of the population, with a further post-stratification of the Hispanic and Anglo-American samples on the acculturation scale.

The initial feasibility study also permits testing of the instruments and especially of the Spanish translations. These translations are done by English-to-Spanish conversion followed by independent Spanish-to-English translation to check on the accuracy of the translations. At the end of the feasibility study, the availability of a study population is known, translations have been validated, interviewers have been trained, and instruments have been fine-tuned.

Instruments are used to measure demographics, acculturation, intended feeding, actual feeding in a previous time period, reproductive history, maternal health, prenatal care, infant health/care, prenatal education/care, social influence, behavioral capability, attitudes, self-efficacy, perceived environmental constraints, breastfeeding problems, role of the doula (breastfeeding counselor), breastfeeding maintenance, and the social influence of the male partner.

Methods and Procedures

Interviewers gather data from the subject mothers regarding: demographic information (education, income); social support/influence (actor's in the mother's decision to breastfeed); attitudes to breastfeeding; behavioral capability to breastfeed; perceived self-efficacy for breastfeeding; role of the doula; environmental constraints; infant and maternal health; prenatal care; and the influence of the male partner on the breastfeeding decision.

All forms are designed for simple and easy completion. Within 24 hours of the completion of each questionnaire, another staff member comprehensively reviews the questionnaire for completeness and major consistencies of response across questions. If any incompleteness or inconsistencies are detected, the respondent is immediately contacted to clarify the response At this time, the questionnaire is coded for data entry. A single person conducts the coding, and a comprehensive manual is maintained of all previously unexpected but legitimate codes. Ten

percent of all data are double coded to monitor, maintain, and estimate coder reliability.

Analysis Plan

After data entry, all data are submitted to further quality review. Simple frequencies are printed to identify error codes. In addition, a series of cross tabulations are conducted to identify inconsistences or unlikely patterns between pairs of variables. (Many of these inconsistency checks are the same as those conducted on the recently completed forms.) All error codes and inconsistencies are checked against the original questionnaire to determine whether a data entry or possible response error occurred. In turn, all changes are made in the database.

Data are analyzed within ethnic groups by degree of acculturation. The relative importance of the interaction of the demographic, environmental, social, and behavioral factors is determined relative to the initial decision to breastfeed. Each of the psychosocial variables are measured to assess their importance in the initiation and maintenance of breastfeeding. Indices of support are created from the instruments used and factors are mapped in the domain of attitudes towards breastfeeding. Finally, a path diagram has been constructed to relate both measured and unobserved (latent) variables to the breastfeeding decision. Once a specific set of indicator variables has been established for each latent variable, the parameters of the hypothesized model can be estimated and model goodness-of-fit can be determined by use of a structural equations program.

UTERINE ACTIVITY PATTERNS: DEFINITION WITH HOME MONITOR

GRANTEE University of Texas Health Science Center

INVESTIGATOR Robert K. Creasy, M.D.
University of Texas Health Science Center
Department of Obstetrics, Gynecology and Reproductive Sciences
Houston, TX 77030
Telephone: (713) 792-5362

GRANT AWARD INFORMATION *

Project Number:	MCJ-480561
Project Period:	12/01/87–11/30/89
Grant Year:	2 of 2
Type of Grant:	Continuation

Costs:	Year 1	Year 2
Awarded:	201,745	191,640
Requested:	212,908	201,290

* Jointly supported by the National Institute of Child Health and Human Development (NICHD)

SUMMARY

Study Objective

This project's objective is to establish the range of normal uterine activity so that potential deviations from normal may be assessed appropriately. The detection of such deviations is useful in the early detection of possible preterm labor and in its prevention. Currently the appropriate time to monitor uterine activity and the effect of daily activities on uterine activity are unknown.

Research Questions or Hypotheses

The underlying, long-range hypothesis of this proposal, which is not specifically addressed in this study, is that deviations from normal baseline uterine activity may be useful in the prediction of and/or the early detection of preterm labor. The hypotheses which *are* addressed in this study are as follows:

1. The uterine activity of uncomplicated singleton human gestation, during the last half of pregnancy, can be accurately described with the use of an external tocodynamometer which may be used in ambulatory, sitting, or recumbent positions;
2. The determination of uterine activity in the normal singleton gestation over a 24-hour period discerns the presence or absence of a circadian rhythm; and
3. The determination of uterine activity in the normal singleton gestation detects whether the frequency and duration of uterine activity changes during advancing gestation.

