

EVALUATION OF FAMILY
PRACTICE NURSE DEPLOYMENT
IN URBAN MEDICAL PRACTICE
IN NEWFOUNDLAND

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EVALUATION OF FAMILY PRACTICE NURSE DEPLOYMENT IN URBAN
MEDICAL PRACTICE IN NEWFOUNDLAND

by

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ABSTRACT

The Family Practice Nurse Education Program of Memorial University of Newfoundland was established to prepare experienced, diploma- and degree-holding nurses to assume an expanded nursing role in primary health care settings. The topic of this thesis is the evaluation of the impact of six graduates of this program on private medical practices in St. John's and Corner Brook, Newfoundland. The evaluation component of the family practice nurse project began in 1973 with the development of instruments to measure the family practice nurse's impact on the effectiveness of patient care, patient and health professional satisfaction, quality of care, practice service output and organization, and financial aspects of the practices.

Effectiveness of Patient Care: In order to assess the effectiveness and safety of the primary care provided by a family practice nurse, a randomized clinical trial was conducted in one of the St. John's practices between June 1975 and May 1976. Before and after the trial, standardized measurements of physical, social, and emotional function were administered by lay interviewers to 572 patients who received conventional care by the family physician and to 296 patients who received care mainly from the family practice nurse. At the start of the study, statistical analyses revealed the comparability of the two groups of patients with respect to all three health outcome measurements. At the end of the study, the health outcomes of the two groups of patients were found comparable. These results corroborate the evidence derived from other controlled trials that family practice nurses/nurse practitioners provide effective care.

Satisfaction: Satisfaction and acceptance of family practice nurses was found high for patients, physicians and allied health professionals.

Quality of Patient Care: Quality of patient care standards were maintained after the introduction of family practice nurses. Before and after evaluations were achieved by using the indicator condition method. Minimal explicit process criteria for the management of patients with 12 indicator conditions and the use of 14 drugs were approved by an ad hoc peer group of community physicians. These criteria were applied to the practices using a single blind design and abstracting unaltered medical records. A standardized score for each practice was used to compare management of indicator condition scores and clinical use of drug scores before and after attachment of the family practice nurses. For each of the indicator conditions and the drugs assessed similar levels of adequacy were observed between study periods. These explicit (objective) audit results agreed with the implicit (subjective) assessments of the family practice nurses by their physician colleagues.

Practice Service Output and Organization: The addition of a family practice nurse to an urban medical practice increased service output in four out of six cases. Physician/family practice nurse teams were studied using daily logs of family practice nurse activity, physician claims to the provincial Medical Care Plan, time study sheets, and function delegation questionnaires. Practices using family practice nurses had a mean increase of 14% in the number of patient services during the first year of family practice nurse attachment; the mean

increase for all physicians in the province was 9%. The number of patients in the six study practices changed only slightly while services per patient increased by 15%. Family practice nurses provided total care in 4% of office services, and participated with physicians in a further 26%.

No consistent changes were noted in the age and sex of patients seen or in the amount of time the physician spent in the office.

Financial Aspects: Estimated losses were experienced by four of six fee-for-service family physicians in a study of revenues generated and expenses incurred by the six family practice nurses who had held salaried positions for one year in private medical practices. Daily service diaries were used to make annual estimates of family practice nurse generated revenues. Data from these diaries were linked by computer to yearly physician service data maintained by the provincial Medical Care Plan.

During the year of family practice nurse attachment, the six physicians experienced a mean increase in gross Medical Care Plan revenue of \$11,350 with an additional estimated mean increase of \$2,690 when solo family practice nurse services were included. Physicians' subjective appraisals and actual financial statements from the practices were used to estimate annual expenses related to the employment of the family practice nurses. The first procedure indicated average costs of employment were \$14,700 and the other \$19,770.

The estimated physician losses in net income, though real, were not substantial given (1) this was the first year of the family practice nurse attachment, (2) the purposes of the family practice nurse attachment were exploratory to determine the family practice nurse's

role in the practice and not primarily to demonstrate the profitability of employing family practice nurses, (3) the fee-for-service method of payment on the whole discourages delegation of tasks and allocation of time for teaching, factors not present with physicians on salary.

