

A DESCRIPTIVE STUDY
OF A SCREENING CLINIC FOR 3-YEAR-OLDS

by

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B. Sc. N., University of British Columbia, 1951.

A THESIS SUBMITTED IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE IN NURSING

in

THE FACULTY OF GRADUATE STUDIES
(School of Nursing)

We accept this thesis as conforming
to the required standard

THE UNIVERSITY OF BRITISH COLUMBIA
March, 1978

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ABSTRACT

A community health unit in a British Columbia suburb established a screening clinic for 3-year-olds modelled on similar programs already operating in nearby localities. The purpose of the study was to describe this new screening clinic: to report on the procedures employed, the personnel involved, the characteristics of the clientele, and the types, incidence, and disposition of problems detected amongst the children brought to the clinic.

The study population consisted of the 47 children and their parents who were the clients of the clinic during its first three months. The research instruments were original questionnaires and forms devised to obtain sociological and health history information. The forms were completed during a home visit and by a telephone interview with each family. The data are arranged in frequency tables and percentages calculated where appropriate. A few variables are cross-tabulated to add descriptive depth to the study.

The families in the study were from the middle and upper-middle class segment of society. They had frequently used other health resources in the community. The mothers' main concerns were about speech and language development and behavior problems of their children. Twenty-four children were referred by the clinic staff for 39 problems requiring retesting, further investigation, or intervention.

Twelve of these referrals were for problems of vision, 10 for behavior, 6 for speech and language, 3 each for hearing, nutrition, and dental health, and 2 for physical developmental delay.

The children cooperated enthusiastically in the test procedures and their parents found the clinic to be reassuring and a valuable learning experience. The parents were willing to comply with the referrals, but some delays in the follow-up procedures were noted, due to the newness of the clinic.

The screening clinic for 3-year-olds appears to be filling a previously unmet need in the community. Community health workers involved in planning and promoting new services should find the detailed descriptions of the procedures and of the clientele of the clinic useful to them. The extensive bibliography provides a background of published material on the rationale and result of a variety of methods of screening. Comparison with similar clinics in other areas will be impossible until terminology used, test procedures employed, and methods of reporting results are standardized. Meanwhile, the clinic staff should continue to maintain statistical evidence of the results obtained and to evaluate the procedures used in its program.

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ACKNOWLEDGEMENTS

I would like to thank the children and parents of the study population who joined me in this project so enthusiastically and who gave so generously of their time.

I'm indebted to the many dedicated people who have worked with young children and who have written about the results of their work.

For their continuing support and encouragement, I'm most grateful to family, friends, colleagues, faculty advisors, classmates, librarians, correspondents, and many other associates in community health and education.

Chapter I

INTRODUCTION TO THE STUDY

This study describes a screening clinic for 3-year-old children established by a community health unit in a British Columbia suburb, and profiles the small population of parents and their children who were its first clients.

Although similar screening programs have operated in other areas for a number of years, the literature contains few studies that report on the effectiveness of the programs as measured by the comprehensiveness of their coverage of community populations, the incidence of problems detected, or the proportion of clients who comply with clinic referrals.

The clinic described in this study is staffed by community health nurses, a speech therapist, and a dental hygienist. It offers a variety of standard screening procedures designed to detect existing or potential health problems and delays in normal development. Children in whom such problems are detected are referred to appropriate health professionals for further investigation and remedial intervention where indicated.

Screening programs for preschoolers are of interest to the author because, as a community health nurse, she has met many mothers who are concerned about whether their children are developing normally, and because in her work

in schools she frequently encounters children who have entered the educational system handicapped by undetected sensory or physical impairments.

There is an obvious need for earlier detection of these handicapping conditions so that interventions can be undertaken which will allow the affected children to function at their optimal level. Routine screening of children at the age of 3 appears to offer hope that many potentially handicapping conditions can be discovered and remedied before the children enter the school system.

Definition of the Problem

A screening clinic for 3-year-olds was established in a British Columbia suburb by a community health unit. The organization of the program and the procedures employed were modelled on programs already functioning in nearby localities. Because no evaluation had been done on these programs to demonstrate validity of the procedures or the effectiveness of the clinics, planning for the new clinic was based on assumption and imitation.

Purpose of the Study

The purpose of the study was to investigate and describe this new screening clinic for 3-year-olds, and to report on the procedures employed, the personnel involved, the characteristics of the clientele, and the types,

incidence and disposition of problems detected.

Specific Objectives of the Study

1. To describe the operation of a screening clinic for 3-year-olds and the specific procedures and personnel involved.

2. To describe the characteristics of the children brought to the screening clinic.

3. To describe the characteristics of the parents who make use of the screening clinic, including the socioeconomic status of the attending families, based on the parents' occupations and education.

4. To elicit parents' perceptions of current and potential health or behavioral problems of their children and to identify their preferred sources of help for these concerns and their previous use of community health resources.

5. To determine the incidence and types of problems detected by the clinic staff and the distribution of referrals of these problems to other health professionals.

6. To determine the subjective responses of the children and their parents to the clinic experience.

7. To determine to what extent parents comply with referrals and with subsequent therapeutic programs.

8. To obtain other information that might help the sponsoring health agency to improve and promote this new service.

Significance of the Study to Nursing

Contemporary educational programs are preparing nurses to undertake increasing responsibility for health services in the community. One way in which nurses are meeting this new challenge is by planning and operating screening programs for apparently well children. Such programs are assumed to be one way of reaching those children who would benefit from early remediation of hitherto undetected disabilities. However, without knowledge of the segment of the community which actually utilizes the service, the results to be expected, and the benefits derived from such a program, the true value to the community of this nursing role cannot be determined.

Chapter II

LITERATURE REVIEW

The literature was reviewed from several perspectives. Books and articles were reviewed on developmental theory; definitions of screening; the rationale for screening programs (both for disease and for developmental delay); various procedures used in screening programs to assess developmental status, vision, hearing, speech and language development, nutritional status, dental health, and social adjustment; the professional personnel employed in various screening programs; the optimal age for screening; participation in screening programs by various groups among the population, in terms of socioeconomic factors and of the "at-risk" concept; and the incidence of potentially handicapping disorders detected by screening programs.

Developmental Theory

Formalized developmental theories of childhood began with the work of Arnold Gesell in the United States and Jean Piaget in Switzerland in the 1920s. Gesell, a pediatrician at Yale University, used the controlled observations of children in his pioneering studies (Gesell and Ilg, 1923) and devised scales for testing the child's developmental progress (Gesell and Amatruda, 1947). Piaget,

a professor of child psychology at the University of Geneva, developed his theories partly as the result of his detailed and analytical observations of the behavior of his own three children over the first several years of their lives (Beard, 1969, p. xii).

The development of the child proceeds continuously from birth, but is characterized by sudden and marked changes in complex patterns of behavior. Much of developmental theory is concerned with the definition of the developmental stages (Sutton-Smith, 1973, p. 162) through which the child passes, and with delineating the normal parameters of the child's progress through these stages. Various screening procedures have been devised to measure the child's development stage by stage. Orderly progress is important (Ginsburg and Oppen, 1969, p. 29) because certain capabilities are most easily acquired during specific definable periods in childhood. A Conference on Critical Periods of Development in New York in 1961 (Havighurst, 1972, p. 6) promulgated the theory of the critical period or the teachable moment in childhood. Psychologist Paul Mussen (1963, p. 12) explains that "the child who does not learn (certain tasks) during these periods may have great difficulty learning them later."

Definitions of Screening

The Conference on Preventive Aspects of Chronic

Disease, sponsored in 1951 by the Commission on Chronic Illness, defined screening, according to Wilson and Jungner (1968, p. 11), as:

the presumptive identification of unrecognized disease or defect by the application of tests, examinations, or other procedures which can be applied quickly A screening program is not intended to be diagnostic. Persons with positive or suspicious findings must be referred to their physicians for diagnosis and necessary treatment.

The U.S. Department of Health, Education and Welfare defines screening (Terrell, 1974, p. 10) as:

the use of quick, simple procedures which can be carried out with large groups of people to sort out apparently well persons from those who have a disease or abnormality and to identify those in need of more definitive study.

Thomas McKeown, Professor of Social Medicine at the University of Birmingham, defines prescriptive screening (McKeown, 1968, p. 6) as:

investigation which has as its primary aim neither research nor the protection of public health, but a direct contribution to the health of individuals.

Clinical psychologist Ken Lessler argues (1972, p. 101) for a broad definition of screening, one which goes beyond physical health problems to encompass any process or condition which may be detrimental to the child's growth

and positive development.

He proposes (p. 193) this definition of screening:

The acquiring of preliminary information about characteristics which may be significant to the health, education, or well-being of the individual and which are relevant to his life tasks.

Muriel Uprichard (1972, p. 30) makes the distinction between "medical care" and "health care", the latter being "the effort to assist each individual to achieve his optimum level of wellness." Screening is one way to promote what Kirsten Weber (1972, p. 138) defines as "high-level wellness" by seeking out those individuals in the general population whose potential for this state of wellness may be impaired.

Rationale for Screening

In a broad sense, screening has been explained as part of a general trend away from "complaint medicine" to what could be called "maintenance medicine", in which a health team continuously endeavors to protect and maintain the health of the population for which it is responsible (Kaprio, 1968, p. 345).

"Once we move from looking for communicable diseases to looking for chronic conditions or developmental problems," says Lessler (1972, p. 193), "we can no longer easily separate the sick from the well." Nor should this be a

prime concern. "It is more important to gain information and understanding about problems of growth and development and the handicapping conditions of childhood." Such information, he notes (p. 195), is more important during the child's earliest years than after his life patterns have been established.

Lessler insists that the information obtained by screening must have relevance to the child's particular life situation. "A condition or characteristic which may be adaptive for one person, in one set of circumstances, and at a given point in his life, may be problematic for another person at a different time, or in a different cultural milieu" (p. 193).

In Canada, the Hall-Dennis Report (1968, p.80) suggested a coordinated health and educational service to serve parents in the critical preschool developmental period of their children's lives when, it said, a great deal can be done to "identify and alleviate characteristics and conditions that are potentially detrimental to the child's later development."

The CELDIC Report (Shannon, 1970, p. 164) mentions the need "to provide for continuing care during the preschool period in order that early detection of difficulties in development would allow for prompt remediation." The report described the incidence of emotional and learning disorders among Canadian children as of epidemic proportions, and estimated that one million

children were in need of integrated professional services (p. 59).

In "A New Perspective on the Health of Canadians", Health Minister Marc Lalonde (1974, p. 61) states that 5 to 10 percent of Canadian school children have an emotional or learning disorder that should receive professional care.

Disease Screening. The scope of a screening program may range from determination of the incidence of a specific disease entity such as urinary tract infection within a limited population (Constable, 1975, p. 172), to attempts to estimate the level of the general health of an entire nation (Goldsmith, 1972, p. 214).

In recent years the concept of multiple screening has come to the fore. Multiple screening involves the administration of a battery of standardized tests to a population with the aim of detecting existing or potential disease or disability at low cost through efficient use of personnel and facilities. The concept is not universally accepted. Smillie, for example, in a 1952 paper (p. 256) declared that

Multiple screening (is) inferior
medicine, poor medicine, slipshod,
short-cut medicine and, furthermore,
poor public health.

Developmental Screening. The aim of any screening program is to detect the target abnormality at an early stage, when it is most likely to be susceptible to remediation. This applies to developmental delays as well as to disease entities. The work of the developmental theorists has led to the creation of tests which can be used with some confidence to detect delays in development which, if unrecognized, could seriously handicap the child in later school and social situations.

There is general agreement among authors who have written on the subject of developmental progress that many potentially handicapping conditions can be detected before the child reaches school age, but often this is not done. Wintle et al, in a British study (1972, p. 327) found that 87 percent of all defects detected in school medical examinations were previously unknown to the general practitioner or to the district nurse. The Lancet (1975, p. 784) says that between 10 and 20 percent of children in Britain still reach school age with defects, often treatable ones, that have gone undetected.

In a review of American screening programs, Rogolsky (1968-69, p. 18) reports that about 40 percent of all kindergarten children have problems which can seriously interfere with their learning or adjustment in the early primary-school years. Bower (1969, p. 11) comments that

failure to function in school is not tantamount to failure in life but it comes perilously close in this day and age.

Does developmental assessment actually detect treatable conditions? MacKeith (1975, p. 328), reporting on British experience, says that children with cerebral palsy used to arrive for treatment at an average age of 2 1/2 years. However, he says, in an area where universal periodic developmental assessment has been done for several years, 90 percent of cerebral palsied children now enter treatment during their first year of life. Davis (1975, p. 105) considers that effective preschool screening should be able to detect virtually all congenital abnormalities.

Specific Problem Screening. The rationale for disease or developmental screening may focus on some specific areas of concern.

1. Vision:

The importance of effective visual functioning to a child's normal development is self-evident.

If a young child cannot develop normal binocular vision because of inequality of refraction or a squint, the vision in the affected eye is suppressed to prevent the confusion caused by a blurred image or diplopia,

writes Perkins (1968, p. 253).

If suppression is allowed to persist, a permanent amblyopia will follow and, once established, is extremely difficult to treat.... Most squints start between the ages of 2 and 4, and if they are not detected and treated before the first school examination, amblyopia will be well established. It has been estimated that approximately 1 percent of the population is virtually one-eyed as a result of amblyopia.

In a review of ophthalmological services in the Northampton area, Ingram (1973, p. 279) reported that nearly 50 percent of the children with squint were over the age of 7 when first detected. By this age, there is no real hope of improvement with treatment.

2. Hearing, Speech and Language:

The ability to hear clearly has a significant bearing on the child's development of language and, therefore, social skills: "Hearing is the social sense" (Psychology Today, 1970, p. 271). Fellendorf (1975, p. 211) considers that

Detection of hearing loss, especially in view of the implications of undetected hearing loss with regard to a child's language and speech development, should be one of the public health agencies' major responsibilities.

A developmental disability affecting the development of language occurs in 1 of every 170 children, according to Schwartz and Murphy (1975, p. 722). They preclude "self-recovery" as a function of increasing age, and state

(p. 717):

Early detection of developmental language disabilities may be expected to maximize the effectiveness of remedial programs and minimize residual effects on communication.

Bricker and Bricker (1974, p. 454) argue for early speech training, stating that "particular errors become more consistent and persistent with age."

Stuttering is an affliction of 1 percent of the population, and the therapy is preventive (Bruce, 1972, p. 24).

3. Nutritional Status:

The Nutrition Canada Survey of 1970-72 revealed deficiencies in intake of various nutrients by a surprising number of Canadian children. For example, of those children under 4 years of age in the general (i.e., non-indigenous) population, more than 60 percent were not consuming adequate amounts of potential Vitamin D, 44 percent were deficient in iron intake, and 26 percent lacked sufficient calcium in their diets (Nutrition Canada, 1973, Table 5-3).

Reporting on the Nutrition Canada Survey, nutrition consultant Z.I. Sabry (1974, p. 343) proposed the development of systems for monitoring the nutritional health of Canadians in order to detect problems early and to enable the initiation of corrective measures.

(The validity of the Nutrition Canada findings has been questioned by Pett (1975, p. 165), among others. Pett contends that the survey data "cannot possibly be used to represent the population of Canada", since only 46 percent of Nutrition Canada's sample actually completed the survey.)

4. Dental Health:

Three out of five Canadian children have dental caries by the age of 3 years; by the early school years the figure has risen to nine out of ten (Dental Health Division, 1970, p. 20). In a paper evaluating the effectiveness of a dental program for 3-year-olds, Gray et al (1970, p. 192) declare that "To achieve good dental health with minimal premature primary-tooth loss, Grade I children (sic) should be under the regular care of a dentist by the age of 3 years." In an earlier article (1968, p. 202) Gray explains that the idea for the program, which involved sending birthday-card offers of free dental checkups to 3-year-olds, originated in California and was tried in the Interior of British Columbia because it had been found there too that "dental public health programs beginning at school entrance are too late."

5. Social Adjustment:

Family dynamics may be a source of learning problems, write McDonald and Soeffing (1971, p. 681), and

intellectual development may be influenced by family social patterns such as the nature of the mother-child or child-sibling interaction.