Population and Sample Description

The study population consists of 25 primigravida and 25 multigravida women recruited over two years from each of three sites, for a total of 150 patients. The population from which the subjects are recruited includes: 4,200 patients (annually) at the University of Texas at Houston Science Center, 25 percent of whom receive public assistance, and the remainder are considered middle class, with an ethnic composition of 41 percent white, 40 percent black, 15 percent Hispanic, and 2 percent Asian; 3,200 patients (annually) at the University of California – San Diego Hospital, approximately half of whom receive public assistance and the remainder are considered middle class, with an ethnic composition of 53 percent white, 35 percent Hispanic, 10 percent Asian, and 3 percent black; and 1,500 patients (annually) at Ohio State University Hospital (Columbus), approximately half of whom receive public assistance and half of whom are considered middle-class, with an ethnic composition of 51 percent white and 47 percent black.

Exclusion criteria include: history of abortion at 14-22 weeks of gestation; history of more than two abortions (spontaneous or induced); age less than 18 or more than 35 years in primigravidas, and less than 18 or more than 40 years for multigravida; history of preterm labor and delivery; multiple gestation in current pregnancy; previous cone biopsy, cervical cerclage, or diethylstibestrol exposure *in utero*; uterine anomalies; chronic collagen, cardiovascular, renal, or seizure diseases; bleeding between 12 weeks and entry; or any other characteristics that the investigators think may be associated with preterm labor or fetal risk.

Study Design

This study is an observational and descriptive investigation carried out at three separate sites chosen as a result of previous and ongoing fruitful collaboration studies on preterm birth as part of the March of Dimes Multicenter Birth Prevention Project.

Methods and Procedures

Recruitment signs are placed in various clinics at the different sites, and individual patients are asked to volunteer during their first prenatal visit. Patients are entered into the investigation after signing informal consent and a patient entry form. The only inducement offered is a potential $200 to $400 savings on laboratory and delivery fees attendant to the patients' pregnancies.

The study protocol provides for initiation of 24 hours of continuous uterine monitoring at 20 completed weeks of gestation. Each patient is given a home monitoring unit to keep (the study center maintains two backup units) for the duration of the study. On days monitoring is performed, it begins at 6 a.m. on the first day and continues until 6 a.m. on the second day. After a succeeding period of not less than 24 hours and not more than 72 hours has elapsed, the patient repeats the 24-hour monitoring procedure. In this way, the patient completes two 24-hour periods of uterine monitoring each week until the date of delivery. In addition to the 24-hour uterine monitoring, each patient keeps a log of activities (daily activity log) for the periods during which the monitor is worn. This activity log, which includes

information on emotional states, is reviewed with a nurse over the telephone. The home monitor (tocodynamometer) stores all uterine activity data for 24 hours, whereupon the data is transferred by phone to a microprocessor terminal where all data is stored using a computer-assisted algorithm.

In summary, at any one time during the study, one dedicated home monitor per patient will track 10 patients twice weekly for twenty weeks. All home monitoring data is input to a computerized database system, and all data is maintained at the individual study sites until the study is completed. At that time, all data is transferred to the designated study center, where it is amalgamated and analyzed descriptively, with appropriate statistical comparisons generated.

Analysis Plan

Data for each 24-hour record of uterine activity and the daily activity log are printed as hard copy using a standard report form and maintained as part of each patient's study record, along with Patient Entry and Patient Delivery Forms.

All patients and their demographic characteristics are described using standard descriptive statistical techniques. Data analysis includes cross-sectional, longitudinal, trend, and multiple factor discriminant analyses and multifactorial analysis of variance.

Uterine activity is defined for all patients using descriptive statistical analysis for all patients. Uterine activity data is defined across gestational age using weekly, bimonthly, and monthly intervals. Analysis includes several defined parameters, including, among others: duration and frequency of contractions, daily uterine activity quotient (the total summed time of uterine activity in minutes for each hour divided by 60 minutes), and gestational age, evaluated longitudinally, for each patient, for all patients using cross-sectional analysis, and for patients who are nulliparous and multiparous. Comparative statistical tests (multifactorial analysis of variance, trend analysis, and multiple factor discriminant analysis) are used to evaluate the hypotheses that relationships between uterine activity, gestational age and parity exist. The influence of diurnal rhythm, i.e., clock hour, are evaluated using the comparative statistical tests, Student's t-test and analysis of variance across all gestational ages and as a function of gestational age.