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CHAPTER I

BACKGROUND OF THE FAMILY PRACTICE NURSE CONCEPT

(i) Introduction

Long and extensive collaboration among interested provincial and national organizations preceded the acceptance of the development of the Newfoundland Family Practice Nurse Pilot Project. The purpose of the pilot project was to provide nurses with formal education to enable them to function in an expanded role in the provision of primary care in Newfoundland.

An advisory committee functioned from the earliest stages of planning of this pilot project. Membership of this advisory committee included representatives from the College of Family Physicians (Newfoundland Branch), the Newfoundland Medical Association, the Faculty of Medicine, the School of Nursing and the Provincial Department of Health. The advisory committee operated at the policy level and provided a mechanism for early and continuing involvement of the bodies concerned. Technical sub-committees and working parties have had responsibility for specific tasks such as definition of the family practice nurse role, family practice nurse curriculum planning and consideration of evaluation techniques. In August 1973 financial support was first received from the National Health Research and Development Program to proceed with the development of this pilot project. Diploma- and degree-holding nurses were enrolled in this federally supported family practice nurse pilot project with the education program sponsored jointly by the Faculty of Medicine and School of Nursing at the Memorial University of Newfoundland.

(ii) Definitions (Roles)

For over fifteen years there has been increasing discussion and

controversy in Canada as to the optimum method of filling an alleged gap between the existing roles of the physician and the nurse (Department of National Health and Welfare, 1972a). It has been shown by Wolfe (1968) that physicians may spend an important proportion of their work day in activities not requiring their level of skill. It has also been demonstrated (Cartwright and Scott, 1961; Crombie and Cross, 1957; Connelly et al, 1966; Hunter and Clark, 1971; Lewis and Resnik, 1967; Lewis et al, 1969; McKendry, 1968a; Rogers et al, 1968) that, particularly in general practice, an attached nurse with no special preparation for an expanded role can accept delegation of many functions, presently restricted to physicians. It is at this point that the controversy begins. In order to encourage further delegation of functions and more efficient utilization of expensive medical skills, the case for specific preparation for a new role in health care has been advanced by proponents who fall into two groups:

- (1) Those like McKendry (1968b) who support the concept of establishing a new health care worker - the physician associate;
- (2) Those who advocate the development of an expanded role nurse.

These latter tend to predominate in Canada (CNA Board Takes Stand on Physician's Assistant, 1970; College of Family Physicians of Canada, 1971; Department of National Health and Welfare, 1971, 1972a, 1972b; Newfoundland Medical Association, 1972; and Ontario Ministry of Health, 1969). They feel that the best course is the further development of an existing category of health care worker, rather than the construction of a new one with its potentially greater educational, legal and

organizational problems, to say nothing of those of patient and physician acceptability.

Discussion of this subject in Canada is attended by considerable semantic confusion. Each writer advances his own concepts and his own terminology. Thus we have the Physician Associate, the Physician Assistant, the Nurse Practitioner, the Outpost Nurse, the Family Practice Nurse, among other names appearing in Canada. Functionally, many of these roles overlap.

A common terminology, as part of a coordinated approach to this subject, is a basic requirement not presently met. Spitzer and Kergin (1971) considering only expanded role nurses have suggested the term "Nurse Practitioner" (for primary care settings) with "Nurse Clinician" and "Clinical Nurse Specialist" in settings other than primary care.

In the primary care context, any typology of assistants to physicians has to consider the following four classes:

CLASS I Attached Nurse

A degree or diploma nurse, often with public health training but with no preparation specific to an expanded role. Degree of delegation of functions variable and on an ad hoc basis when it occurs - working as a team member.

CLASS II Nurse Practitioner - Family Practice Nurse

An expanded role nurse with preparation specific to that role - involving the delegation of traditional medical functions - working as a team member.