A Boston study reported by Pratt (1973, p. 76) found that restrictive parents who demanded conformity and obedience in their children failed in achieving long-term socialization objectives because the "children fail to develop their own internal capacities for self-correction." Conversely (p. 68),

granting of autonomy fosters competency and active coping behavior in children of which one important expression is sound health behavior.

Shaw (1974, p. 696) says that contemporary mothers, if they are to gain confidence in their role, require professional programs which supply the information on child development and assistance in child rearing once provided by the extended family.

Screening Procedures

Screening programs for preschoolers have taken a variety of forms as they have developed in different regions, in response to local traditions, needs and capabilities. Some include complete physical examinations by pediatricians; others rely on relatively simple tests, often performed by volunteers under professional supervision.

Typically a screening program encompasses some procedure to assess developmental levels; tests for vision and hearing; a dental examination; and an assessment of the child's nutritional status.

Lessler's definition of screening (1972, p. 193) fairly describes the program in operation at the clinic under study in this paper. Rather than focussing solely on the traditional health/illness dichotomy, this clinic seeks to identify physical, social or emotional states that might inhibit the child's attaining "high-level wellness." Like many other clinics reported in the literature, this one seeks to assess children in terms of developmental status (including personal/social and language skills), hearing, vision, nutrition, and dental health.

Developmental Status. In Lennart Kohler's pilot project of screening Swedish 4-year-olds, mental development and social adaptation were assessed by a psychologist who observed the children in groups of four or five. This was followed by an interview with each of the parents (Kohler, 1973, p. 13). This procedure appears to have been devised specifically for this study.

In Britain, the Stycar Developmental Sequences have been available since 1960. These schedules were developed

by pediatrician Mary D. Sheridan over a period of 35 years in an attempt to perfect an assessment tool specifically related to British children (Sheridan, 1975, p. 1).

In the United States and Canada, the most common assessment tool is the Denver Developmental Screening Test (DDST), developed by Frankenburg and Dodds (1967). This test provides a practical method of screening for evidence of slow development in infants and preschool children. It covers four functions: personal/social, fine motor/adaptive, language, and gross motor. The performance of the child is rated on a test form (Appendix E, p.127) on which 105 tasks are arrayed in the four sectors across the age range from birth to 6 years. Norms are given for the ages at which 25, 50, 75, and 90 percent of the children in the original test sample passed each test item. A manual (Frankenburg et al, 1970) provides instructions for administering and scoring the tests.

Although the test was originally standardized on a sample of 1,063 presumably normal children whose families reflected the occupational and racio-ethnic characteristics of the population of Denver, Colorado, in the 1960s, it has proven to be widely applicable in other contexts.

For example, Dr. Frederick A. North, former director of the U.S. Head Start program, found the DDST to be reliable and valid. He recommends using the parent-reported

items of the DDST to identify the large majority of clearly normal children, and applying the full DDST procedure to the remaining minority (North, 1974, p. 633).

In Canada, the DDST was made an integral part of the Etobicoke screening program because it "is easily administered and is conducive to health screening and anticipatory guidance" (Kirstine, 1974, p. 12).

The DDST has been used in an Alberta screening program (Edmonton, 1976), and in a number of programs in British Columbia (Thores and Philion, 1972; Wolf, 1976; Burnaby, 1976). Barnes and Stark (1975, p. 364), in a British Columbia study undertaken specifically to determine whether local norms were needed, found that the DDST can validly be used on a rural and semi-rural Canadian population.

Vision. A number of techniques have been devised to overcome the difficulty of testing the vision of very young children. In Sweden, for example, Kohler (1973, p. 16) combined a visual acuity test, a cover test, and a test of binocular vision, none of which required the child to be able to identify letters. He found these tests easy and quick to carry out, and follow-up studies showed that no children with functional strabismus or amblyopia had passed the screening tests.

Thores and Philion (1972, p. 269) used a gestalt technique for visual screening. This was developed from

the Stycar method but substituted simple geometric shapes for Sheridan's letters and toys. They felt this to be superior to the more traditional random-E test, which they felt confused some children.

The Etobicoke study used the Snellen illiterate-E chart and Good-lite equipment (Kirstine, 1974, p. 11). The Burnaby program (Burnaby, 1976) relies on an eye-muscle balance test.

North considers (1974, p. 632) that the Snellen chart can be used successfully on most children past the age of 3 or 4. But he says

it should amaze and chagrin us all to realize that after decades of routine vision screening for millions of children, almost nothing is known about the reliability or validity of the technique of screening for visual acuity.... Nonetheless, screening 'makes sense.'

Hearing, Speech and Language. A child's hearing and language development can be monitored, through the child's earliest years, by means of parent-answered questionnaires, according to North (1974, p. 632). After the age of 3 or 4, he says, testing by means of a pure-tone audiometer is feasible. This technique was employed in the Swedish health-control study of 4-year-olds (Kohler, 1973, p. 17); in the Etobicoke nursing assessment project (Kirstine, 1974, p. 11); and in the Vancouver Island preschool program (Thores and

Phillion, 1972, p. 269). For younger children, "play audiometry" may be used, as in the Stycar sequences (Sheridan, 1975, p. 67), and at the Halifax Hearing and Speech Clinic (Sortini, 1964, p. 71).

In British Columbia, two approaches are taken to the testing of hearing. Some screening programs (Wolf, 1976) use conventional audiometry; others, such as that of the Burnaby Health Department (1976), use the language-related items from the DDST as an indirect measure of the child's hearing ability.

Nutritional Status. Weight and height measurements constitute one rough assessment of a child's nutritional status. Admittedly the assessment is imperfect and indirect, but North (1974, p. 633) believes that growth measurements are so reassuring to parents that they can probably be justified on that ground alone. However, any interpretation depends on comparing the child's measurements with his own previous records, or with age-appropriate norms. The Children's Medical Center of Boston has devised an anthropometric chart which is commonly used for this purpose in British Columbia (Appendix G, p. 132).

Overnutrition leading to obesity may be a more serious problem in our affluent Canadian population than undernutrition. Many writers agree that obesity begins early in childhood, although over-feeding is not the only cause.

Overnutrition per se cannot and should not be singled out as the only factor in the high incidence of obesity among infants and children,

writes pediatrician Donald E. Hill (1975, p. 59).

However, feeding practices established in childhood are difficult, if not impossible, to alter, and likely play a role in the high incidence of obesity.... We should look for ways of identifying these individuals at an earlier age.... We need to identify these infants and children whose growth-pattern is abnormal and examine both the pattern and amount of food intake in order to reduce the likelihood of lifetime obesity.

Dental Health. A detailed dental examination and dental-health counselling session were included in the Swedish health-control program (Kohler, 1973, p. 17). Kohler found a high incidence of caries in his study population and concluded that a program of prevention should be introduced at a very early age: "The age of 4 is far too late" (p. 26). North (1974, p. 635) considers that "Dental caries are so prevalent that all children over age 3 should be counselled to obtain routine dental evaluation and preventive care."

In the Etobicoke nursing assessment project (Kirstine, 1974, p. 21), dental screening was included as part of the total physical assessment of the children.

Dental screening is also included in the screening program conducted by the Richmond Health Department (Wilson, 1976). It was omitted from the Central Vancouver

Island preschool screening program because, according to Thores and Pillion (1974, p. 386), "we were unable to tackle it."

Social Adjustment. As previously discussed, the DDST assesses some aspects of the child's personal/social functioning.

Perceiving the parent-child relationship as a causative factor in developmental difficulties, Cokin et al (1971, p. 504) initiated a teamwork approach in one clinic: the doctor and the social worker greeted the parents together before the child's examination, and the indicated remedial interventions, physical or social, were jointly planned.

Personnel Employed in Screening Programs

In surveying the literature on screening programs, the types of personnel who perform the assessment tasks were considered. The procedures performed and the relative emphases placed on various aspects of the assessment may be determined by the mix of professional workers involved in such a program.

Lessler (1973, p. 657) argues for a broad approach to screening. He writes:

Too often screening programs are encapsulated by professional boundary-setting. Educators look at cognitive development and 'school readiness.'

Mental health specialists look for behavioral or emotional problems.... Physicians search for deviations of physical growth.... Each alone, however, misses the whole child while looking at him piecemeal.

In the Swedish health-control model the assessment team consisted of Kohler (a pediatrician), a psychologist, a dentist, a registered nurse and a pediatric nurse (Kohler, 1973, p. 8). A detailed physical examination of each child by the pediatrician was an integral part of the study; because the results were so sparse Kohler questions the necessity of this type of examination (p. 24) and suggests delegating the initial health appraisal because "nurses with training and experience of children should make the best examiners" (p. 8).

In Britain, by contrast, Curtis Jenkins believes that screening should be done by physicians as a part of general practice. "The doctor should carry out the entire examination, and delegate none of it to other workers", he says (1975, p. 95).

MacKeith (1975, p. 328) says, however, that parts of the developmental assessment can be carried out by aides, or health visitors in the home, but this "needs to be under the constant supervision of experienced medical doctors."

Wintle et al (1972, p. 328), reviewing the results of school medical examinations in an integrated British

practice, found that four out of five previously unknown defects could have been detected by a suitably trained nurse.

In a Cardiff study of the use of the Denver Developmental Screening Test, Bryant et al (1973, p. 39) concluded that there was no significant difference between the test results obtained by doctors and those obtained by health visitors.

An unsigned Lancet article (1975, p. 785), reviewing British experience with developmental assessment, suggests that "well-instructed paramedical personnel may well do a more skilful assessment than a harassed or half-hearted doctor."

Increasingly in the United States child assessment has been delegated to pediatric nurse practitioners. McAtee and Silver (1974, p. 579) say that surveys and evaluation studies of the University of Colorado pediatric nurse practitioner program have shown that these practitioners and pediatricians agree closely in their assessment of the health status of children.

Terrell (1974, p. 11) describes a program of Early and Periodic Screening, Diagnosis and Treatment (EPSDT) offered to U.S. children eligible for Medicaid benefits. The clinic on which she focusses is staffed by three public health nurses and a pediatric nurse practitioner.

Specially trained community health nurses performed

the assessment procedures on the children in the Etobicoke study (Kirstine, 1974, p. 20). There was no objective assessment of their performance.

In Edmonton, community health nurses perform routine preschool assessment procedures and direct health aides who are responsible for screening hearing, speech and vision (Edmonton, 1976).

The Vancouver Island preschool screening program described by Thores and Phillion (1972, p. 269) was conducted largely by trained volunteers under the supervision of public health nurses and a physician.

In contemporary British Columbia practice, screening programs for preschoolers are directed by community health nurses and utilize a variety of other health personnel. The Fraser Valley program, described by Wolf (1976), for example, employs health aides to perform audiometric examinations and nurse-volunteers to perform vision tests. In Burnaby, community health nurses team with a nutritionist and a speech therapist who is trained in audiometry (Burnaby, 1976). In Richmond, the assessment team is composed of community health nurses, a registered nurse trained in hearing and speech evaluation, a dental hygienist and an orthoptist (Wilson, 1976).

From her review of others' studies of preventive health behaviors, Pender (1975, p. 388) concluded that "the competence the public attributes to the nurse will ...

affect their responsiveness to her suggestions...."

According to a Toronto study (Canadian Press, 1976), one segment of the public is not seeking assistance in child care from the community health nurse. The low-income mothers surveyed said that when they needed help for their children, they turned first to a doctor, second to a teacher, third to a counsellor, and fourth to their husbands.

Public confidence in nurses presumably will be enhanced by developments in Canadian nursing education following the recommendations of the Committee on Nurse Practitioners (Boudreau, 1972, pp. 13-14). Canadian universities have begun to offer expanded-role nursing programs (Hurd, 1972; Kergin et al, 1973) whose graduates should exhibit a high degree of competence in developmental assessment skills, among others.

All final-year nursing students enrolled in the community health nursing course at the University of British Columbia are prepared to carry out physical appraisals and developmental tests of young children (Cawston, 1972, p. 67).

Age Levels for Preschool Screening

The appropriate age level for screening for developmental delays and handicapping conditions of childhood has been a matter of considerable controversy. While it is generally conceded (Gallagher, 1973, p. 687; Benson and Beattie, 1964, p. 378; Sheridan, 1975, p. 1) that age

6, or school entrance, is too late for many remedial interventions to be fully effective, many tests cannot be performed until the subject is old enough to cooperate. Therefore the optimal age for screening becomes subject to compromise.

"In a developmental sense," said Arnold Gesell (1923, p. 253),

the child is indeed a pretty well-finished product when his sixth-year molars begin to erupt. The pre-school years are incomparably the period of most rapid and most fundamental growth....

Later work has confirmed Gesell's findings. Bloom has written (1964, p. 57) that by the time a child reaches the age of 4, his basic intelligence and personality structure have been formed. Psychologist Burton White, head of the Harvard Preschool Project, believes that the developing and learning capabilities that will see a child through the rest of his life are set by the age of 2 (White, 1975, p. 4). Further, the degree of flexibility and the capacity for change that humans have declines with age, and to alter personality patterns or social attitudes after age 3 is very difficult (p. 257).

Kohler agrees, in a report (1973, pp. 6-7) on the elaborate pilot study for a Swedish health-control program which he directed, that "the earlier a disability is detected and the earlier suitable treatment can be instituted, the better results may be expected."

However, he says, in order to detect minor handicaps in some fields, the cooperation of the child is of great importance. He and his colleagues therefore chose the age of 4 as "this age was presumed to be the earliest at which specific mass screening tests, involving a great deal of cooperation, could be used on the majority of the children." This age, however, proved to be too late for effective prevention of dental caries; two out of three of Kohler's 4-year-olds already suffered from caries (p. 26).

Canadian programs have also encountered difficulty in establishing an optimal age for screening of preschoolers.

The Etobicoke Community Health Department in Ontario chose 3-to-4-year-olds for the nursing assessment project reported by Myrtle Kirstine (1974, p. 12), apparently because they were conveniently enrolled in junior kindergarten classes in the target community.

In Edmonton, Alberta, the Local Board of Health offers screening services to all children over the age of 4 1/2 who attend a kindergarten or day care centre, and to some younger children identified by preschool teachers or nurses as warranting health or developmental assessment (Edmonton, 1976).

Thores and Phillion (1972, p. 269), reporting on the preschool screening program on Vancouver Island, chose 4 as the age for screening. "Ideally," they said, "this should be done even earlier, but it was felt that the

application of a large-scale program much earlier than this age was not practical for us initially."

In British Columbia, recent developmental screening programs have focussed on 3-year-olds (Burnaby, 1976; Wilson, 1976; Wolf, 1976).

Participants in Screening Programs

The ultimate objective of any screening program for preschoolers, and of the necessary follow-up and remediation which should flow from it, is the maximization of the chances of all children to succeed in school and in life. That this goal is not being met is evident from the literature.

North (1970, p. 700), reporting on the U.S. Head Start experience, says that

a central problem of all health programs has been to assure that every child obtains the necessary screening tests, examinations, and preventive measures and that every child who needs treatment actually receives it.

He adds:

Programs have only rarely succeeded in achieving the 100 percent coverage which is the only true standard of success.

Even Kohler's highly organized Swedish health-control pilot project achieved slightly less (95.1 percent) than North's ideal standard, in spite of strenuous efforts to

reach all parents in his study population. Like many other workers, Kohler found (1973, p. 12) that non-participating families had a somewhat poorer socioeconomic background than participants, and that their need for advice and support was greater than that of other families.

Similarly The Lancet (1975, p. 784) notes that in Britain "a big problem is that parents of the child most in need may not seek the services offered." The result, it says, is that 10 to 20 percent of British children enter school with undetected defects, many of which could have been treated earlier had their parents taken advantage of available screening and treatment services.

In Sweden, Wallace reports in a comparative study (1975, p. 4) 69 percent of all children aged 2 to 7 visit child welfare centres which provide screening and health assessment among other services. In contrast, she notes, only 20.7 percent of children aged 2 to 5 in England and Wales visited similar centres.

In the United States, Brinton (1972, p. 47) says the desired goal of health supervision of all children of the lower socioeconomic classes is not being met in spite of an increased emphasis on preventive health services.

Socioeconomic Status. Birch and Gussow (1970, pp. 4-5), who note a strong correlation between poverty and membership in non-white minorities in the U.S., consider

it beyond argument that children burdened by this double handicap do less well in school than their more privileged fellows. They see a relationship, also, between physical well-being and school success (p. 7).