LISTENING PARTNERS: PSYCHOSOCIAL COMPETENCE AND PREVENTION

GRANTEE University of Vermont

INVESTIGATOR Lynne A. Bond, Ph.D.
Department of Psychology
University of Vermont
Burlington, VT 05405
Telephone: (802) 656-2680

GRANT AWARD INFORMATION

Project Number:	MCJ-500541
Project Period:	10/01/86–09/30/89
Grant Year:	3 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	192,237	233,161	196,089
Requested:	211,085	229,791	135,071

SUMMARY

Study Objective

The overall goal of the proposed study is to evaluate the effectiveness of an investigator-developed intervention, The Listening Partners Program, which is designed to promote the intellectual and ethical development of impoverished single mothers who live in isolated rural areas and have children under the age of six. The specific aims of the project are to:

1. Determine the impact of the Listening Partners (LP) Program on the development of the mother's ethical and intellectual reasoning, parent communication strategies and conceptualization of the child, and characteristics of maternal social support network.
2. Examine the interrelationships among these variables.
3. Gather systematic data on rural, poor, single mothers and their interactions with their young children.
4. Develop a cost-effective preventive intervention for mothers and young children, which is particularly sensitive to the needs of the rural poor.

Research Questions or Hypotheses

The study has the following major hypotheses:

1. Maternal levels of epistemological and moral development are positively interrelated and are associated with mothers' Parental Communications Strategies and Construction of the Child interviews at pre- and post-intervention assessments and at followup.
2. Compared to matched controls, the mothers in the experimental program will show greater gains in a measure of epistemological development and greater gains in a measure of moral development. The experimental mothers will also

show a greater increase in a measure of responsibility orientation than will the control mothers, and the experimental mothers will demonstrate a greater shift toward viewing children as active constructors rather than passive recipients of knowledge. Concomitantly, there will be greater decreases among the experimental mothers in both measures of impulsivity and in measures of use of authoritarian strategies. Finally, the experimental group mothers will have greater increases in the size of their social support networks than will the control group mothers.

3. Maternal behavior in parent-child interaction episodes measured at post-intervention and followup times will be related to contemporaneous measures of maternal epistemological and moral development as well as to maternal Communication Strategies and Construction of the Child interviews.
4. It is expected that several of the hypothesized associations will appear stronger at the followup interview than at the post-intervention interview.

Population and Sample Description

During each of two consecutive years, a sample of 30 experimental subjects and 30 matched controls are selected, yielding a total sample of 120 subjects. The experimental LP program recruits women aged 15-25 who are:

1. Raising at least one child under the age of six.
2. Living below the poverty line.
3. Heads of single-parent households.
4. Experiencing or have experienced any personal or family history of violence and/or substance abuse.
5. Living in rural isolation and have little support from the children's father or grandparents.
6. Limited in either work skills or education or both.

Study Design

This study is a randomized clinical trial in which the experimental intervention is the LP program.

Methods and Procedures

To recruit study subjects, a letter describing the study is sent to a wide variety of educational and social service agencies that serve the targeted geographical area. The letter is closely followed by a personal visit to enlist the agency's support. Agencies and individuals are asked to search their records for possible referrals, especially for those families which are isolated, have been hard to reach, and who are not currently participating in a peer support program. Any mother participating in Parents Anonymous, Alcoholics Anonymous, or other counseling is excluded.

Methods of data collection include subject self-description, the Actual Moral Judgement Interview, the Epistemological Development Interview, the

Hypothetical Moral Judgment Interview, the Communication Beliefs Questionnaire and Interview, the Arizona Social Support Interview Schedule, the Porteus Maze Test, and observations of parent-child interaction.

Assignment of participants into experimental and control groups is determined by matching volunteers as closely as possible on the variables screened for during first contact, and randomly assigning the members of each pair to experimental and control groups. During the second contact with participants, group assignments are discussed, further questions are addressed, and consent to participate is obtained. The informed consent material is documented in both a written handout and also on audiotape so that those who cannot read have clear access to the material and are able to review it whenever they wish.