CLASS III Physician Assistant

A para-medic - not strictly a nursing role, although nurses

CLASS III Physician Assistant (Cont'd)

may be candidates for training program - a new category of health care worker with special training for a role, which involves a greater degree of delegation of technical medical procedures than Class II, e.g. bone marrow biopsies, lumbar puncture (Fenderson, 1974). Best known example, the Duke Physician's Assistant (Sadler et al, 1972) - working as a team member.

CLASS IV Physician Surrogate*

Usually a nurse - in rural and northern areas. Frequently without (Hutchings, 1965) but occasionally with (Department of National Health and Welfare, 1970; and Robertson, 1973) preparation specific to providing primary care under conditions of limited medical supervision. That is, frequently working in isolation NOT as a team member.

These classes of "mid-level health professionals" (Lippard and Purcell, 1975) are envisaged as essentially representing differing degrees of specialization each with special educational requirements with provision for vertical mobility. The subject of this project is Class II - the Nurse Practitioner (Family Practice Nurse).

Prior to the first formal education programs for expanded role nurses in the 1960's, a number of demonstration projects in Canada and the United States were reported (Connelly et al, 1966; Ford et al, 1966; Lewis and Resnik, 1967; Silver et al, 1967; Yankauer et al, 1969; and Yankauer et al, 1970). These first formal demonstrations involved nurses

* Historically with the greatest degree of mismatch between responsibilities and preparation.

in extensions of the roles and functions of clinical-nurse specialists and public health nurses. In the United States these activities occurred in settings which provided care to pregnant women, infants and children, and to adults with chronic disease. Lewis et al (1976) have argued that "all were located in health departments or hospital clinics, and the concern of those responsible for these efforts was to improve the quality of care provided to the recipient of services. Although there were some occasional references to the relief of physicians from these types of activities, and thus some saving of physician, the primary objective was not replacement but improvement". The intentions of the investigators reporting in Canada on such demonstration projects is less clear (Day et al, 1969; and McAuley, 1969). Early reports in Canada concentrated either on (a) the public health nurse working "on attachment" to the primary care physician's office to the physician's bringing public health nursing practice to the physician's office and also providing him with efficient community services liaison (Day et al, 1969), or (b) the registered nurse providing a broad range of nursing care services to complement medical care services and assuming more responsibility in giving continuing health care while working within the physician's practice setting (McAuley, 1969).

Development of education programs to prepare individuals to perform as extenders of physicians or to serve as mid-level health professionals began soon after the demonstration activities. In the United States, the first training programs were concerned with the preparation of physicians' assistants (including Medex) (Andreol and Stead, 1967; Estes, 1968; Estes and Howard, 1970; Medex: Another answer to the physician shortage, 1969; Project plans to cut chores of physicians, 1969; and Stead, 1966).

Organized nursing in the United States rejected the role of the "nurse practitioner" as not within the scope of nursing until the late 1960's (Sadler et al, 1972; and Mussalem, 1969). Since that time, there has been a rapid increase in the number of programs preparing various nurse practitioners to function in extended/expanded roles (Dobmeyer et al, 1976; and Schroeder et al, 1974).

Wise (1972) and Bates (1975) have articulated many of the potential role conflicts between physician and family practice nurse which may affect their ability to work together in private medical practice in the community. Wise (1972) lists the inadequacies of traditional physician and nurse training which he suggests have caused problems experienced by physicians and nurses attempting to work as a team in primary care. Tables 1 and 2 list the differences in training and practice of physicians and nurses. Similar differences between primary care versus secondary tertiary hospital care have been pointed out by Hodgkin (1978) (Table 3). While Bullough (1975) emphasizes the role of sex as a potential role conflict area between physicians and nurse, Bates (1975) pinpoints the following potential barriers to physician and family practice nurse role change. According to Bates (1975), each physician-nurse team must develop new ways of working together and must do so against a background of long-standing professional territoriality. For example, conflicts between physician and nurse may arise when the sharing of analysis and decision-making is viewed as an infringement on the physician-patient relationship or when there is not an attitude of commitment to patients without professional possessiveness. Other potential areas of conflict outlined by Bates are listed in Table 4. Family practice nurses and physicians