North (1970, p. 698) notes that "the actual incidence of certain health problems ... is higher in poor children."

Similarly, Kohler (1973, p. 25) found that "children from lower socioeconomic groups ran a particular risk of having important health problems."

In their study of kindergarten children in three British Columbia areas, Tonkin et al (1973, p. 954) found that "poor school performance seemed to be a liability of low socioeconomic status."

Despite their greater need, poor people apparently do not fully utilize available preventive health services. Maisel writes (1975, p. 377) that special programs aimed at needy groups have been revealed as stopgap measures which actually perpetuate a system of unequal health care. "Simply offering health care to the poor or near poor is no guarantee that people will avail themselves of it or utilize it properly."

In a useful review article, Rosenstock (1966, p. 96) says that studies have shown that preventive and detection services are used mainly by young, white, relatively affluent and well-educated women. Steele and McBroom (1972, p. 384) found that "health behavior is in part a

function of income" and that "persons of higher socioeconomic status were more likely to engage in preventive health actions."

Pender (1975, p. 385) also says that studies have shown that those who use preventive health services tend to be white, married women who have graduated from college, are in the middle-to-high-income groups, and are members of small families. Green found (1970, p. 95) that the mother's education was the variable that correlated most highly with a family's preventive health behavior. Income and education, he reports, are essentially equivalent in their relationship to health behavior.

Steele and McBroom (1972, p. 391) found that recent experience with illness generally heightens the likelihood that persons of upper socioeconomic status will engage in preventive health behavior; for those in the lower groupings, it decreases the likelihood.

Among the hard-to-reach population, Green (1970, p. 88) found that large families inhibit the mother's exposure to social influences that might otherwise improve her chances of using preventive health services.

Cherry and Kuba (1971, p. 572) found in a Chicago study that the traditional assumption that "parents are by definition mature adults who will protect their offspring" was not necessarily true. There are parents who cannot assume their social responsibilities; these parents "must

be pursued, understood, and tolerated" if they are to be effectively involved in preventive health services to the benefit of their children.

If socioeconomic status is an indicator of health behavior, some way must be devised to stratify a study population. Kohler writes (1973, p. 9):

The influence of the social environment upon growth and development, health and disease has been confirmed in many studies and is now common knowledge. Therefore, in a study of child health it is necessary to include some kind of description of the way of life of the children and their families.

The Two Factor Index of Social Position was developed by Yale University sociologist August Hollingshead to meet the need for a procedure to estimate the position that individuals occupy in the status structure of society (Hollingshead, 1957, p. 2).

Occupation and education are the two factors used by Hollingshead in determining social position. The occupational factor is derived from a scale which classifies jobs into seven categories:

- Category 1: higher executives, major professionals and major employers;
- Category 2: lesser executives, lesser professionals and lesser employers;
- Category 3: administrators, minor professionals and minor employers;
- Category 4: technicians, clerical and sales workers and self-employed;
- Category 5: skilled manual employees;
- Category 6: semi-skilled employees; and
- Category 7: unskilled employees.

The educational factor is derived from a scale divided into seven positions:

Category 1: graduate professional training;
Category 2: university graduation;
Category 3: partial college training;
Category 4: high school graduation;
Category 5: partial high school;
Category 6: junior high school completion; and
Category 7: less than seven years of school.

The occupational factor is given a heavier weight than the educational factor (7:4) to obtain the Index of Social Position Score for an individual. These scores are ranged into Social Classes I, II, III, IV, and V (Hollingshead, 1957, p. 10).

The development of the Index of Social Position using the occupational scale, the educational scale and a residential scale, and the validation of the Index, are discussed by Hollingshead and Redlich (1958, pp. 387-407). The occupational scale is a modification of Alba Edwards' system used by the United States Census Bureau (Myers and Bean, 1968, p. 235).

In the report of the National Child Development Study in Britain, the authors (Davie et al, 1972, p. 2) borrowed from the Registrar General's classification of fathers' occupations for census purposes, in order to stratify the population from Social Class I to Social Class V. In this schema, Social Class I consists of higher professionals with high educational qualifications. Social Class II consists of other professionals and managers. Social Class III (non-manual) consists of all other non-manual workers and Social Class III (manual) of skilled manual workers. Social Class IV consists of semi-skilled manual workers and Social Class V consists of unskilled manual workers.

Families with no father or male head of household were considered unclassifiable.

The "At-Risk" Concept. Although North and Kohler aim for universal coverage in screening programs, some other workers have felt that attention should be concentrated on those children most likely to suffer from defects or developmental delays. The concept of a register of children "at-risk" was introduced in Britain by R.L. Lindon (1961) and Mary Sheridan (1962). The Edmonton Local Board of Health (1976) maintains surveillance of children on its at-risk register until the age of 3. For its nursing assessment project, the Etobicoke Community Health Department chose a population from predominantly lower-income urban areas (Kirstine, 1974, p. 12).

However, Kohler writes (1973, p. 7) that clinically selecting children who are considered to be especially liable to develop handicaps and keeping them under close surveillance produces disappointing results. He found the risk groups included only a portion of the children who had subsequent handicaps, and included too many normal children.

Benson (1969, p. 145) concurs with this assessment. His evaluation of the at-risk registers which had been established in some health units in British Columbia concluded that

a very high percentage of all children inevitably had to be placed on such a registry if a potential 'at-risk' condition were not to be missed, and this made the concept unworkable.

In Britain, Curtis Jenkins found (1975, p. 94) that "in some areas over-enthusiastic application of the rules has placed more than half the newborns on the 'at-risk' register."

In the specific case of strabismus, Kornder et al (1974, p. 213) found that

although there is a positive relationship between a family history of visual problems and the diagnosis of strabismus, there is no clear-cut indication of a group especially at risk which could be selected in order to streamline a program of preschool vision screening.

Many authors are agreed that there is little point in screening children unless personnel, facilities and procedures exist to provide help to those who are found to need it.

The discovery of health problems or defects is of no interest whatsoever if there exist no ways or means of treating or alleviating these conditions,

writes Kohler (1973, p. 8).

"Detection of defects should not be encouraged unless there are resources for follow-up diagnosis and treatment," says an unsigned article in The Lancet (1975, p. 786). North emphasizes (1970, p. 699) that a program "must be willing to do whatever is necessary to assure treatment and follow-up." For Lessler (1972, pp. 194-5),

a 'screening program' does something about the problems that have been

identified.... It is a cruel hoax to gain information about a child and then do nothing with it.

Incidence of Handicapping Conditions

In the last few decades social and medical changes have made it possible for health workers to devote less time and attention to the gross child-hazards of earlier generations and correspondingly more to the less obvious hindrances to normal physical, intellectual and social development.

Writes Vancouver pediatrician John U. Crichton (1975, p. 379), in an exploration of the "borderland" between medicine and education:

One of the manifestations of the changing priorities of medical practice is the involvement of physicians in the field of learning disorders. Likely this has arisen partly because within the last 20 years or so control of most acute diseases of childhood has been achieved. Doctors, therefore, have been able to devote more time to subtly handicapping conditions, which formerly were the province of specialist neurologists or which were completely ignored by the profession at large.

The CELDIC Report (Shannon, 1970, p. 59), describing an exhaustive study of the needs of Canadian children with emotional and learning disorders, states that between 2 and 3 percent of children require full-time special educational

placements and estimates that a further 8 to 12 percent of children need additional professional interventions to assist them with their emotional, behavioral or learning disabilities.

When one examines the incidence of handicapping conditions revealed by screening programs reported in the literature, it is futile to attempt to make comparisons without first considering socioeconomic differences among the populations screened, the ages of the subjects, the screening procedures employed, and the objectives of the various programs.

In his Swedish study, Kohler (1973, p. 23) found that 15 percent of the 4-year-olds examined had "functionally important health problems." This category excluded dental and potential psychological and educational health problems. In specific areas Kohler reported (p. 19) the following incidences:

Dental problems	65.4 percent
Visual problems	12.5 percent
Hearing problems	3.9 percent

Not all of these were considered "functionally important health problems."

In a review of several American screening programs, Lessler (1973, p. 657) found the following ranges reported in specific problem areas:

Dental problems	80 - 90	percent
Vision problems	7.4	percent
Visual perception	36 - 69	percent
Hearing	1.5- 3	percent
Language	16.3- 25	percent
Mental health	2 - 10	percent

The difficulty of comparing results from screening programs reported in the literature is illustrated by the data cited in this section. The use of a variety of screening procedures, and the use of different terminology to describe possibly similar conditions, makes confident comparison impossible. Many authors use such vague terms as "mental health" problems or "behavioral or emotional disorders"; or "vision", "visual perception" or "perceptual" problems. Lessler (1972, p. 196) recognizes this problem. He says, for example, that

there is little agreement on what constitutes a treatable language problem and what the distribution of language problems may be. Yet most people agree that language difficulties are among the most devastating to a child's life.

In a pre-kindergarten screening project in Wellesley, Massachusetts, aimed at early identification of children with potential learning disabilities, project director Gertrud Wyatt (1970, p. 6) recorded these findings:

Behavior and emotional disorders	10.8 percent
Speech and language disorders	7.0 percent
Possible hearing problems	3.0 percent
Markedly poor motor coordination	1.9 percent
Mental retardation, previously known	1.2 percent
Multiple problems	5.7 percent

(Language, restlessness,
hyperactivity, short attention
span, poor motor coordination)
Visual problems
(Percentage not recorded because
all cases already under treatment)

In a much earlier paper on the National Health Survey in the United States in the late 1950s, Eleanor Hunt of the Children's Bureau reported (1959, p. 21) the following classifications of impairment in 4.1 percent of all children under 15:

Orthopedic	36 percent
Speech	26 percent
Hearing	15 percent
Vision	8 percent

Meyerstein (1969, p. 1920) found that fewer than 2 percent of first-grade pupils had previously unknown pathologic conditions, even after extensive health examinations; these were mainly acute infections.

This paucity of results from traditional school medical examinations was also recognized by the British Columbia Health Department in 1961. According to Benson (1964, p. 376), a review of the previous 21 years' records showed that only about 15 percent of the children examined had problems, and that most of these were already under adequate care. In a change of departmental policy, the traditional universal school examination was abandoned and children were thereafter examined by a doctor only on

referral after screening by a school nurse. The yield of cases was about the same under the new system, Benson found (p. 378).

In a narrow-focus study of strabismus in infants, Kornder et al (1974, p. 208) found an incidence of 3.2 percent of manifest strabismus among the 1,074 children born during 1967-68 in the Boundary Health Unit area of British Columbia. In a further study of 2,619 first-grade pupils, the same authors found (p. 212) that 4.5 percent had manifest strabismus. They considered this should be regarded as the minimum incidence as some cases might have been missed by the project team.

In the Etobicoke study (Kirstine, 1974, p. 30) of 283 kindergarten children, 103 or 36.4 percent were initially referred by the screening team to community health nurses for follow-up. After re-screening, the nurses identified the following needs:

Behavioral/emotional needs	25.3 percent
Speech (excluding language barrier)	14.7 percent
Developmental	12.0 percent
Nutrition (obesity and underweight)	9.3 percent
Social and school adjustment	6.7 percent
Dental	2.7 percent

On this re-examination, the community health nurses detected a total of 75 needs among 55 of the 103 referred children, who represented 18.7 percent of the 283 children initially screened.

In their study of preschoolers on central Vancouver

Island, Thores and Philion (1972, p. 270) reported the following findings as the result of screening with the Denver Developmental Screening Test, hearing and vision tests:

Language delay	9.2 percent
Fine-motor/adaptive delay	4.0 percent
Personal/social delay	3.5 percent
Gross-motor delay	2.9 percent
Hearing problems	6.4 percent
Vision problems	3.5 percent

The original screening was done by non-professional volunteers. After re-screening of children with suspicious findings by public health nurses, Thores and Philion reported (1974, p. 386) the following rates of referral:

Hearing problems	4.0 percent
Vision problems	1.8 percent
General health development	1.1 percent

In the 1974 annual report of the Burnaby Health Department (p. 15), the Child Health Services included the following data on the operation of their screening clinic for 3-year-olds:

Number of clinics held	13
Number attending	123
Number of defects noted	86
Number referred to follow-up	99

A later report (Burnaby, 1976) reveals that of 216 children seen at the screening clinic for 3-year-olds, 124 or 57.4 percent were referred for follow-up for these reasons:

Dental	12 percent
Hearing	11.6 percent
Speech	11.1 percent
Vision	8.8 percent
Developmental delay	5.1 percent
Nutrition	4.6 percent
Mother	2.3 percent
Other (unspecified)	1.8 percent

School surveys conducted in Saskatchewan and British Columbia have revealed that "the number of boys with learning disabilities is greater than the number of girls" (Shannon, 1969, p. 58). This higher incidence of learning disabilities in boys is reported in surveys throughout the English-speaking world, according to Hackney (1969, p. 19). Rutter and Tizard (1970, p. 53) state that

it was noted that all conditions involving a marked delay in the development of a normal function (e.g., speech) were associated with a male preponderance. The physical maturation of boys is much slower than girls from before birth to adulthood ... perhaps through the slow development of certain parts of the brain.

The Kirstine study (1974, p. 33) reported an equal number of boys and girls referred for follow-up. The boys had more speech problems and the girls had more nutritional needs and social adjustment problems.

Summary

The developmental theory of childhood has provided a foundation for new methods of health promotion and the prevention and detection of disability in the preschool

population. Every screening program is unique in its objectives, in the skills of the workers involved, in the procedures employed, and in the segment of the population under study. The children most "at risk" are likely to be members of families who are least likely to use available health resources. Educationally qualified nurses are increasingly responsible for a broader role in developmental assessment screening programs. The actual incidence of handicapping conditions in children is difficult to estimate because of the use of vague terminology, the varied skill levels of the examiners, and the paucity of follow-up studies reported in the literature.

Chapter III

METHODOLOGY

This chapter sets out the research question; definitions, assumptions and limitations of the study; and the research plan, including detailed descriptions of the approach taken by the researcher, the setting and procedures of the clinic under study, the selection of the study population, the research instruments, the means of data collection, and the method of data analysis.

The Research Question

The question to be answered in this paper is: "How does a newly established screening clinic for 3-year-olds function and what results does it produce?"

This question will be answered in terms of the mode of operation of the clinic, the personnel and procedures employed, the characteristics of the children and their parents who attend the clinic, the number and types of referable problems observed by the clinic staff, the distribution of referrals, the degree of compliance with referrals, and the subjective responses of the children and their parents to the clinic experience.

Definitions

The following terms are defined for the purposes of this study:

Screening means the use of relatively simple and economical procedures to detect existing or potential disorder in apparently well persons.

Screening clinic means a facility established in a British Columbia suburb where parents may bring their children, by appointment, for developmental, sensory and dental screening.

Child development means the orderly progression of a child through the stages of development delineated by developmental theorists.

Developmental assessment means the appraisal by trained professionals of the normality or otherwise of the child's developmental progress.

Problem means any condition which may actually or potentially impede a child's physical, cognitive or social development. A problem may be a handicap, developmental delay, physical or sensory impairment, physical or intellectual defect, disease, disorder, disability, dysfunction, or other abnormality.

Community means the geographic area served by the health department that sponsors this screening clinic, or the population of that area.

Community health nurse means a nurse who has had university or post-basic training in nursing in the community, and who is employed by the agency sponsoring this clinic.

Study population means the parents and children who attended the screening clinic during its first three months of operation.

Parent means the mother, father, grandparent, guardian or other adult responsible for a child attending the clinic.

Compliance means the voluntary acceptance by the parent of a referral by the clinic staff to another health resource, and action to implement that referral.

Health resource means any health professional or health or social agency to which a parent may be referred for definitive diagnosis of a child's problem and/or for therapeutic intervention.

Intervention means any action designed to ameliorate, alleviate or remedy a problem.

Breast-fed infant is an infant whose primary source of nourishment until the age of three months is breast milk.

Bottle-fed infant is an infant who is fed at the breast for less than three months after birth or whose primary source of nourishment during that period is a bottled formula.

Assumption

It was assumed that the findings of the six community

health nurses and the two speech therapists who took part in the clinic sessions under study, and whose skill levels were not evaluated, were at a uniform standard.