Analysis Plan

Different approaches to data analysis will be employed, depending upon the individual hypothesis, the nature of the dependent variable under consideration, and, in some cases, the specific data which result. The analyses planned fall roughly into two categories: (1) confirmatory, and (2) exploratory. Examples of confirmatory analyses are those involving group differences, those involving between-group comparisons, and those which measure mother-child interaction. One set of hypotheses related to group differences postulates an interrelationship among measures of epistemological and moral development, Parental Communications Strategy, and Construction of the Child. These surmised relationships will be examined by computing Pearson correlations for each pair of variables. These correlations will be computed separately for each set of pre-, post-, and followup measures. Between-group comparisons concern differences with respect to a number of variables. In these analyses one can take advantage of the fact that the subjects were paired and then assigned at random to the two treatment groups. The sign test will be used to test these hypotheses. Finally, a variety of exploratory analyses will be used to examine:

1. Maternal endorsement and/or use of communication strategies other than the three which are addressed in the study hypotheses;
2. Characteristics of maternal social support networks other than simply network size;
3. Characteristics of successful and unsuccessful LP pairs;
4. The quantity and types (contexts) of contact with LP pairs; and
5. Both experimental and control subjects' use of other community resources, programs, etc.

The planned analyses make the general assumption that the method of randomly assigning a member from each matched pair to the experimental and control groups will produce groups which are equivalent at pretest. Since assignment is mainly based on pretest scores, this is a very reasonable assumption. Because of this method of group assignment the investigators have planned frequent use of repeated measures analysis of variance and have not, at this time, made provision for any of the pretest measures as a covariate. This decision, however, could be reversed in light of later information.

FAMILIAL ADAPTATION TO DEVELOPMENTALLY DELAYED CHILDREN

GRANTEE University of Washington

INVESTIGATOR Mark T. Greenberg, Ph.D.
University of Washington
Child Development and Mental Retardation Center
Seattle, WA 98195
Telephone: (206) 545-1278

GRANT AWARD INFORMATION

Project Number:	MCJ-530517
Project Period:	05/01/85–04/30/89
Grant Year:	3 of 4
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4
Awarded:	123,571	140,599	149,409	no cost extension
Requested:	123,571	131,857	140,434	149,194

SUMMARY

Study Objective

The two major objectives of this study are to determine whether parents of a developmentally delayed child differ from control parents across measures of parent-child interaction, attitudes, family status, coping resources, and perceived stress; and to identify the degree of stress perceived by these families, and the moderating effect on family adaptation of various coping resources.

Research Questions or Hypotheses

The major hypotheses of the proposed study are:

1. Families with a handicapped child will report greater stress on objective measures than families with a non-handicapped child.
2. High levels of stress will have a deleterious effect on parent-child interaction and child outcome.
3. Coping is a developmental process and the coping process in these families will vary across time and in relation to the degree of perceived stress.
4. Family adaptation will vary as a function of using coping resources, with more positive adaptation related to more effective use of coping resources.
5. Child developmental status will be positively related to the family's adaptation response.

Population and Sample Description

The subjects for the study are 120 families, of which 60 are families with a developmentally delayed (DD) child, and 60 are families with normally developing

children. The experimental group (families with a DD child) are drawn from the population of subjects available through the Child Development and Mental Retardation Center (CDMRC) Child Study Clinic. The criteria for selecting children for the experimental group are: diagnosis of mild or moderate developmental delay, no moderate or severe sensory handicaps or motor syndromes, age between 2.0 and 5.0 years, residence with biological mother and within two hours driving time of the University of Washington.

The families in the control group are recruited from the population of families who use CDMRC services for routine well-child visits, and the control families are matched with the experimental families on child's age, race, mother's marital status, and mother's education. The two groups are balanced with respect to child's sex and birth order.

Study Design

This study uses a longitudinal, quasi-experimental design, and it is basically a static group comparison.

Methods and Procedures

Families of delayed and non-delayed children are seen for a total of four visits over a two-year period. The first visit is at time of diagnosis for the delayed group, with subsequent visits at eight-month intervals. For the control children, visits are scheduled at chronological ages matched to the experimental children. Measures of stress, child characteristics, parental attitudes, parental coping resources, and family functioning are collected at each visit. Also, each clinic visit involves direct behavioral observations of mother-child interaction, a behavioral assessment of the child, and a family interview.