Table 1 Differences in Physician Training and Practice*

<u>Training</u>	<u>Practice</u>
Trained in hospital	Works in health center
Structure is authoritarian - top-down	Structure is quasi-egalitarian
Clear reference group in hospital eg. pediatric house staff	Unclear reference group in health center - takes out membership in a new "club", the health team.
Hospital is center of power and knowledge	Health center is an outpost
Role in hospital clearly defined	Role in health center constantly changing
In hospital, emphasis is on diagnosis and treatment of acute illness	In health center, emphasis is on treatment of subacute illness and management of chronic and psychosocial problems
Trained to do careful "hospital-type" workup	Confronted with large numbers of patients. Quick work-up. Are standards falling?
No training in preventive medicine	Must learn about preventive medicine, much of which is in speculative stage
Treats "real" i.e., organic illness. The "clock" is ignored.	Unending group of people with psychosocial problems. Tends to use referral as an outlet.
Trained to work alone	Must work with team members
Patients in hospital are there on hospital's terms	Culture shock - meeting people on their terms in ambulatory setting

* Source: Wise H. (1972) The Primary-Care Health Team. Arch Intern Med 130: 441.

Table 2 Differences in Nurses' Training and Practice*

<u>Training</u>	<u>Practice</u>
Hospital: hierarchy, authoritarian; top-down	Health center; quasi- egalitarian participatory
Role is submissive	Role is assertive
Takes orders	Problem solver
Rules help in supervision	Few rules to assist in supervision of the family health workers
Task-oriented	Patient and team-oriented
Observer	Practitioner

*Source: Wise H. (1972) The primary-Care Health Team.
Arch Intern Med 130: 441.

Table 3 Complementary Aspects of Primary and
Hospital Care*

<u>PRIMARY CARE</u>	<u>SECONDARY AND TERTIARY (HOSPITAL) CARE</u>
Patient	
Patient initiates and motivates care. Patient freedom high. Patient secure in his own environment.	Patient voluntarily abrogates many freedoms. Patient freedom relatively low. Patient insecure in foreign environment.
Doctor	
Doctor has relatively little control. Doctors have to be relatively non-directive. Doctors responsible for a relatively large community of patients.	Doctor control high. Doctors have to be directive. Doctors required to concentrate extensive resources on relatively small numbers of patients.
Clinical	
Trivial disease frequent. Serious disease (a) relatively rare, (b) presentation confused by presence of trivia, (c) clinical presentation undifferentiated and early diagnosis difficult.	Trivial disease rare. Serious disease (a) relatively common, (b) presentation confused with other serious disease, (c) clinical presentation more differentiated.
Continuity	
Data collection cumulative Background of patient often known to doctor before patient presents. Dual care often uncontrolled.	Data collection episode. Doctor often has no prior knowledge of patient's background. Dual care controlled by doctors.
Comprehensiveness	
Doctor must know a little about everything. Patient expects doctor to help with very wide range of problems.	Doctor must know everything about a special area. Patient expects doctor to help with relatively narrow range of problems.
Economics	
Patient responsible for own nursing accommodation and upkeep. Relatively inexpensive.	Hospital has to be funded for nursing accommodation and upkeep. Relatively costly to patient and/or community.

*Source: Hodgkin K.(1978) Towards Earlier Diagnosis: A Guide to General Practice, 4th ed., Longman, New York.

Table 4 Potential Areas of Conflict Between the Physician
and the Family Practice Nurse*

Should the physician automatically take up the position of team leader in all situations?

Should the family practice nurse's role be confined to care, comfort, counselling, guidance and helping the patient to cope and not be involved in diagnosis and treatment?

Should the family practice nurse spend most of her time as an assistant to the physician (receptionist, gives shots, chaperons pelvics, and answers the phone) rather than taking on an expanded nursing or family practice nurse role?

Should the family practice nurse be one who assesses and manages and one who comforts, supports, and helps?