Limitations of the Study

This study is limited by the following factors:

1. The study population consists of a self-selected group of parents and children engaging voluntarily in preventive health behavior.
2. The study was restricted to a time frame of three months which was the initial period of operation of the clinic.
3. The assessment procedures and their specific applications in the clinic may be unique.
4. No evaluation has been attempted of either the assessment procedures or of the skills of the clinic personnel.
5. For two parents it was impossible to arrange a home visit before the clinic appointment date, so questionnaire no. 1 was left in their mailboxes and completed by them without personal explication by the researcher.
6. Data on dental health were compiled separately by the dental hygienist and she did not attend the first clinic session.

The Research Plan

The research plan will be described in terms of the approach, the setting for the clinic, the personnel and procedures employed at the clinic with photographic illustrations, the selection of the study population, the research instruments, and data collection and data analysis.

The Approach. All parents attending the sessions of the screening clinic under study were asked to complete a questionnaire before their visits to the clinic, and to participate in a telephone interview some time afterwards. The information acquired in this way was augmented by the findings of the screening personnel and by other data available from the sponsoring agency. The data were entered into a computer and submitted to statistical analysis.

The Setting. The screening clinic described in this study was established by a health department in a suburban location in British Columbia in January, 1976. The clinic is centrally located in a rented church hall, but removed from major bus routes. The clinic originally scheduled screening appointments for ten children on the third Friday morning of each month, but the overwhelming response to the initial announcement of the program necessitated scheduling a second clinic on the first Friday of each month. Friday morning was chosen for the clinics because the accommodation

was available and staff could be freed from other commitments on that day.

The Personnel. Each clinic is staffed by three community health nurses who are trained to administer the Denver Developmental Screening Test (DDST), to use vision assessment tools, and to counsel parents on nutrition. Each parent receives pamphlets on various aspects of health maintenance from the charge nurse.

A speech therapist assesses children in speech and language development and for possible hearing impairment. She suggests to parents ways of promoting speech and language skills.

A dental hygienist screens children for dental defects and teaches parents and children routines for maintaining optimal oral hygiene.

The Procedures. One nurse administers the personal/social, fine-motor/adaptive, and gross-motor segments at the child's age level of the DDST (Appendix F, p.130). In the personal/social segment, the parent is asked if the child can independently perform certain tasks: washing and drying hands, putting on clothing, helping in household routines. The child is asked to button up a sweater or coat, and his/her independence is further tested by a brief separation from the parent.

The fine-motor/adaptive segment involves pencil-and-paper tasks: imitating the drawing of a vertical line,

copying a circle, a cross, and a square, and drawing a person. The child is asked to pick the longer of two lines (Appendix F, p.130) in three trials. Building a tower of eight, one-inch wooden cubes, and imitating the building of a bridge with three of these cubes completes this segment for the child.

The parent is asked if the child can pedal a tricycle to begin the gross-motor segment. Then the child is asked to broad-jump over the test form (Plate 1, p. 53). The child is timed from five to ten seconds while balancing on one foot, and then is asked to hop on one foot. A heel-to-toe walk along a straight line follows, and the segment concludes with the child attempting to catch a bounced tennis ball.

The second nurse performs a vision assessment on each child. This includes tests for color-blindness, depth perception, visual acuity, muscle rotation, the cover test, and eliciting a brief history of family eye problems from the parent because of the familial nature of strabismus.

The Colour Vision Test Plates for the Infants (Matsubara, 1957) are used to test for color-blindness.* These plates display animal figures which most children can quickly identify. Depth perception is tested using the Titmus Stereo Test (Plate 2, p. 54). The child wears

*This test was later discontinued as invalid.



Plate 1.

From the Gross-motor Segment of the
Denver Developmental Screening Test



Plate 2.

Testing Depth Perception using the
Titmus Stereo Test

polaroid glasses and is asked to "pinch the tip of the wing" of the house fly, and is asked "which of the animals is coming out to meet you?" in the animal plates.

Visual acuity is tested using Henry F. Allen's Preschool Vision Test. Pictures of familiar objects are shown to the child, and with eyes alternately occluded, the child is asked to name the object which the examiner displays while backing away from the child to a distance of 20 feet. A comparison of the visual acuity of the child's two eyes is considered more important than the absolute values obtained.

Muscle balance is tested by the cover/uncover test, noting any movement of the uncovered eye, and by the light reflex test, using a flashlight and noting the reflection in the pupils. Muscle rotation is assessed by testing through the six cardinal fields of gaze and midline convergence (Bates, 1974, p. 34). The procedures are explained and an opportunity is given for the parent to express any concerns about the child's vision.

The third nurse weighs and measures the child (Plate 3, p. 56) and then plots these findings on the anthropometric chart (Appendix G, p. 132). Discussion of the child's nutritional status is based on these measurements and the answers to questions on a diet form (Appendix H, p.134) which was previously mailed to and completed by the parent. This form was devised by the clinic staff specifically for the 3-year-old clinic.



Plate 3 .
Nurse Obtaining Height and
Weight Measurements

The speech therapist completes the language segment of the DDST. She asks the child its first and last names and tests for the child's comprehension of "cold", "tired", and "hungry". By placing blocks, the child demonstrates its comprehension of the meanings of the prepositions "on", "under", "in front", and "behind". Color recognition is tested by asking the child to make choices from a bright assortment of red, blue, yellow, green, and orange blocks, and the therapist attempts to elicit the antonyms of "hot", "woman", and "big" by asking the child to complete short sentences. The child is asked to define a "ball", "lake", "desk", "house", "banana", "curtain", "ceiling", "hedge", and "pavement", and the composition of a spoon, a shoe, and a door. The use of plurals is noted.

Using picture test cards (Plate 4, p. 58), the speech therapist next evaluates the child's consonant and vowel sounds and determines a total sound score on the Arizona Articulation Proficiency Scale (Fudala, 1972). The AAPS total scores are averaged for children aged 3 to 11 years. The test is interpreted to the parent.

To assess the child's hearing, the therapist asks the parent a series of questions from a form designed specifically for the screening clinic (Appendix I, p.135). The questions relate to the child's response behavior at home, listening habits, and any history of ear infections.

The dental hygienist examines the child's teeth



Plate 4.
Speech Therapist Evaluating
Consonant and Vowel Sounds

and mouth for any problems of occlusion, bite, the tongue, and caries (Plate 5, p. 60). She describes to the parent what tooth decay is, and demonstrates on a denture model how caries can be prevented by good brushing habits. She discusses the effects of thumb sucking, blanket sucking, and tongue thrusting on the teeth.

The hygienist advises on the administration of fluoride drops and suggests fluoride painting of the child's teeth, since the area's water supply is not fluoridated. She concludes her interview with a discussion of the importance of good dietary habits to dental health and suggests nutritional snacks for home and play school that will not be damaging to tooth enamel.

A package of literature given to the parent includes Up the Years from One to Six and Canada's Food Guide from Health and Welfare Canada, assorted pamphlets on nutrition and child health published by private companies as promotional material, and snack suggestions and recipe sheets from the sponsoring health department.

No psychological tests are employed, but the nurses observe the parent-child interactions and the child's adjustment to the testing procedures. The children are also observed at a toy table (Plate 6, p. 61) where they may play if time permits between visits to testing stations. Siblings are discouraged from attending the screening clinic, but if they arrive with a brother or sister, their attention



Plate 5.

Dental Hygienist Examining the Mouth



Plate 6.

At the Toy Table

can be diverted to the toy table.

Five clinic appointments are scheduled at 9:00 a.m. and five at 10:30 a.m., each child being allotted 15 minutes at each of the five screening stations. If a problem is observed in the child, or a re-test is indicated, the parent is told she will be contacted by the community health nurse in her area.

The Selection of the Study Population. After the establishment of the clinic was announced, parents phoned the health department to place their names on a waiting list for appointments. When phoned back by the assistant supervisor to be given an appointment time, the parents were asked if they were willing to participate in a study to be undertaken by a nursing student. The supervisor made it clear that unwillingness to participate would not prejudice the parents' right to attend the clinic. Parents who agreed to participate were told that the student would contact them to arrange an interview in their home. This procedure was carried out for the first five clinic sessions. All parents scheduled to attend these sessions agreed to cooperate in the study.* Three clinic appointments were broken because of illness of the children; these children and their parents were eliminated from the study. The total study population, therefore, numbers 47 children and 47 parents.

*All children attending the screening sessions were accompanied by their mothers.

The Research Instruments. Questionnaire no. 1

(Appendix A, p. 119) was designed by the researcher to elicit information on the child's previous use of health resources, parental concerns about possible problems, the parent's preferred sources of guidance on physical and behavioral problems, the age of the mother and education of both parents, and how the parent learned about and got to the clinic.

This questionnaire was pre-tested on a group of ten parents who attended a similar screening clinic in another urban locality. As a result of the pre-test, the format of the original questionnaire was altered and one question was eliminated as irrelevant. Explanatory notes were added to reduce the need for explanation by the interviewer.

Supplementary information was drawn from the standard health department client record form (Appendix B, p.123), which had been completed before the clinic appointment. Permission to incorporate this additional information into the study had been obtained from health department administrators. This supplementary information was entered on the data summary form (Appendix C, p.125), also devised by the researcher.

A clinic results form (Appendix D, p.126) was designed by the researcher to enable clinic personnel to record the number and types of problems detected, whether or not these problems had been previously known, and the health resources to which referrals were made.

Questionnaire no. 2 (Appendix E, p.127) was devised by the researcher as an outline for a follow-up interview with each parent. Because of the subjective nature of this questionnaire, it was neither pre-tested nor modified.

To preserve confidentiality, a code number was used to identify each family on both questionnaires, the data summary form and the clinic results form.

Data Collection. The researcher visited the home of each of the participating parents to complete questionnaire no. 1 and to answer any questions they might have about their forthcoming clinic visit. During this interview each parent was asked for permission to use additional information previously recorded by the health department. In all cases permission was granted. The researcher then later completed the data summary form.

A clinic staff conference was held immediately after each clinic to share test results and observations on each child, to decide appropriate referrals, if any, and to initiate referral procedures. The clinic results form was completed at this conference.

Approximately one month after each clinic session, the researcher conducted a telephone follow-up interview with each of the participating parents. The purpose of this interview was to obtain information on compliance with referrals and to elicit the parents' and children's subjective reactions to the clinic experience.

The code numbers for each family used on the four forms enabled the researcher and the clinic staff to maintain accurate records on all participants while preserving the confidentiality of the information recorded.

All participants were informed that a summary of the findings would be made available to them on request upon completion of the study.

Data Analysis. The data were transferred to Hollerith cards and read into storage in the UBC Computing Centre. The library program, UBC MVTAB, was used to produce frequency and percentage tables of all variables. Selected sets of variables were cross-tabulated and subjected to Chi-square tests for independence.

Summary

Certain terms are uniquely defined for this study, one assumption is made, and the study limitations are listed following the research question. A description is provided of the screening clinic for 3-year-olds under study. Details of the setting, the personnel involved, and the procedures employed are illustrated with photographic plates. The method to select the study population, to use the research instruments, and to facilitate data collection and data analysis is discussed.

Chapter IV

ANALYSIS OF THE DATA

The data collected from the data summary form, questionnaire no. 1, the clinic results form, and questionnaire no. 2 were amalgamated and, where appropriate, arranged in frequency tables and described in percentages. Selected sets of variables were cross-tabulated for possible relationships.

The children in the study population are characterized in terms of sex, birthplace, birth rank, number in family, age, birth weight, and immunization status.

The parents of the children are described in terms of the mother's infant feeding practice, mother's age, mother's occupation and father's occupation, the educational attainments of mothers and fathers, and their socioeconomic status. The parents' responses to questions about previous use of health resources and their current concerns about health or behavioral problems of their children are outlined. Their preferred sources of help for these concerns are identified.

The findings of the clinic screening team are summarized in terms of the numbers and types of problems observed and the distribution of referrals to other health professionals.

The subjective responses of the children and their parents to the clinic experience are reported, as are the

parents' compliance or non-compliance with the clinic team's referrals and the initiation of intervention where necessary.

Also outlined are the parents' responses to publicity about the clinic, their means of transportation to the clinic, and their evaluation of the usefulness of the screening program.

Characteristics of the Children in the Study Population

Information from the data summary form (Appendix C, p.125) revealed information about the 47 children in the study. Twenty-five of the children are girls, 22 are boys. The Greater Vancouver region was the birthplace for 35 of the children, 4 were born in other regions of Canada, and 8 children were born abroad (5 in the United Kingdom and 3 in East Africa).

Fifteen of the children in the study population were first-born, 22 were the second children in their families, 9 were third children, and 1 participant was the fourth child. Two of the 47 children were "only" children, 31 children had 1 brother or sister, 13 children had 2 brothers or sisters, and 1 child had 3 siblings. These characteristics are summarized in Table I (p. 68).

All of the children were between 44 and 48 months old at the time of the study. Twenty-eight, or 60 percent, of the children were within two months of their 4th birthday.

Table I

Children's Birth Rank and Number of Children
in the Families in the Study Population

Birth Rank of Child in Study	Number of Children in Family				Totals	Percentage
	1	2	3	4		
1st	2	13			15	31.9
2nd		18	4		22	46.8
3rd			9		9	19.2
4th				1	1	2.1
Totals	2	31	13	1	47	
Percentage	4.2	66.0	27.7	2.1		100.0

All of the children weighed between 2.5 and 3.9 kilograms at birth, within the normal range. Thirty-seven, or 79 percent, weighed in the range between 3.0 and 3.9 kilograms. Forty-two of the children had received the correct dosages of all the immunizing agents recommended by the provincial health department for children of their age. Only 5 of the children were deficient in immunization.

Characteristics of the Parents in the Study Population

In infant feeding practice, 17 of the mothers in the study had breast-fed their infant and 30 had fed their infant a bottled formula. All of the mothers were between 25 and 40 years old, 23 of them, or 39 percent, being 30 to 34 years old. Thirty-six of the mothers described themselves as housewives (i.e., full-time homemakers), 9 held steady part-time jobs in the community, and 2 had full-time positions.

All of the 47 fathers of the children in the study population were employed full-time. Eleven, or 23 percent, of the fathers' occupations were in Category 1 of Hollingshead's occupational scale (Hollingshead, 1957, p. 3). This category includes university professors, medical doctors, and top business executives. Another 11 fathers were in Category 2 positions: bank managers and large business employers. Ten fathers, or 21 percent, were in Category 3: administrators and owners of smaller business concerns. Another 10 fathers were in Category 4: salesmen, technicians, and self-employed

tradesmen or small store owners. Three fathers, or 6 percent, were skilled manual workers (Category 5) and 2 fathers, or 4 percent, were semi-skilled employees (Category 6).

None of the 94 parents in the study population had less than a Grade 9 education. Thirteen of the fathers and 1 mother had a university degree; 11 fathers and 14 mothers had completed some university courses but had not obtained a degree; 9 fathers and 8 mothers had completed technical or vocational programs; 2 fathers and 3 mothers had completed a business school program; 10 fathers and 16 mothers had completed Grade 12 or its equivalent but had not had post-secondary education; and 2 of the fathers and 5 of the mothers had ended their formal education between Grades 9 and 11. The educational attainments of the parents are summarized in Table II (p. 71).

It was decided to attempt to estimate the social position of each of the 47 families in the study population, using the father's education and occupation as the key variables, according to the Hollingshead Two Factor Index of Social Position. This made it necessary to re-categorize the educational levels of the fathers, as reported by the mothers, to coincide with the categories of the Hollingshead educational scale. (1957, p. 9).

A social-class score for each family was then computed according to the Hollingshead method, and 10 of the families were found to be in Social Class I, 10 in Social Class II,

Table II

Levels of Educational Attainment
of Parents in the Study Population

	<u>Father</u>		<u>Mother</u>	
	<u>Number</u>	<u>Percentage</u>	<u>Number</u>	<u>Percentage</u>
University degree	13	27.7	1	2.1
Some university	11	23.4	14	29.8
Technical/vocational	9	19.1	8	17.0
Business school	2	4.2	3	6.4
Grade 12	10	21.3	16	34.0
Grade 9 - 11	2	4.2	5	10.6
Totals	47	100.0	47	100.0

19 in Social Class III, 7 in Social Class IV, and 1 in Social Class V. These data are displayed in Table III, p. 73.