Analysis Plan

Data analysis involves statistical analysis to test the major hypotheses of whether differences exist between the control and experimental families on child characteristics, parent health/energy/morale, parent problem-solving skills, social networks, use of resources, general and specific beliefs, and coping ability. In order to determine the interaction patterns between mothers and their children over time, detailed analyses of selected behaviors from the observations are conducted with repeated measures multivariate analysis of variance (MANOVA). Between-group differences on the first wave of parental variables are determined using multivariate statistics. Because the impact of a developmentally delayed child varies from family to family, within-group analyses of the experimental families will also be performed. Measures of marital adjustment, social support, and the Questionnaire on Resources and Stress (revised) and other similar measures are dichotomized at their medians to separate the experimental families onto groups of high and low-functioning families. Also, since stress is presumed to be important in this study, there is an analysis of how stress affects the parents' involvement in their child's treatment Those variables which contribute to the amount of parental compliance with clinic recommendations are examined with stepwise multiple regression

analyses, with measures of compliance as the dependent variables. Taking into account the developmental nature of this study, it is necessary to analyze the data from the younger and older children separately to determine the extent to which differences are related only to a child's developmental status.

MOTHERING IN ADOLESCENCE: FACTORS RELATED TO INFANT SECURITY

GRANTEE University of Washington

INVESTIGATOR Susan J. Spieker, Ph.D.
University of Washington
Child Development and Mental Retardation Center
Seattle, WA 98195
Telephone: (206) 543-9200

GRANT AWARD INFORMATION

Project Number:	MCJ-530535
Project Period:	04/01/86–03/31/89
Grant Year:	3 of 3
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3
Awarded:	128,700	151,010	114,049
Requested:	142,511	166,047	125,420

SUMMARY

Study Objective

To understand the psychosocial and environmental factors that enable adolescent mothers to foster secure infant attachments.

Research Questions or Hypotheses

This research is based on a model which assumes that the quality of mothering is the primary determinant of secure attachment. The model also assumes that to promote secure attachment, the mother needs to be sensitive and appropriately responsive to the infant cues. The mother's ability to be sensitive is determined in part by the nature of her internal working model of her childhood, herself, and attachment relationships. Based on this model and its underlying assumptions, the study posits the general hypothesis that mothers who have more secure relationships with their own parents, whose life stress is more limited, whose social support is more available, and whose own personality seems healthier, will be more likely to provide sensitive care to their infants and thus have babies that develop secure attachments to them.

Population and Sample Description

The study population consists of all adolescent mothers (less than 19 years of age) and their year-old infants residing in Whatcom County, Washington. In Whatcom County the mean number of births to adolescents mothers during the 1982-83 period was 157. The study recruits subjects for 24 months thus it anticipates a final sample of 300. The first 60 subjects contacted who agree to participate are enrolled in the longitudinal study and are studied intensively beginning in pregnancy and over their infant's first year of life. The ones who volunteer thereafter participate in

the cross-sectional study beginning when the infant is 12 months old. The adolescents are recruited from all social backgrounds represented in the county, which is 95 percent white, 3 percent Native American, Alaskan, or Aleutian, 1.8 percent Hispanic, and 0.2 percent black.

Study Design

A static group comparison design is employed consisting of longitudinal and cross-sectional components.

Methods and Procedures

The subjects are recruited using the High Priority Infant Tracking (HPIT) program of the Bellingham-Whatcom County Public Health Department (PHD). The program has been fully operational for one year. Infants of adolescent mothers are automatically considered at risk under HPIT guidelines, so adolescent mothers enter the tracking system when they first approach the PHD for prenatal services. At that time, all potential subjects are informed about the project and given a choice to not enroll, or to enroll in either the longitudinal sample beginning in pregnancy, or in the short term sample, beginning when the infant is 12 months.

The large number of subjects who represent the cross-sectional sample are studied for the first time at 12 months of age. At this time, mother-infant interaction is observed, and an already validated coding system is used to assess the sensitivity and the quality of mother's availability to her infant. In addition, through interviews and questionnaires, life-stress assessments are made of life events in the mother's recent history, as well as of her social self-esteem. These data, obtained when the infant is twelve months of age through home visits, are then used to predict the quality of the attachment relationship, as revealed in the Strange Situation paradigm, videotaped when the infants are studied at 13 months of age.