Should the physician relinquish any portion of his conventional role- and should his protocol always call for physician involvement with the family practice nurse not encouraged to work beyond his protocol for her?

Should the sharing of analysis and decision-making be viewed as an infringement on the physician-patient relationship rather than having an attitude of commitment to patients without professional possessiveness?

Who should collect patient data?

Who should make what decisions?

Who should decide on which management plan?

Who should be the principal provider for which group of patients and should it be both physician and family practice nurse?

Should the responsibility of the physician or family practice nurse in the eyes of the law be raised frequently when deciding on who should do what for patients (for example, taking night or weekend calls or making decisions without the physician present)?

Should the physician take time to teach the family practice nurse how to become a significant contributor in the management of patients and a member of the practice team?

Should family practice nurse relations with hospital and extra-practice personnel lead to confusion as to whether her role should be a conventional medical one or a conventional nursing one?

Should the practice have a policy of handing over to the family practice nurse all new and unknown "clinic" patients for which the physician has little interest or time?

Should the uncertainties of the family practice nurse's future in the practice prevent her from some activities?

*Source: Bates B. (1975): Physician and Nurse Practitioner: Conflict and reward. Ann Intern Med 82: 702-706.

intending to work as a team would benefit by discussing together this list of potential problem areas. Often these problems exist or are perceived to exist but are not easily articulated by the physician or the nurse.

(iii) American Experience

In the United States, public health nurses have long performed many primary care duties. The Frontier Nursing Service of Leslie County, Kentucky has since 1925 provided most of the health care, particularly maternal and child care, to residents of that county (Isaacs, 1972). The United States Armed Forces have also had considerable experience in the training of Corpsmen to assist in the delivery of health services to the Military and its dependents. In the 1960's over 30,000 of these Corpsmen per year were leaving the services (National Academy of Science, 1969).

In 1974 Schroeder et al (1974) reported close to 400 education programs in the United States to produce physician assistants (including Medex) and expanded role nurses for primary care and specialist care. About 70% are designed to train primary care personnel. Five organizations - The American Medical Association, the North American Academy of Sciences, the Association of American Medical Colleges, the American Academy of Pediatrics and the American Society of Internal Medicine - have jointly produced guidelines for definition and education of physicians' assistants and expanded role nurses (Sadler et al, 1975).

One principal difference among the mid-level health professional education programs, as of the early 1970's, was the extent to which students were prepared to function independently/interdependently/dependently. The first programs preparing assistants to physicians

placed heavy emphasis on this individual as an extender of the physician's abilities to collect data through history and physical examination and to perform routine tasks (see Charles et al, 1974; Greenfield et al, 1974; Komaroff et al, 1974; Sox et al, 1973; and Taller and Feldman, 1974). Physicians were expected to supervise their actions, to review the data collected by them, make all decisions, and to prescribe all the necessary treatments which might (depending on their complexity) be carried out by an assistant (Yankauer, 1969).

Another emphasis in these early education programs in the United States was on the preparation of the individuals to perform certain "tasks". Many of these were similar to those performed by corpsmen in the Vietnam war, such as suturing wounds and applying casts. Their curricula stressed the performance of activities that required psychomotor skills, rather than in-depth preparation for evaluation of clinical data or decision-making.

Physicians assistants programs lately have changed their philosophy and assumptions underlying their educational objectives down playing the characteristics described. Graduates are being prepared to process information and make decisions, as well as to collect data and perform certain skills. A recent article in the New England Journal (Roles, tasks and practitioners, 1977) pointed out that this new direction of the programs cloud the distinction between physician and non physician.

In the United States (and in Canada), nurse practitioner programs have emphasized aspects of patient care that involve psychosocial interventions, such as health education and counselling. In early education programs (except for northern nurse programs that included mid-wifery), very little emphasis was placed on the surgical aspects of medical

practice. Increasing numbers of programs are emphasizing courses for clinical nursing specialists, supplemented by training in physical diagnosis and medical management.