Previous Use of Health Resources. Twenty of the mothers in the study population, or 43 percent, had attended community prenatal classes while they were carrying the child included in the study. Five had attended prenatal classes during a previous pregnancy and 22 had never attended a prenatal class. (This last group included 2 mothers of adopted children included in the study.)

The mothers were asked to recall their previous use of community health resources for their children. For 38 of the mothers, or 81 percent, the resource most frequently used was the general practitioner. Twenty-five of the children, or 53 percent, had visited a general practitioner within the six months preceding the administration of the questionnaire. The second-most-frequently-used resource was the well-baby clinic, which had been visited by 22, or 47 percent, of the mothers. The mothers' responses are shown in detail in Table IV, p. 74.

Before the clinic visit, 26 of the children, or 55 percent, had received professional treatment for tonsillitis, ear infection, or an orthopedic problem. Four children had been treated for allergies, 3 for asthma, 2 for eczema, 2 for a vision problem, and 2 for gastro-intestinal

Table III

Social Class of the Families in the Study
Population According to the Hollingshead
Two Factor Index of Social Position

	Number of Families	Percentage
Class I	10	21.3
Class II	10	21.3
Class III	19	40.4
Class IV	7	14.9
Class V	1	2.1
Totals	47	100.0

Table IV

Parents' Previous Use of Community Health Resources
for their Children

Resource	Rank-Ordered Frequency of Use						Total
	1	2	3	4	5	6	
Dental clinic	0	1	7	4	3	0	15
Dentist	1	12	10	1	0	1	25
Emergency ward	0	4	10	7	4	1	26
General practitioner	38	2	2	0	1	0	43
Pediatrician	6	1	2	5	0	1	15
Well-baby clinic	2	22	6	2	1	0	33
Other: Ophthalmologist	0	1	0	1	0	0	2
Speech therapist	0	0	1	0	0	0	1
Urologist	0	1	0	0	0	0	1
Totals	47	44	38	20	9	3	

disorders. Other reported problems of physical health were cystitis, bronchitis, whooping cough, and a tumor requiring surgical excision.

One mother had sought professional help in dealing with her child's temper tantrums and 1 child had received speech therapy. Eight of the children had received dental treatment. Sixteen of the mothers, or 34 percent, indicated that their children had never received professional treatment.

Parents' Present Concerns. Twenty-five of the mothers, or 53 percent, indicated that they had no current concerns about their children's development, even though they were eager for them to attend the screening clinic. Eleven mothers thought their child might have a problem in speech or language development, 7 were concerned about behavior, 3 were concerned about dental health, 2 were concerned about hearing, 2 had concerns about nutrition, and 2 were concerned about their child's vision. These numbers exceed 22 because some mothers were concerned about more than a single potential problem. These concerns are detailed in Table X, p. 88.

Parents' Preferred Sources of Advice. When seeking advice about physical problems of their children, 29 of the mothers, or 62 percent, turned first to their general practitioner. For advice on behavioral problems, 21 of the mothers, or 45 percent, preferred to discuss their concerns

with their spouse. No mother identified the community health nurse as her first-choice advisor in either category. Table V, p. 77, details the mothers' preferences. These preferences were weighted for clarity in the table.

Findings of the Screening Clinic

The clinic staff adjudged 23 of the children in the study population to be problem-free and referred 24 children to appropriate health professionals or agencies for further investigation of a total of 39 problems, of which 11 had been previously known to the parents. Thirteen of the referred children each had a single problem and 11 had two or three problems each.

Of the 39 problems noted at the clinic, 12 were related to vision, 3 to hearing, 6 to speech or language development, 2 to physical development, 8 to social adjustment, 3 to nutrition, 3 to dental health, and 2 were problems of parent-child relationships.

Nineteen of the 24 children were referred to the family's local community health nurse, 1 child was referred to the nurse and the speech therapist, 1 child was referred to the general practitioner and the speech therapist, 2 children were referred to the general practitioner, and 1 child was referred to the speech therapist.

No referrals for immunization were made by the clinic staff. However, the researcher referred the 5 children who

Table V
Parents' Preferred Sources of Advice
(Weighted)*

Source	For Physical Problems	For Behavioral Problems
Child-care book	1.79	2.00
Community health nurse	.23	.43
Druggist	.19	Not applicable
Friend or neighbor	.59	1.62
General practitioner	5.59	3.45
Husband	1.19	3.59
Pediatrician	1.38	1.21
Other relative	.75	.70
No one	.00	.15

* The mothers were asked to rank-order their preferred sources of advice. These choices were weighted by allotting 7 points for 1st choice, 6 points for 2nd choice, 5 points for 3rd choice, 4 points for 4th choice, 3 points for 5th choice, 2 points for 6th choice, and 1 point for 7th or 8th choice, and dividing the sum for each source of advice by 47, the total number of participants.

were deficient in immunization status to their doctors or to the nearest child health centre. With one exception, all of these children were recent arrivals to the local area and all were partially immunized.

The data on the problems of the children referred by the clinic staff are tabulated in Table VI, p. 79.

In addition to the 39 problems referred, the dental hygienist detected 3 dental problems which were not reported as referrals on the clinic results form (Appendix D, p.126). It is not known if these children were subsequently seen by a dentist. Also, as previously stated in the study limitations, the dental hygienist did not examine 9 of the children in the study population. For these reasons, the findings of the dental hygienist for the 38 children in the study population that she examined are reported separately in Table XIV (Appendix J, p.136). Thirty-one of those children, or 82 percent, were caries-free.

Responses of the Children and Parents to the Clinic Experience

Mothers of 41 of the 47 children reported that their child cooperated well or enthusiastically in the test procedures. Three mothers said their child was confused, 1 child was said to be frightened, and 2 children did not cooperate. Mothers of 2 children reported that the vision testing procedure distressed the child.

Twenty-nine of the mothers reported learning something

Table VI
Findings of the Screening Clinic

Reason for Referral	New	Known	Total	Percentage of Problems (N=39)	Percentage of Children (N=47) *
Vision	8	4	12	30.8	25.6
Hearing	1	2	3	7.7	6.4
Speech or language	4	2	6	15.4	12.8
Physical or developmental delay	2	0	2	5.1	4.2
Social adjustment delay	6	2	8	20.5	17.0
Nutrition	3	0	3	7.7	6.4
Dental	3	0	3	7.7	6.4
Parent-child relationships	1	1	2	5.1	4.2
Totals	28	11	39	100.0	
Children referred			24		51.1
Children not referred			23		48.9
Totals			47		100.0

* The sum of these percentages would be greater than the percentage of children referred (51.1 percent) because some children were referred for more than one problem.

new about one or more aspects of their child's health and development by taking the child to the screening clinic. Speech or language development was mentioned by 16 of these mothers, 8 learned about physical development, 7 learned about nutrition, 6 learned about social adjustment, 6 learned about dental hygiene, and 3 learned about vision. This number (46) exceeds the number of mothers reporting (29) because some mentioned two or more aspects as being new to them. Table VII, p. 81, summarizes these data.

Forty-four of the mothers queried found the clinic experience to be useful and reassuring to them as a parent, 2 mothers stated an opposite view, and 1 mother had no opinion. Six of the mothers thought the clinic had detected a problem that could have adversely affected the child later in school had it proceeded untreated.

Other popular aspects of the clinic were the toy centre for the children and the developmental literature given out. The most frequent complaint was that the testing session was too long for the children and a few mothers complained about the lack of feedback after the clinic visit. Only 2 mothers had complaints about the staff and the test procedures.

Compliance of the Parents to Referrals

Twenty-six referrals were made for 24 children for further investigation and possible intervention in a total

Table VII

Parents' Responses to the Screening Clinic
as a Learning Experience

Response	Number	Percentage
Not a learning experience	18	38.3
A learning experience	29	61.7
Totals	47	100.0
Parents learned about:		
Vision	3	6.4
Speech or language	16	34.0
Physical development	8	17.0
Social adjustment	6	12.8
Nutrition	7	14.9
Dental health	6	12.8
	46*	

* The reported number of items learned about (46) exceeds the number of parents who found the clinic a learning experience (29) because some parents mentioned having learned about more than one aspect of their child's health or development.

of 39 problems. At the time of the post-clinic survey, 18 of the referrals had been kept. In only two instances did the referred-to health professional not concur with the clinic nurses' reason for referral. Eight of the referred children were undergoing further testing or treatment. For the remaining 8 children, no further testing or treatment had yet begun.

Of the remaining 8 mothers who had not yet complied with the referral, 7 were waiting to be contacted by the community health nurse in their area and 1 preferred to take her child to the family physician for retesting.

Table VIII, p. 83, summarizes these data.

Additional Findings

The pre-clinic and post-clinic questionnaires also elicited information on how the parents learned about and got to the clinic, their assessment of its usefulness, and some general comments.

Publicity. Twenty-three of the 47 mothers attending the clinic learned about the service from items inserted in School Parent Bulletins brought home by older children. Nine parents read about the clinic on a Play School notice board. Other sources of information were a notice in the Health Unit office, a friend or neighbor, an item in the local newspaper, the community health nurse, and a family-life

Table VIII

Compliance by the Parents to Referrals

	Referred-to Health Professional		
	Community Health Nurse	Doctor	Speech Therapist
Number of children referred	20	3	3
Compliance to referrals	13	2	3
Non-compliance	7	1	0
Concurrence with reasons for referral	12	1	3
Non-concurrence	1	1	0
Intervention begun	4	1	3

NB: Data reported at the time of the post-clinic survey (approximately one month after the clinic visit).

education pamphlet.

Transportation. Forty-two of the mothers drove themselves to the clinic in the family car. Only 3 came by bus, 1 walked, and 1 took a taxi.

Usefulness. Forty-six of the mothers felt the clinic to be a very useful community service and would recommend it to their friends. One mother said she had no opinion about its usefulness or recommending the service.

Comments of the Parents. Three out of four of the parents' spontaneous comments were favorable towards the clinic. Almost half of these focussed on the clinic as a learning experience. Other favorable comments included such statements as:

"All children should be tested";

"The family doctor doesn't know enough about development";

"(The child) enjoyed being the centre of attention";

"Useful for answering 'little' problems";

"It should be done every two years".

The most frequent cause of criticism or unfavorable comments was the length of the clinic session (75 minutes). Many of the mothers complained of having to wait for their child's turn in the testing procedures, and their children became tired, hungry, restless, or bored. Some of the test procedures were described as confusing, frightening,

inadequate, or unnecessary. Six mothers were disappointed that they had not had an opportunity to discuss their child's problems in detail with the clinic nurses, and three comments were made about the staff being rushed, lacking rapport with the children, and not being sufficiently strict with the children.

Cross-Tabulation of the Data

Some of the variables previously described were cross-tabulated in contingency tables to lend depth to the description of the study population.

Referral for Further Investigation versus Sex of Child.

Of the 24 children who were referred by the clinic staff to other health professionals for further investigation, 13 were male and 11 female. Of the 23 children who were adjudged free of problems requiring referral, 9 were male and 14 female. The preponderance of males in the referred group is not significant at the .05 level. (See Table IX, p.86.)

Parents' Concerns versus Reasons for Referral for Further Investigation.

Of the 25 children whose mothers expressed no concerns, 16 were adjudged by the clinic staff to be free of problems. The remaining 9 children were referred to other health professionals for investigation of one or more problems which had not been apparent to their mothers.

Table IX

Referral for Further Investigation versus Sex of Child

	Sex of Child		Total Percentage	
	Male	female		
Referred for further investigation	13	11	24	51.1
Not referred	9	14	23	49.9
Totals	22	25	47	
Percentages	46.8	53.2		100.0

Chi-square = 1.108; Degrees of freedom = 1
 Difference not significant at .05 level

Of the 22 children whose mothers expressed some concerns, 9 were referred for investigation of the problem that had caused the concern. Five of these children were also referred for investigation of additional problems, about which the mothers had not expressed concerns.

Six children whose mothers had expressed concerns were referred for problems other than those that had given rise to their mothers' concerns.

Seven children whose mothers expressed concerns were considered by the clinic staff to be free of problems requiring further investigation. (See Table X, p. 88.)

Previous Use of Health Resources versus Referral for Further Investigation. A comparison was made between the previous use of health resources amongst the referred group of children and the non-referred group. In the referred group, an average of 4.1 health resources had been previously attended. The non-referred children had attended an average of 3.8 health resources previously. (See Table XI, p. 89.)

Referral for Further Investigation versus Social Class of Family. Of the 24 referred children, 3 were from families in Class I, 7 were in Class II, 9 were in Class III, 4 were in Class IV, and 1 was in Class V. Of the 23 non-referred children, 7 were in Class I, 3 were in Class II, 10 were in Class III, and 3 were in Class IV. (See Table XII, p. 90.)

Table X

Mothers' Concerns versus Reasons for Referral
for Further Investigation

Concerns of 22 Mothers		Number of Problems Referred	Reasons for Referral							Not Referred
Reason	Number		D	H	N	P	B	S	V	
Dental (D)	4	3			1				2	1
Hearing (H)	2	2		1*					1	0
Nutrition (N)	2	0								2
Physical (P)	0	0								0
Behavior (B)	7	5					4*		1	2
Speech (S)	16	14	1	1		2	2	4*	4	2
Vision (V)	3	3	1		1				1*	0
Subtotals	34	27	2	2	2	2	6	4	9	7
Mothers Not Concerned	25	12	1	1	1		4	2	3	16*
Totals		39	3	3	3	2	10	6	12	23
Cases of parent/staff concurrence (*)										26
Cases of parent/staff non-concurrence										36

(NB: For purposes of this table, problems of parent/child relationships and delays in social adjustment have been combined in the single category, Behavior.)

Table XI

Previous Use of Health Resources
versus Referral for Further Investigation

Health Resources Used	Referred Group (N=24)	Non-Referred Group (N=23)
<u>For Parents:</u>		
Prenatal classes	11	14
<u>For Children:</u>		
Dental clinic	7	8
Dentist	15	10
Emergency ward	13	13
General practitioner	22	21
Pediatrician	9	6
Well-baby clinic	19	14
Other: Ophthalmologist	1	1
Speech therapist	0	1
Urologist	1	0
Totals	98	88
Average per child	4.1	3.8

Table XII

Number of Children
Referred for Further Investigation
versus Social Class of Family

	Social Class of Family					Totals
	I	II	III	IV	V	
Referred	3	7	9	4	1	24
Not referred	7	3	10	3	0	23
Totals	10	10	19	7	1	47

Previous Use of Health Resources versus Social Class of Family. The mothers in the study population were asked to identify their previous use of prenatal classes and the following health resources for their children: dental clinic, dentist, emergency department, general practitioner, pediatrician, well-baby clinic, or other health professional or agency. The mothers' designations were totalled and averages computed by Social Class of each family. The average number of health resources previously used were: 4.3 for Class I, 4.7 for Class II, 3.8 for Class III, 2.9 for Class IV, and 3.0 for the Class V mother. (See Table XIII, p. 92.)

Summary

The children and their parents in the study population are characterized by the information obtained with the research instruments. Selected data were arranged in frequency tables and percentages calculated where suitable. The families were categorized according to the Hollingshead Two Factor Index of Social Position. The previous use of community health resources, current concerns, preferred sources of advice, and the mothers' responses to the clinic experience are tabulated. Selected variables were cross-tabulated to add descriptive depth to the study. Tests for dependence of the variables were negative.

Table XIII

Previous Use of Health Resources
versus Social Class of Family

Health Resources Used	Social Class of Family					Totals	Percentage of Families (N=47)
	I	II	III	IV	V		
<u>For Parents:</u>							
Prenatal classes	6	7	9	3	0	25	53.2
<u>For Children:</u>							
Dental Clinic	6	3	5	1	0	15	31.9
Dentist	4	6	12	2	1	25	53.2
Emergency ward	6	6	12	2	0	26	55.3
General practitioner	9	8	18	7	1	43	91.5
Pediatrician	3	7	4	1	0	15	31.9
Well-baby clinic	9	8	11	4	1	33	70.2
<u>Other:</u>							
Ophthalmologist	0	2	0	0	0	2	4.2
Speech therapist	0	0	1	0	0	1	2.1
Urologist	0	0	1	0	0	1	2.1
Totals	43	47	73	20	3	186	
Number of families by social class	10	10	19	7	1	47	100.0
Average number of resources used per family	4.3	4.7	3.8	2.9	3.0	4.0	

Chapter V

DISCUSSION OF THE DATA

The data will be examined in the light of previous studies reported in the literature. The implications of the findings of the present study, its limitations and weaknesses will be discussed and suggestions made for future studies.