The 60 longitudinal subjects are studied more intensively with special focus on the mother's working models of their own attachment relationships, using an intensive interview procedures developed by Mary Main, as well as some questionnaires developed by others. The quality of the adolescent mother's relationship with her own parents while growing up is investigated. Data on the teenage parent's relationships with their own parents are gathered in the last trimester of pregnancy. In addition, at this time, data are also collected on social support, self esteem, and social desirability. Social desirability is considered to be conceptually important because it is assumed, on the basis of data that the investigator has gathered for another study, that some mothers will present a very positive image of their relationship with their own mother and with much of their world, that, in fact, distorts their actual experience. Social desirability will therefore be a means to determine who might be misrepresenting their past relationships as well as their current situation.

Once the infants are born, a home visit is conducted in the first week of life to gather data on neonatal capacities using the Brazelton scales. At this time, an observation of mother-infant interaction is conducted as well as assessments of social support. At six weeks and at three months postpartum, additional followup

observations of mother-infant interaction and interviews regarding social support are conducted. Subsequently, at three months, mother's knowledge of child development is assessed as well. All of these factors obtained longitudinally—first prenatally, then in the newborn period, then at six weeks, and three months—are conceptualized as antecedents of individual differences in attachment.

Analysis Plan

Discriminant analysis is the principal statistical technique used. Two discriminant analyses are performed. The first utilizes all 300 subjects from both the longitudinal and cross-sectional samples, and uses only the variables measured at 12 months of age. In order to combine the longitudinal and short-term sample, it must be shown that the two groups do not differ on the variables of concern. Multiple t-tests are used for this purpose. If no more significant differences are found than would be expected by chance, then the two groups are combined for the first discriminant analysis. Because a stepwise procedure tends to artificially inflate the magnitude of a model fit, a robust estimate of classificatory accuracy also will be assessed using a jackknifing procedure.

The second discriminant analysis is used only on the longitudinal sample. Because of the small sample size this test may not have much power. However, its primary purpose is to generate hypotheses about the contribution to attachment outcomes of the adolescent mother's degree of egocentrism in her representation of parent-child roles, and by the security of her mental representations of attachment in general. Furthermore, a log-linear model will be fitted to a three-way contingency table, in order to determine to what extent parent's classification on the Parent Awareness Interview (PAI) and the Berkeley Adult Attachment Interview (BAAI) correspond to an infant's attachment classification.

EPILEPSY IN PREGNANCY: DEVELOPMENTAL FOLLOWUP OF INFANTS

GRANTEE University of Washington

INVESTIGATOR Mark S. Yerby, M.D.
University of Washington
Child Development and Mental Retardation Center
Seattle, WA 98195
Telephone: (206) 545-1350

GRANT AWARD INFORMATION

Project Number:	MCJ-530552
Project Period:	04/01/87–03/31/92
Grant Year:	2 of 5
Type of Grant:	Continuation

Costs:	Year 1	Year 2	Year 3	Year 4	Year 5
Awarded:	103,036	109,300			
Requested:	103,035	108,177	117,638	125,912	130,749

SUMMARY

Study Objective

The study's objectives are to determine if there are differences between the children of epileptic (case) and non-epileptic (control) mothers with respect to malformations or neurodevelopmental outcomes; and if group differences are found, to look for correlations between outcomes and the maternal prenatal and perinatal histories, specifically seizure type and frequency and anti-epileptic drug (AED) use.

Research Questions or Hypotheses

The primary hypothesis is that there are significant differences between case and control groups, with the children of epileptic mothers having more malformations and a greater likelihood of adverse neurodevelopmental and behavioral outcomes. In particular, the children of epileptic mothers are expected to exhibit relative delays in infant development beyond the neonatal period: adverse behaviors characterized by difficulties with irritability, adaptability, attention, and mood; delay in the development of language; less effective use of language; less effective parent-child interactions characterized by reduced sensitivity to cues and less contingent responding to mothers; and lower IQs than a group of agemates who are the offspring of otherwise similar mothers who do not have epilepsy.