A third type of mid-level health professional education program operating in the United States include such programs as the child health associate, the family planning specialist, and the primary-care associate. These practitioners possess a blend of skills and abilities of physicians' assistants and nurse practitioners. However often these education programs do not require previous training or experience in the health sciences.

(iv) Programs Outside North America

The concept of the Physician Assistant is of course not new. The Russian Feldsher described by Sidel (1968) and others (Field, 1966; The training and utilization of feldshers in the U.S.S.R., 1974; and U.S.S.R., The ordinary or general feldsher, 1971) was active in the 1700's. In the United Kingdom there has been an increasing trend to the attachment of members of the domiciliary nursing services to general practitioners. This began in 1963 following the Gillie Subcommittee recommendations. Legal problems were removed by the Health Services and Public Health Act of 1968. However, it has been found necessary to stress that "where nurses make a first visit to the patient, it must be understood that this visit is not for the purpose of diagnosis. The doctor remains accountable and the attachment schemes are not an attempt to relieve the general practitioner of responsibility, but to make more effective use of existing medical and nursing skills" (Gish, 1971). It is interesting, then, that attached personnel of this type in the United Kingdom are neither physician assistant nor

expanded role nurses as understood in the North American context.

Robinson (1977) recently reviewed the major differences in the style and content of primary medical practice in North America compared with the United Kingdom. In the United States, he argues, emphasis is on diagnosis. In the United Kingdom emphasis is on continuity and home-based care supported by a nationwide network of paramedical and social services. Beyond a concern that these services be continued at existing levels, primary care physicians in the United Kingdom remain uninterested in actual delegation of their diagnostic responsibilities despite the reported efficiency of trained nurses in making decisions in housecalls (Moore et al, 1973). They are also apparently unimpressed by enthusiastic reports from the United States about the potential of mid-level health professionals (An assistant in the house?, 1975).

Ethiopia, Uganda, Sudan, Tanzania, Kenya, Malawi, and Northern Nigeria all deploy varieties of medical auxiliaries (Fendall, 1972). Thailand, several of the South American republics and Iran are either actively considering or have been employing categories of Assistants to the Physician (Fendall, 1972). Fiji trains Assistant Medical Officers in a five year program, and the People's Republic of China is currently training "Barefoot Doctors" (Fendall, 1973; and Wen and Hays, 1975). There seems little merit here in discussing in detail the many interesting developments in these countries - countries which have marked differences from Canada in their political, social and economic environments, and health care systems.

(v) Nurse Practitioner Programs in Canada

A variety of programs (Department of National Health and Welfare,

1973) exist across Canada aimed at preparing nurses for an expanded role, usually in a primary care context, frequently for a rural or northern environment, and seldom with a defensible evaluative component. Detailed task inventories have been developed for the Saskatchewan Nurse Practitioner Demonstration Project (Cardenas, 1975) whose graduates have been placed in northern Saskatchewan or to practice in isolated nursing stations who trained in the specially sponsored Medical Services Branch (Health and Welfare, Canada) education programs at the Universities of Sherbrooke, McGill, Toronto, Western Ontario, Manitoba and Alberta (Hazlett, 1975). However, empirical studies of monitoring these graduates in the field have yet to be reported. Sophisticated evaluation studies, done at McMaster University, have been reported on the nurse practitioner in Canada. The McMaster studies (Batchelor et al, 1975; Chenoy et al, 1975; Sackett et al, 1974; Scherer et al, 1977; Sibley et al, 1975; Spitzer and Kergin, 1973; and Spitzer et al, 1973, 1974, 1976a, 1976b), where nurse practitioners have been carefully observed in their daily work (primarily in urban medical practice) have reported that nurse practitioners conduct numerous medical procedures, teach patients how to handle or prevent illness and disease symptoms and decide which patients are in genuine need to see the physician. The McMaster studies of the nurse-practitioner-physician pairs have found: without increasing their billing, the nurse-physician teams gave 24% more service, were able to care for 40% more families and reduced per person hospitalization by 31%. In one community clinic, annual hospitalization costs were reduced by 77%. Nurse practitioners were able to handle 67% of patients' calls and visits without involving the physician, who was either left free to

give better quality care to patients requiring the help of someone with his level of training or to increase the number of patients seen in the practice.