The Children in the Study Population

The typical child in the study was of normal weight at birth, had received all recommended immunizations, had already been treated for one or more health problems, but was essentially healthy at the time of assessment. The child was three months short of his/her 4th birthday, but was able to cooperate well in the testing procedures. This appears to belie the belief of Kohler (1973) and Thores and Phillion (1972) who felt that 4 years was the earliest age at which children could cooperate sufficiently to make screening practicable.

A majority of the children were born in the local area, and nearly all had one or more siblings.

The Parents in the Study Population

The parents who attended the new screening clinic in its initial phase were typically from the middle and

upper-middle class segment of the community. The father is employed, in a medium-to-high-status occupation. He has had at least some university education. The mean level of education of the fathers in the study was 13.6 years. The community mean level of education for employed males is 10.4 years (Lioy, 1975, p. 122).

The mothers in the study are almost all full-time homemakers, aged 30 to 34 years. The mean level of education of the mothers was 12.5 years, higher than the mean level of 10.6 years for females in the labor force (Lioy, 1974, p. 122).

The families almost all owned at least one car and have a history of frequent use of other health resources in the community. The average family in the study numbered 4.3 people, compared to the community average of 3.8 people per family household (Lioy, 1975, p. 164).

This profile of the typical family in the study population coincides generally with many of the studies mentioned in Chapter II. Rosenstock (1966), Green (1970), and Steele and McBroom (1972) say that the relatively affluent and well-educated segment of the community have a consistent pattern of health behavior and more often use community health resources.

Children of parents in the lower socioeconomic strata were under-represented in the study population. It is such children, according to North (1970), Kohler (1973), and Tonkin et al (1973), who are most likely to have important

health problems that might be detected by the new screening service.

Parents' Concerns for their Children's Health

Sheridan (1973, p. 16) has concluded that if a mother suspects that her child has some developmental deficiency, she is likely to be right. This conclusion was not borne out by the present study. A comparison of the mothers' concerns with the findings of the clinic staff (i.e., reasons for referral) shows that in 26 instances the clinic staff concurred with the mothers either in the reasons for their concerns, or in their lack of concern, and in 36 instances the clinic staff did not concur with the mothers.

It may be that in many instances the mother is properly concerned about her child's development, but cannot accurately identify the problem area. For example, of 16 children whose mothers expressed concern about their speech development, only 4 were referred for further speech investigation but 10 were referred for investigation of other problems.

Preferred Sources for Health Advice

The literature was very sparse in reporting preferred sources of advice for mothers about their children's health

and behavior problems. The single study mentioned in the literature review (Canadian Press, 1976) reported that among a group of low-income women in Toronto, the physician was the preferred source of help for problems of their children, with the husband in fourth place. In my study, the general practitioner was the overwhelming favorite for advice on physical problems, with the husband in fourth place, but for behavioral problems the husband was the preferred source of advice, closely followed by the general practitioner. This appears to reveal a close sharing of child-rearing responsibilities among the parents. In neither study did the community health nurse appear as a significant source of advice.

Findings of the Screening Clinic

In the present study, 51 percent of the children screened were referred for further investigation. For reasons set out in Chapter IV, it is difficult to make a direct comparison of this overall referral rate with many of the previous studies examined. The most similar program mentioned in the literature review was that of the Burnaby Health Department, in which 57.4 percent of the children screened were referred for follow-up investigation (Burnaby, 1976). This compares to the 36.4 percent referral rate of the Etobicoke study (Kirstine, 1974).

Of the reasons for referral in the present study,

vision was the most common. It accounted for 26 percent of the children referred. This compares to 12.5 percent in the Kohler (1973) study, the 3.5 percent reported by Thores and Philion (1972), and the 8.8 percent reported in the Burnaby (1976) study.

The second most common reason for referral in the present study was behavioral problems. This accounted for 21 percent of the children referred (including social adjustment delay and problems of parent/child relationships). This compares with Kirstine (1974), who reported 25.3 percent of the needs of the children screened were in the area of behavioral problems. In the Wellesley study, Wyatt (1970) reported that 10.8 percent of the children screened had behavioral and emotional disorders. In his review of a number of U.S. screening programs, Lessler (1973) reported a range of 2 to 10 percent of mental health problems.

Speech and language problems were the third most common reason for referral in the present study. These accounted for 13 percent of the children referred. In his review Lessler (1973) found a range of 16.3 to 25 percent of language problems. Wyatt (1970) reported a 7 percent incidence of speech and language problems. Kirstine (1974) found that 14.7 percent of the needs detected in her study related to speech. In the Burnaby (1976) study, speech accounted for 11.1 percent of the children referred.

The finding in the present study of 6.4 percent of the

children referred for hearing problems exactly equals the figure reported by Thores and Pillion (1972). Kohler (1973) reported 3.9 percent of hearing problems. The Burnaby (1976) study found 11.6 percent hearing problems.

In the present study 6.4 percent of the children were referred for investigation of nutritional problems. Kirstine (1974) reported 9.3 percent of the needs detected were in the area of nutrition. Burnaby (1976) reported 4.6 percent of children referred for nutritional reasons.

Problems of delay in physical development were the reason for referral of 4.2 percent of the children in the present study. Burnaby (1976) reported referring 5.1 percent of the children screened for investigation of "developmental delay." Wyatt (1970) reported 1.9 percent of children in her study had "markedly poor motor coordination." Thores and Pillion (1972) reported fine-motor or gross-motor delay in a total of 6.9 percent of the children in their study.

A startling finding of the present study, as compared with previous studies, was the relatively low rate of dental disease among children from an area whose water supply is not fluoridated. Of the 38 children for whom dental examination records are complete, only 7 (or 18.4 percent) showed signs of caries. This is in sharp contrast to Kohler's finding of 65.4 percent of Swedish children with dental problems, Lessler's 1973 review which found incidences of 80 to 90 percent of dental problems in various U.S. screening programs, and the 60 percent incidence of caries reported for Canada as a whole (Dental Health

Division, 1970).

A number of authors (Rutter and Tizard, 1970; Shannon, 1970; Hackney, 1969) have found a higher incidence of developmental delay among boys than among girls. In the present study, 13 of the 24 children referred for further investigation were boys and 11 were girls. The difference in this case is not statistically significant.

Compliance of the Parents to Referrals

The rate of compliance with referrals of the children to other health professionals was very high. This was to be expected: good facilities exist in the community for follow-up procedures and universal medical care insurance eliminates any cost concern factor. The reason for the delay in the mothers being contacted by the community health nurse in their area can be explained by the newness of the clinic and the fact that firm follow-up procedures had not yet been established.

Implications of the Present Study

It seems clear that the new screening clinic for 3-year-olds is meeting a previously unfilled need in the community. Despite the advantages of superior home and family backgrounds, conscientious and intelligent parents, and previous use of an array of health services, half of the children were found to have possible defects or developmental delays warranting further investigation. Timely detection and intervention presumably will ameliorate many of these

problems. The parents also benefited psychologically from the clinic experience; all but three of those who attended felt reassured by it and found it useful. They apparently felt a need for support in their parenting role and found it at the clinic.

The findings of the clinic appear to cast doubt on the philosophy of concentrating health resources on a presumed "at-risk" population. None of the children in the study population would have been considered to be especially "at risk", yet many of them had need for further service from health professionals.

At the same time, the clinic is not attracting many children who may genuinely face a higher risk of disorder than its present population. It is well recognized (North, 1970, Green, 1970, Kohler, 1973) that lower socioeconomic status implies a proportionately higher rate of developmental, social and educational problems. The study population, however, was conspicuously drawn from the middle and upper-middle classes.

This study also makes it clear that, even among the well-educated and health-conscious population, the community health nurse has a remarkably low profile. Although the parents expressed confidence in the competence of the clinic nurses and the validity of their test procedures, and most had previously attended a well-baby clinic, they did not regard the nurse as a significant source of advice for either the

physical or behavioral problems of their children.

Limitations and Weaknesses of the Present Study

As discussed earlier, this study was limited by the fact that the study population consisted of a self-selected group of families; the study was restricted to the initial three months of the clinic's operation; the combination of assessment procedures and their specific applications in the clinic may be unique; neither the assessment procedures nor the skills of the clinic personnel were evaluated; and the dental health data were not fully integrated with the other clinic results.

The newness of the clinic may have attracted an unrepresentative clientele. Women who pride themselves on being "good mothers" might be more willing than others, or might even feel compelled, to try a new service that offers some prospect of benefiting their children or reinforcing their confidence in themselves in their "mothering" role.

Some of the assessment procedures were new to the clinic staff, so allowance must be made for error in application and interpretation of the procedures and the results. Further, criteria for referral were not well established at this early stage. The community health nurses of the sponsoring agency who were not directly involved in the clinic operation were unfamiliar with expected follow-up routines.

Some of the weaknesses of the design and execution of the study must be attributed to the inexperience of the researcher. The specific objectives of the study were probably unrealistically broad. The survey instruments could have been improved with more thorough pre-testing. The form in which some of the data was gathered made subsequent analysis unnecessarily difficult. The content of the instruments could have been more narrowly focussed on the specific objectives of the study, and some overlap and repetition could have been avoided.

Suggestions for Future Studies

A number of possibilities for future studies suggest themselves.

As a minimum, the clinic staff should continue to maintain records of its findings in a systematic and standardized way to permit long-term measurement of the need for its services and to enable predictions to be made about unmet health needs in the community.

Another obvious need is a study of the results of initial referral. In most cases children were referred to the community health nurse; in some cases this was simply because of suspicious or incomplete results of the initial application of the clinic's assessment procedures. The clinic results must be considered incomplete without knowledge of whether the nurse subsequently judged the child

to be problem-free, continued surveillance or initiated interventions, or referred the child to some other health professional for more definitive investigation and possible treatment.

In the longer term, it would be useful to investigate the effectiveness of intervention in those children for whom it was deemed necessary. Such a study could be done after a lapse of perhaps a year, or repeated at suitable intervals.

Once the children screened by the clinic begin to enter the school system, it would be possible to compare them with a control group of peers who had not had the benefit of the clinic's services. This presumably would provide more definitive information on the value of a service based on concepts of developmental theory.

An evaluation of the skill levels of the personnel of the screening clinic could be a future study. This could be done by comparing the assessments made by one clinic nurse to those of another, or by comparing their findings with those of more specialized personnel. This could help to modify a concern for under-referring or over-referring children.

Another future on-going study that suggests itself is an evaluation of the assessment procedures employed by the clinic. Are the procedures reliable and valid? Are they efficient? Do some procedures overlap? Are better techniques available? The clinic staff should continually

consider these questions. Liaison with agencies providing a similar screening service in adjoining municipalities could answer some of these questions and eventually make result comparisons possible.

Finally, there is a need for more detailed delineation of the clinic population in socioeconomic terms to find out if the clinic population represents the community. If it does not, as this study has revealed, a survey of eligible non-users of the service should be attempted to determine why they do not use it and how the service could be made more accessible and attractive to them.

Chapter VI

SUMMARY AND RECOMMENDATIONS

A brief description of the purpose of the study, the literature review, the research methodology employed, the findings of the clinic and other data acquired by the researcher in the course of the study are summarized in this chapter, and recommendations are presented.

Summary of the Study

A screening clinic for 3-year-old children was established by a health department in a British Columbia suburb, based on similar programs already functioning in nearby municipalities. The effectiveness and validity of these programs had not been evaluated before the opening of the new clinic. The purpose of this study was to investigate and describe this screening clinic, to report on the procedures employed, the personnel involved, the characteristics of the clientele, and the results obtained.

The literature was reviewed from several perspectives: the developmental theory of childhood, the rationale for screening programs, the optimal age of the subjects to be screened, the various test procedures employed in screening programs and their validity, the personnel involved in screening programs, and that segment of the population who

avail themselves of preventive health resources. Reported incidences of handicapping conditions in children proved difficult to interpret because of the idiosyncratic nature of each program; i.e., variations in the ages of the subjects screened, the use of non-standard and obfuscating terminology, differences in qualifications and skill levels of the personnel involved, and the dearth of follow-up studies.

The population involved in the present study are the 47 children and their parents who were the clients of the screening clinic for 3-year-olds during its first three months of operation. The children were screened by a team of three community health nurses, a speech therapist, and a dental hygienist. The screening routines were designed to assess developmental level, vision, hearing, speech and language, nutritional status, and dental health. Photographs are provided to illustrate these procedures.

The data on the study population were obtained from the health department's client records and from two original questionnaires and a clinic results form designed by the researcher. The data were coded to ensure confidentiality and were machine-tabulated and analyzed, producing frequency and percentage tables for selected variables. A few variables were cross-tabulated to add descriptive depth to the study. Tables are used to display the selected variables. The questionnaires and other forms devised for the study, and the forms used by the clinic staff, are included in appendices.

The study revealed that the initial clientele of the new clinic was drawn predominantly from the higher socioeconomic strata of the community. Most of the children had been exposed to an array of community health resources. Nonetheless, 51 percent of them were found by the clinic staff to have problems requiring further investigation and possible intervention. The commonest reasons for referral were problems related to vision, behavior, and speech and language. The true incidence of these and other problems cannot be confirmed without a follow-up study as proposed in the suggestions for future studies.

Recommendations

The first recommendation arising from this study is that all parents attending the screening clinic receive a follow-up telephone call or home visit to discuss the results of the testing procedures.

This study has shown that the new screening clinic is not reaching all of its potential clientele, and the part of the community that is not using its services may contain those children most at risk of handicapping conditions. Therefore, additional measures are needed to promote more widespread use of this facility. Clinic sessions might be held in the evening to enable parents in the work force to attend. The location of the clinic could be rotated in neighborhoods, perhaps using unoccupied schoolrooms, to

eliminate transportation problems for some parents. Screening procedures could be conducted in Day Care and Play School settings.

Another recommendation that could ensure the most efficient use of the screening clinic is the mailing of a developmental questionnaire to eligible parents in the community. Those children whose parents reported suspicious findings would be given a priority to attend the clinic.

Because of the many concerns the mothers had about problems of behavior and the many referrals made for that reason, the clinic staff could usefully be augmented by another nurse, or a child psychologist, given time to discuss these concerns.

The exchange of information among developmental screening clinics in British Columbia is inadequate. It is recommended that terminology used and methods of reporting be standardized to facilitate information-sharing and the compilation of statistical data. Sharp has written

Preventive medicine is completely dependent upon producing statistical evidence of its success. No grateful patients, relieved of their symptoms, sing its praises. The greater the success in prevention the less likely will there be public appreciation, because it is taken for granted.

(Sharp and Keen, 1968, p. 9).

Finally, community health nurses need to promote their services in the community more actively. This study has

revealed that the parents in the community have a need for their services and nurses have the skills to respond to that need.

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I. How did you hear about this clinic?

- ☐ Community Health Nurse
☐ Day Care Centre notice
☐ Friend or neighbor
☐ Newspaper notice
☐ Play School notice
☐ School Parent bulletin
☐ Other

(Please specify)

II. How did you get to the clinic?

- ☐ Bus
☐ Family car
☐ Friend's car
☐ Walked
☐ Other

(Please specify)

III. Has your child ever been to one or more of these health resources?

(If more than one category is applicable, please rank in order of frequency of visits, with 1 as the most frequently attended.)