In addition to being able to compare the frequency and severity of outcomes between the two groups of children, the project can correlate exposure (type, frequency, and timing of maternal seizures, and type and quantity of AED exposure) to outcomes within the offspring of epileptic mothers. Within that group, negative correlations between neurodevelopmental outcome and both seizure frequency and AED use are expected. Within the subgroup of mothers experiencing seizures during pregnancy, more negative outcomes are expected for

those with generalized seizures than for those with complex seizures. First-trimester seizures (and possibly drug effects) are thought to be more likely to relate to congenital defects, whereas third-trimester seizures are more likely to relate a broader (though probably subtle-to-mild) picture of developmental deficit. This kind of differentiated investigation has, to our knowledge, not heretofore been possible in other studies of this problem because investigators have not followed mothers so carefully throughout the pregnancy nor continued the followup long enough to be sensitive to mild, higher-order deficits (such as language) appearing past the sensorimotor period. The project also gathers information about postnatal exposure to AED through breast milk, a factor which has been almost totally unexplored.

Population and Sample Description

The subjects of this study are 68 pregnant women with epilepsy and 46 matched non-epileptic controls identified during pregnancy and followed prospectively throughout pregnancy until 8 weeks postpartum. In addition, 64 infants of the women with epilepsy and 44 infants of the non-epileptic control mothers are followed for three years postpartum.

Study Design

This study uses a two-group, prospective, longitudinal (repeated measures) design to investigate the role of maternal illness on child development. The study has both between-group (epileptic versus control) and within-group (epileptic) analytic structures.

Methods and Procedures

Epileptic mothers are enrolled (if possible) before conception or by the 12th week of gestation. When they are enrolled in the prenatal phase of the study, they are told of the possibility of a followup phase, although they are not asked to enroll formally in this study and to make available the data from the first stage until the existence of the followup is assured. Recruitment of non-epileptic mothers takes place during the third trimester. Permission is obtained for the perusal of prenatal records, and a family history is taken at this time, parallel to that collected from the epileptic mothers.

Prenatal, perinatal, and postnatal factors are examined in relation to child competence and behavior as they emerge over time. The long-range effects of such outcomes as lower birthweight or head circumference, commonly found in infants of epileptic mothers, are not well described in the literature on this group of at-risk children. Some information suggests that the perinatal growth differences are not stable, and it is possible that early delays in cognitive and motor development may, even if they are discovered, disappear or diminish as postnatal growth proceeds. Because many higher-order cognitive and behavioral functions and subtleties are not observable in children during the first two years, followup needs to be extended, at a minimum, through the third year of life. The major set of variables at age three are measures of language because language development represents the salient

"cutting edge" of development at this age and therefore should be most sensitive to possible group differences. With few exceptions, all postnatal data are collected "blind," the pediatricians and psychologists in particular remaining uninformed about the health status of the mothers.

The followup protocol is the same for both cases and controls. A dysmorphology exam is done at eight weeks of age and again at three years. At 12 months, the children are seen by a pediatrician for a general physical exam including growth parameters, a detailed neuromotor evaluation, and an audiologic evaluation. The parents also complete a questionnaire on their child's temperament. At 24 months of age, they see a pediatrician and also a psychologist, who administers the Bayley Scales of Infant Development and does a 20 minute videotape to look at parent-child interaction, activity level, language development, and play maturity. The parents complete questionnaires on language and temperament. At 36 months of age, they administer the Stanford-Binet IV and obtain a language sample. The parents again fill out questionnaires on language and temperament. Mothers are reimbursed $15 per clinic visit to cover transportation.

Analysis Plan

Descriptive measures of growth, language, and motor development are obtained for both the cases and controls. For the growth measures (height, weight, and OFC) a two-sample t-test or a Wilcoxson rank sum test is carried out to determine if there is any significant difference between the two groups. Differences in incidences of abnormal growth or motor development are assessed using Chi-square tests.

Although mothers are chosen to assure comparability on factors such as maternal age, differences between the groups can occur in other characteristics such as method of delivery. Where such differences occur, analysis of covariance or Mantel-Haentzel's method for combining 2 x 2 tables are used to determine whether these factors might explain observed differences.

As differences between the two groups are established, multiple regression techniques are used to determine if variability in such factors as maternal AED levels and/or maternal seizure frequency during pregnancy correlate with the outcome variables for the exposed group.

The frequency of outcome measures is compared between the two groups (cases and controls) using t-tests or Chi-square tests of statistical significance. In addition, correlations are sought between maternal seizure frequency and maternal AED use with certain pregnancy outcomes, selected parental factors, and selected child outcomes.

Grantee Index

GRANTEE INDEX