With the exception of the present Newfoundland study, there has been no program involving training or evaluation of nurse practitioners in an urban primary care setting operating or planned in any of the four Atlantic Provinces. This is surprising as in rural and northern areas of the Atlantic Region, particularly Newfoundland and Labrador, nurses have been functioning as physician surrogates (see definition above) for many years -- albeit without specific preparation for that role (Lady Harris, 1921). Due to Newfoundland's geography and climatic conditions, nurses have historically, and in most cases without formal training, provided primary health services out of cottage hospitals and nursing stations scattered throughout the Province (Miller, 1974). Family physicians constitute 52% of all registered physicians in Newfoundland indicating that health care is still oriented toward family physicians. In January 1976, the family physician to population ratio was 1 to 1811 but they are unevenly distributed so that many rural and small outport family physicians are overburdened (Government of Newfoundland, 1971). While in the past Newfoundland has been plagued with a shortage of nurses, recent fiscal constraints primarily on the large acute care hospitals have reversed this resulting in an increase in the number of well trained, experienced Newfoundland nurses who are looking for work. Dr. Leonard A. Miller, former Newfoundland Deputy Minister of Health and Commissioner of the Royal Commission on Nursing Education, has recommended that nursing education programs in the province be tailored (in terms of length and orientation) to the needs of the province (Government of Newfoundland, 1974).

(vi) The Memorial University of Newfoundland and Family Practice Nurse Education Program.

In 1971 the Faculty of Medicine and School of Nursing at Memorial University of Newfoundland agreed to offer jointly a pilot family practice nurse education program. The pilot program received the support of the Newfoundland Branch of the College of Family Physicians, the Newfoundland Medical Association, the Provincial Department of Health and the Association of Registered Nurses. Health and Welfare Canada's Health Research and Development Programs Directorate offered to fund the pilot education program provided it was evaluated by methods acceptable to them.

Development of the concept of the Memorial University of Newfoundland family practice nurse role was influenced by recent Canadian expanded role nurse and primary care reports and programs while strongly recognizing the need in Newfoundland: The role of the family practice nurse has been purposely defined to allow for a degree of flexibility in its application both in the Education Program and in primary care practices which have Program graduates attached to them. The "Boudreau Committee on the Nurse Practitioner" (Department of National Health and Welfare 1972b) and others (Spitzer and Kergin, 1973) have accepted the following definition of the family practice nurse role: "A Nurse Practitioner (Family Practice Nurse) is a nurse in an expanded role oriented to the provision of primary health care as a member of a team of health professionals, relating to families on a long-term basis and who, through a combination of special education and experience beyond a baccalaureate degree or a diploma, is qualified to fulfill the expectations of this role" (Department of National Health and Welfare, 1972b). The

Hastings Committee on Community Health Centres in Canada (Report of the Community Health Center Project to the Conference of Health Ministers, 1972) adopted the following as important characteristics of primary care: first contact, accessibility, comprehensiveness (wide range of health services and skills provided or arranged by the health care team), co-ordination of care, continuity of care, and family orientation.

The following are the range of possible activities which the planners of the education program considered as included in the role of the family practice nurse. Under the supervision of a physician the role of the family practice nurse can:

- act as initial contact for persons entering the health care system
- assess the health status of the individual and the family
- determine the required response from the health care system, e.g. initiation and maintenance of treatment for patients with health problems which the family practice nurse has been prepared to handle, referral of the patient after work-up to appropriate health care personnel
- provide health counselling to all age groups and to all socio-economic strata, with particular reference to the adolescent and the geriatric patient
- provide health education, reinforcing the individual's and the family's knowledge and ability in the maintenance of health, in the prevention of illness, in self-care and care of family members in the home in the event of illness
- give pre- and post-natal care of the normal healthy mother, excluding delivery
- conduct preventive programs, e.g. infant and pre-school examinations, immunizations, geriatric health maintenance clinics
- follow up patients with long-term illness, adjusting therapy, often on her own initiative, but always in consultation with the physician