- ☐ Dental Clinic
☐ Dentist
☐ Emergency Department
☐ General Practitioner
☐ Pediatrician
☐ Well-Baby Clinic
☐ Other health-care agency

(Please specify)

☐ None of these

IV. Approximately when, if ever, did your child last visit each of these?

Dental Clinic
 Dentist
 Emergency Department
 General Practitioner
 Pediatrician
 Well-Baby Clinic
 Other health-care agency

	1-6 mos. ago	6-12 mos. ago	More than 1 year ago
Never			
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(Please specify)

- V Has your child been treated for a problem in one or more of the areas listed at right?
- () Dental health
 () Hearing
 () Nutrition
 () Physical health
- _____
 (Please specify)
 () Behavior
- _____
 (Please specify)
 () Speech or language
 () Vision
 () Other
- _____
 (Please specify)
 () None of the above
-
- VI Do you think your child might have a problem in one or more of these aspects of development?
- () Dental health
 () Hearing
 () Nutrition
 () Physical health
- _____
 (Please specify)
 () Behavior
- _____
 (Please specify)
 () Speech or language
 () Vision
 () Other
- _____
 (Please specify)
 () None of the above
-

Note to Questions V and VI:

"Physical health" problems might include such things as ear infections, surgery, pneumonia, allergies, poor co-ordination, etc.

"Behavior" problems might include such things as temper tantrums, disobedience, fighting, bed-wetting, etc.

VII Who would you turn to for advice
if your child became ill with a fever,
an unusual rash, a severe cold, etc.?
(Please indicate first choice with 1,
second choice with 2, etc.)

- ☐ Child-care book
☐ Community Health Nurse
☐ Druggist
☐ Friend or neighbor
☐ General Practitioner
☐ Husband (or wife)
☐ Pediatrician
☐ Relative (mother, sister,
aunt, etc.)
☐ No one

VIII Who would you turn to for advice
if your child became difficult to
manage because of problems at the
table, with toilet-training,
disobedience, etc.?
(Please indicate first choice with 1,
second choice with 2, etc.)

- ☐ Child-care book
☐ Community Health Nurse
☐ Friend or neighbor
☐ General Practitioner
☐ Husband (or wife)
☐ Pediatrician
☐ Relative (mother, sister,
aunt, etc.)
☐ No one

IX Which age-bracket are you now in?

- ☐ 19 or under
☐ 20 to 24
☐ 25 to 29
☐ 30 to 34
☐ 35 to 39
☐ 40 or over

X What level of formal education
have you and your spouse
completed to date?

- | | Father | Mother | |
|--------------------------|--------------------------|--------------------------|---------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | University degree |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Some university |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Technical or vocational program |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Business school |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Grade 12 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Grade 9 - 11 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Grade 8 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Other |
| | | | (Please specify) |
| | | <input type="checkbox"/> | Other |
| | | | (Please specify) |

[illegible]

APPENDIX C

DATA SUMMARY FORM

Date _____

Patient No.	01	02	03	04	05	06	07	08	09	10
S										
BP										
FO										
MO										
R										
PN										
BW										
Fdg.										
I										
Age										

Sex - 1 is male, 2 is female.

Birth Place - 1 is Greater Vancouver, 2 is elsewhere in Canada,
3 is anywhere else.

Father's Occupation) 1-7 according to Hollingshead's scale
Mother's Occupation) and 8 for full-time housewife

Rank - 1 is only child, 2/3 is 2nd of 3 children, etc.

Prenatal - 0 if never attended classes, 1 if did attend, 2 if
attended during previous pregnancy.

Birth Weight - Exact weight to be recorded (intervals to be used
in analysis).

Feeding - 1 for breast, 2 for bottle.

Immunization Status - 1 if all immunizations up to date, 2 if
needs further immunizing, 3 if never
immunized.

Age - Recorded in months.

APPENDIX D

Health Department

3-Year-Old Screening Clinic

Date _____

No. Attending _____

Patient No.	Type of Problem Observed										
	1 None	2 Vision	3 Hearing	4 Speech or language delay	5 Physical development delay	6 Social adjustment delay	7 Nutrition	8 Dental	9 Parent	10 Immunization status	11 Other (please specify)
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											

Patient Referral Record:			
Patient No.	Problem No.	Previously known?	Referred to:
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

APPENDIX E

UBC GRADUATE STUDENT RESEARCH STUDY

Questionnaire No. 2
on a Community Health Department's 3-Year-Old Screening Clinic

(To be administered by the researcher by telephone)

Date _____

Code No. _____

- 1 How did your child react to the experience of being tested at the clinic?

() Frightened
() Confused
() Cooperated well
() Cooperated enthusiastically
() Other _____
(Specify)

- 2 Was any aspect of the experience particularly distressing to your child?

() No
() Yes _____
(Specify)

- 3 Did you learn anything about the state of your child's health and development that you didn't know before?

() No
() Yes _____
(Specify)

- 4 Did the results of your child's screening give you reassurance?

() No
() Yes
() Can't say

- 5 Do you think that taking your child to the clinic was useful to you as a parent?

() No
() Yes
() No opinion

- 6 Do you feel that the clinic has helped to detect any problems that might later have affected your child's performance in school?

() No
() Yes
() Can't say

7 What did you like or dislike about the clinic?

	<u>Liked</u>	<u>Disliked</u>	<u>No Opinion</u>
Time of day	()	()	()
Day of week	()	()	()
Location	()	()	()
Personnel	()	()	()
Testing technique	()	()	()
(Specify)			
Other	()	()	()
(Specify)			

8 Did the clinic staff impress you as:

() Competent
 () Incompetent
 () Other _____
 (Specify)
 () No opinion

9 Did the test procedures appear to you to be:

() Scientific
 () Unscientific
 () Other _____
 (Specify)
 () No opinion

10 Our records show that your child was referred by the clinic to the following agency/agencies:

Agency 1 _____
 Agency 2 _____
 Agency 3 _____

A Did you take your child to:

Agency 1	() No	() Yes
Agency 2	() No	() Yes
Agency 3	() No	() Yes

(If answer to any of the above is Yes, continue with B; if No, skip to D.)

B Did the agency/agencies to which you were referred agree with the clinic nurses' reasons for referring you?

Agency 1	() No	() Yes
Agency 2	() No	() Yes
Agency 3	() No	() Yes

C Has any testing or treatment of your child been started by the agency/agencies?

Agency 1	() No	() Yes
Agency 2	() No	() Yes
Agency 3	() No	() Yes

D If you did not take your child to the referred-to agency/
agencies, could you please tell me why?

Agency 1 _____

Agency 2 _____

Agency 3 _____

11 Do you think the 3-Year-Old Screening Clinic is a useful
service for your Public Health Department to provide?

☐ No

☐ Yes

☐ No opinion

12 Would you recommend the clinic to your friends?

☐ No

☐ Yes

☐ Not sure

13 Would you care to make any additional comments about the
clinic or its service?

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NOT MICROFILMED.

DENVER DEVELOPMENTAL SCREENING TEST

© 1969, WILLIAM K. FRANKENBURG, M.D. and
JOSIAH B. DODDS, PHD, UNIVERSITY OF COLORADO MEDICAL
CENTER, DENVER, COLORADO, U.S.A.

DENVER DEVELOPMENTAL SCREENING TEST

130

APPENDIX F

Date
Name
Birthdate
Hosp. No.

PERCENT OF CHILDREN PASSING

STO = STOMACH
SIT = SITTING
May pass by report
Footnote No. -
Test item
see back of form

PERSONAL - SOCIAL

FINE MOTOR-ADAPTIVE

LANGUAGE

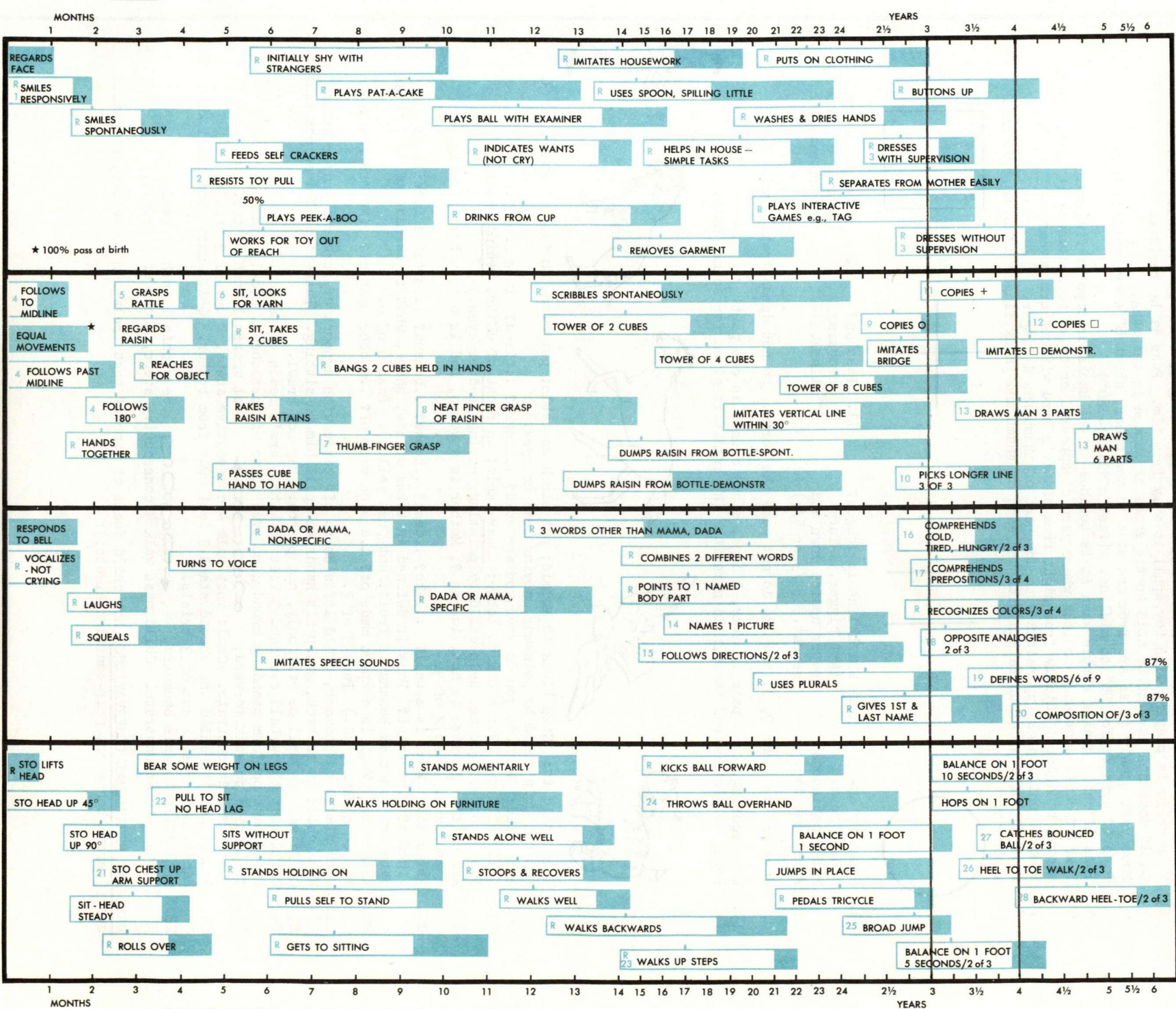
GROSS MOTOR

PERSONAL - SOCIAL

FINE MOTOR-ADAPTIVE

LANGUAGE

GROSS MOTOR



DATE

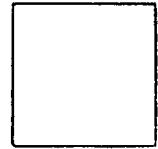
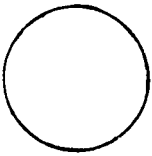
NAME

DIRECTIONS

BIRTHDATE

HOSP. NO.

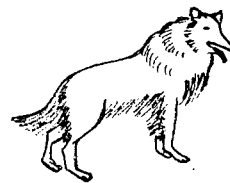
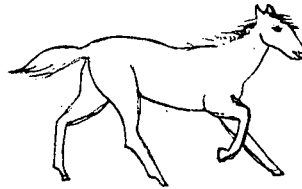
1. Try to get child to smile by smiling, talking or waving to him. Do not touch him.
2. When child is playing with toy, pull it away from him. Pass if he resists.
3. Child does not have to be able to tie shoes or button in the back.
4. Move yarn slowly in an arc from one side to the other, about 6" above child's face. Pass if eyes follow 90° to midline. (Past midline; 180°)
5. Pass if child grasps rattle when it is touched to the backs or tips of fingers.
6. Pass if child continues to look where yarn disappeared or tries to see where it went. Yarn should be dropped quickly from sight from tester's hand without arm movement.
7. Pass if child picks up raisin with any part of thumb and a finger.
8. Pass if child picks up raisin with the ends of thumb and index finger using an over hand approach.

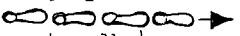
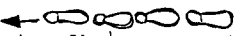


9. Pass any enclosed form. Fail continuous round motions.
10. Which line is longer? (Not bigger.) Turn paper upside down and repeat. (3/3 or 5/6)
11. Pass any crossing lines.
12. Have child copy first. If failed, demonstrate

When giving items 9, 11 and 12, do not name the forms. Do not demonstrate 9 and 11.

13. When scoring, each pair (2 arms, 2 legs, etc.) counts as one part.
14. Point to picture and have child name it. (No credit is given for sounds only.)



15. Tell child to: Give block to Mommie; put block on table; put block on floor. Pass 2 of 3. (Do not help child by pointing, moving head or eyes.)
16. Ask child: What do you do when you are cold? ..hungry? ..tired? Pass 2 of 3.
17. Tell child to: Put block on table; under table; in front of chair, behind chair. Pass 3 of 4. (Do not help child by pointing, moving head or eyes.)
18. Ask child: If fire is hot, ice is ?; Mother is a woman, Dad is a ?; a horse is big, a mouse is ?. Pass 2 of 3.
19. Ask child: What is a ball? ..lake? ..desk? ..house? ..banana? ..curtain? ..ceiling? ..hedge? ..pavement? Pass if defined in terms of use, shape, what it is made of or general category (such as banana is fruit, not just yellow). Pass 6 of 9.
20. Ask child: What is a spoon made of? ..a shoe made of? ..a door made of? (No other objects may be substituted.) Pass 3 of 3.
21. When placed on stomach, child lifts chest off table with support of forearms and/or hands.
22. When child is on back, grasp his hands and pull him to sitting. Pass if head does not hang back.
23. Child may use wall or rail only, not person. May not crawl.
24. Child must throw ball overhand 3 feet to within arm's reach of tester.
25. Child must perform standing broad jump over width of test sheet. (8-1/2 inches)
26. Tell child to walk forward,  heel within 1 inch of toe. Tester may demonstrate. Child must walk 4 consecutive steps, 2 out of 3 trials.
27. Bounce ball to child who should stand 3 feet away from tester. Child must catch ball with hands, not arms, 2 out of 3 trials.
28. Tell child to walk backward,  toe within 1 inch of heel. Tester may demonstrate. Child must walk 4 consecutive steps, 2 out of 3 trials.

DATE AND BEHAVIORAL OBSERVATIONS (how child feels at time of test, relation to tester, attention span, verbal behavior, self-confidence, etc.):

DENVER DEVELOPMENTAL SCREENING TEST

STO.=STOMACH
SIT=SITTING

PERCENT OF CHILDREN PASSING



Date
Name
Birthdate
Hosp. No.

PERSONAL-SOCIAL

FINE MOTOR-ADAPTIVE

LANGUAGE

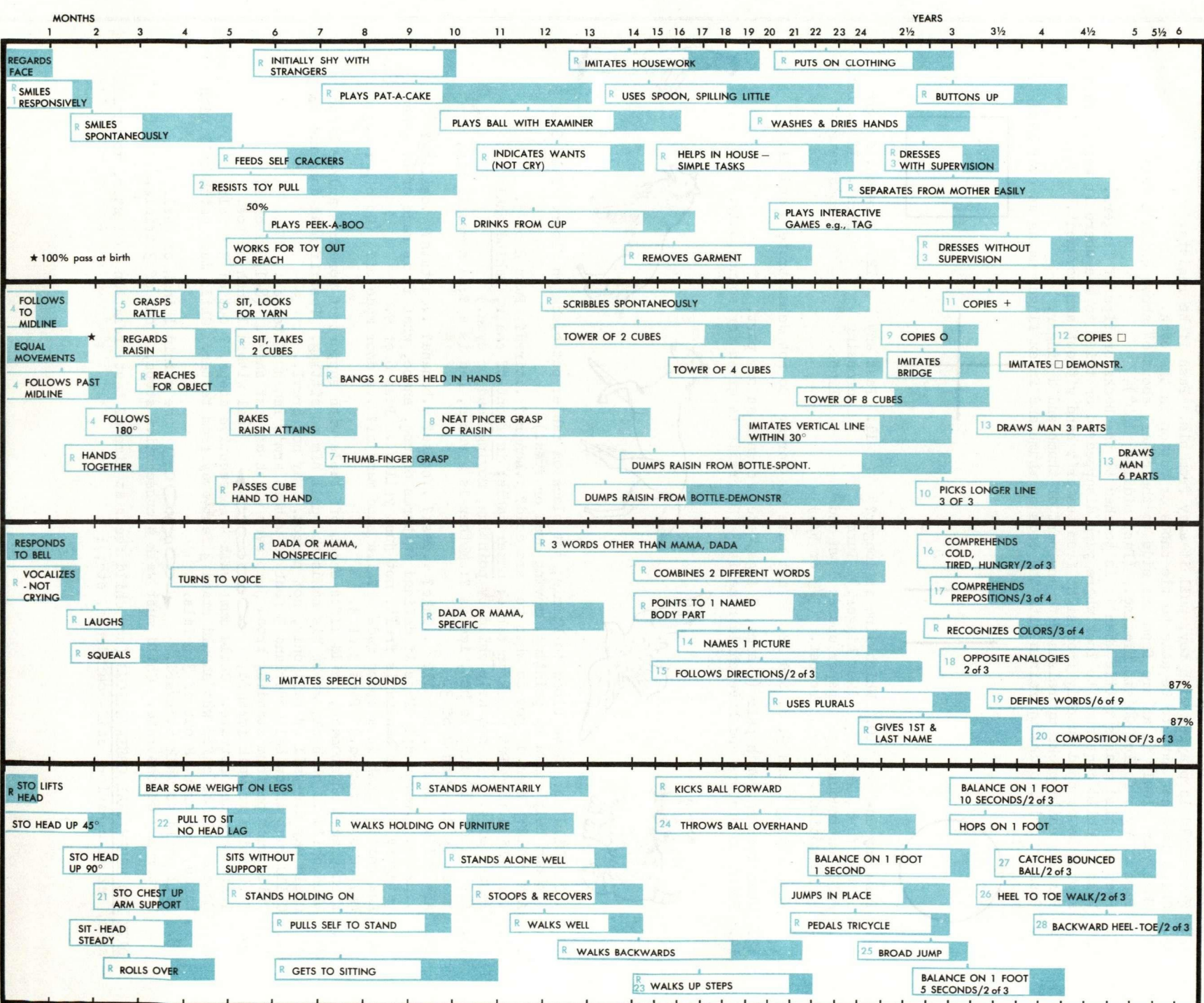
GROSS MOTOR

PERSONAL-SOCIAL

FINE MOTOR-ADAPTIVE

LANGUAGE

GROSS MOTOR



DATE

131

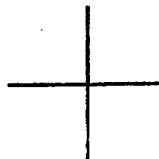
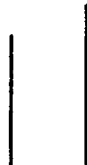
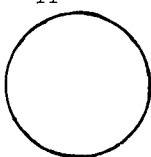
NAME

DIRECTIONS

BIRTHDATE

HOSP. NO.

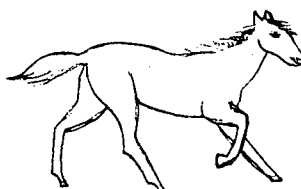
1. Try to get child to smile by smiling, talking or waving to him. Do not touch him.
2. When child is playing with toy, pull it away from him. Pass if he resists.
3. Child does not have to be able to tie shoes or button in the back.
4. Move yarn slowly in an arc from one side to the other, about 6" above child's face. Pass if eyes follow 90° to midline. (Past midline; 180°)
5. Pass if child grasps rattle when it is touched to the backs or tips of fingers.
6. Pass if child continues to look where yarn disappeared or tries to see where it went. Yarn should be dropped quickly from sight from tester's hand without arm movement.
7. Pass if child picks up raisin with any part of thumb and a finger.
8. Pass if child picks up raisin with the ends of thumb and index finger using an over hand approach.

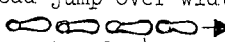
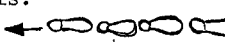


9. Pass any enclosed form. Fail continuous round motions.
10. Which line is longer? (Not bigger.) Turn paper upside down and repeat. (3/3 or 5/6)
11. Pass any crossing lines.
12. Have child copy first. If failed, demonstrate

When giving items 9, 11 and 12, do not name the forms. Do not demonstrate 9 and 11.

13. When scoring, each pair (2 arms, 2 legs, etc.) counts as one part.
14. Point to picture and have child name it. (No credit is given for sounds only.)



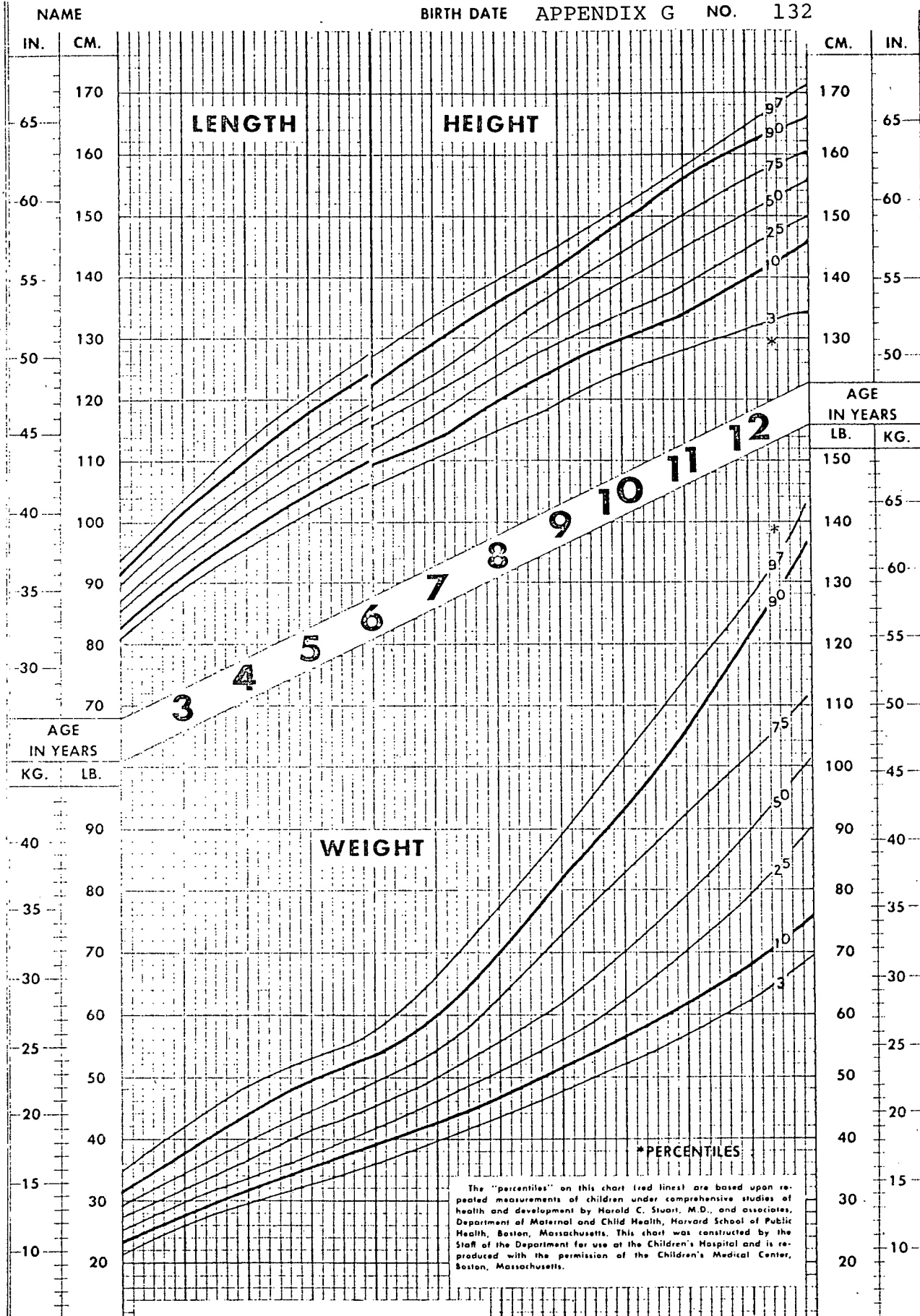
15. Tell child to: Give block to Mommie; put block on table; put block on floor. Pass 2 of 3. (Do not help child by pointing, moving head or eyes.)
16. Ask child: What do you do when you are cold? ..hungry? ..tired? Pass 2 of 3.
17. Tell child to: Put block on table; under table; in front of chair, behind chair. Pass 3 of 4. (Do not help child by pointing, moving head or eyes.)
18. Ask child: If fire is hot, ice is ?; Mother is a woman, Dad is a ?; a horse is big, a mouse is ?. Pass 2 of 3.
19. Ask child: What is a ball? ..lake? ..desk? ..house? ..banana? ..curtain? ..ceiling? ..hedge? ..pavement? Pass if defined in terms of use, shape, what it is made of or general category (such as banana is fruit, not just yellow). Pass 6 of 9.
20. Ask child: What is a spoon made of? ..a shoe made of? ..a door made of? (No other objects may be substituted.) Pass 3 of 3.
21. When placed on stomach, child lifts chest off table with support of forearms and/or hands.
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28. Tell child to walk backward,  toe within 1 inch of heel. Tester may demonstrate. Child must walk 4 consecutive steps, 2 out of 3 trials.

DATE AND BEHAVIORAL OBSERVATIONS (how child feels at time of test, relation to tester, attention span, verbal behavior, self-confidence, etc.):

GIRLS

BIRTH DATE APPENDIX G NO. 132

THE CHILDREN'S MEDICAL CENTER, BOSTON - ANTHROPOMETRIC CHART



BOYS

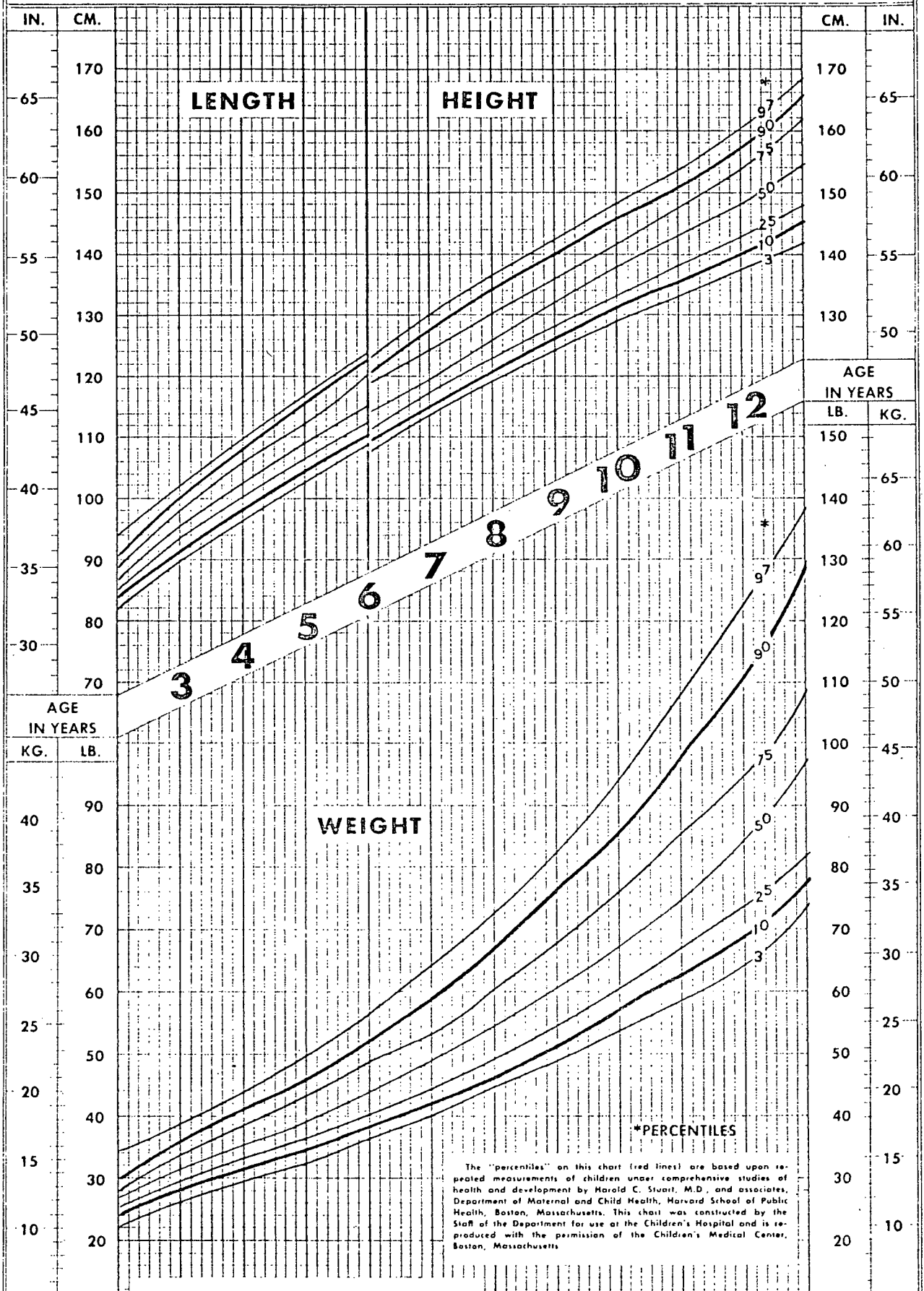
NAME

BIRTH DATE

NO.

133

THE CHILDREN'S MEDICAL CENTER, BOSTON - ANTHROPOMETRIC CHART



APPENDIX H

Nutritional Status Questionnaire

NAME: _____ DATE: _____

1. Frequency of eating: _____ times/day.
2. Child's appetite: Good (); Fair (); Poor (); Variable ().
3. Best meal of the day: Breakfast (); Lunch (); Supper ().
4. Child eats: alone (); with family ().

5. Kinds of Foods	Average Variety and Amounts per 24 Hours	Adequate	
		YES	NO
Milk (include milk used in soups, puddings, etc.) Cheese Yogurt			
Vitamin C Fruits Vegetables			
Cereals and bread whole grains, enriched refined			
Meat/Fish/Poultry/Eggs Legumes/Peanut Butter			
Sweets (sugar, desserts, beverages, candies, cookies)			

6. Is Vitamin D added to the milk you purchase? Yes () No ()
7. Are Fluoride supplements used? Yes () No ()
8. Are Vitamin supplements used? Yes () No () Brand _____
9. Are Mineral supplements used? Yes () No () Brand _____
10. List foods child does not eat.
11. Particular comments at this time.

APPENDIX I

Speech Therapist's Questionnaire

HEARING SCREENING -- 3-YEAR-OLD CLINIC

- 1) Does your child respond to his name being called?
 - (a) in the same room - Yes No
 - (b) in another room - Yes No
 - (c) outside at play - Yes No
 - (d) when awakened - Yes No
- 2) Does your child ask you to repeat your statements and/or questions?
(i.e., I beg your pardon? What? Eh?)

Yes No
- 3) Does your child listen to TV/radio with low/medium/high volume?
- 4) Does your child respond to instructions?

Yes No
- 5) Did your child readily respond to instruction for vision testing?

Yes No
- 6) Have you ever questioned your child's hearing ability?

Yes No
- 7) Has your child ever had ear infections?

Yes No

left ear - right ear - received treatment
with antibiotics!
- 8) Do you think audiometric testing is indicated?

Yes No

APPENDIX J

Table XIV
Dental Hygienist's Findings
for 38 Children in the Study Population

Findings	Number	Percentage (N=38)
Caries-free	31	81.6
Have family dentist	21	55.3
Had attended dental clinic	10	26.3
Previously treated	5	13.2
Mouth habits noted:		
Thumb sucker	8	21.0
Tongue thruster	1	2.6
Blanket sucker	1	2.6
Soother user	1	2.6
Referred to nurse for further counselling	2	5.3
Referred to dental clinic	4	10.5
Referred for treatment:		
For visible decay	3	7.9
For cross-bite	2	5.3
For tongue-tie	1	2.6
Total referrals	10	26.3