- co-ordinate the health care of individuals and families
- intervene in emergency situations

Broad instructional objectives of the Memorial University of Newfoundland Family Practice Nurse Education Program were developed before the start of the Program. These objectives were developed by an advisory and planning committee with representatives from the Newfoundland Branch of the College of Family Physicians, the Newfoundland Medical Association, the Faculty of Medicine and the School of Nursing. In order to fulfill the role expectations placed on the family practice nurse, it was felt that the nurses would need to supplement their background knowledge and ability to the extent that they would possess the following:

- (1) Knowledge of the purposes, techniques, and limitations of interviewing and history-taking, including physical assessment techniques which would equip them to recognize abnormalities that would justify intervention by the family practice nurses, whether preventive or curative.
- (2) Knowledge of nutrition, the life cycle, common illnesses and therapeutics in family practice in order to participate in overall patient management and co-ordination of an interdisciplinary team plan of patient care.
- (3) Ability to apply effectively this knowledge to clinical work situations during the education program.
- (4) Appreciation of the importance of relationships with patients, other health professionals, hospitals and government and the possibilities of self-evaluation in these areas.

Topics covered in the courses offered in the Faculty of Medicine and the School of Nursing included: family medicine skills review, current concepts in nursing, life cycle and common illnesses, therapeutics and nutrition. Students without degrees in nursing were required to take courses in sociology and psychology from the respective University

departments. An important component of the program included clinical experience with patients in cottage hospitals, the University family practice units, children's hospital out-patient department and homes for the aged. Also during the education program the supervising physicians were asked to attend meetings with the students to discuss the objectives of the program and to review the progress of the students. These also served as informal social meetings giving the nurses an opportunity to share their own experiences with their supervising physician.

In addition to being one of the longest education programs for family practice nurses in North America, (Department of National Health and Welfare, 1973), the Memorial University of Newfoundland Family Practice Nurse Education Program is unique in its emphasis on therapeutics. The course has been the joint responsibility of a pharmacologist and a family physician. The instructional objectives of the therapeutics course included: (1) ability to identify drugs and tablets prescribed most often to patients in family practice, (2) appreciation of the therapeutic values and side effects of those drugs most commonly used in family practice such as antibiotics, other proprietary drugs, analgesics, and drugs given to patients with chronic conditions.

A detailed report and recommendations on the Memorial University of Newfoundland Family Practice Nurse Education Program was included in the January 1976 section of the project submitted to the Health Research Programs Directorate of Health and Welfare Canada (Department of National Health and Welfare, 1976).

(vii) The Students

Of the fourteen students who enrolled in the education program,

seven had been previously employed by rural hospitals or the Provincial Department of Health and were selected by these organizations to attend the program. All applicants were required to be degree or diploma-holding nurses and to have two years of nursing experience.

Table 5 gives the profiles of ten nurses who were enrolled in the 1974-75 academic year. One student began working as a nurse in 1972 while some of the others had been nursing for up to twenty years.

As shown in the map on Figure I, all fourteen students, upon completion of the education program, began working in the role of family practice nurses. Seven nurses were attached to primary care settings in rural Newfoundland. In all rural cases, the family practice nurse is attached to a cottage hospital and under the supervision of a salaried physician. The remaining seven graduates, upon graduation, were attached to urban practices either in the cities of St. John's or Corner Brook. Early in the attachment of one of the St. John's practices, largely because of illness of the physician, one family practice nurse was placed in the walk-in clinic of the children's general hospital in St. John's.

(viii) Legal Aspects

A series of steps were undertaken and explored in Newfoundland in order to minimize possible medico-legal difficulties which graduates of the Memorial University of Newfoundland Family Practice Nurse Education Program may have encountered once they were attached to a practice (Personal communication with L.E. Rozovsky, 1974).

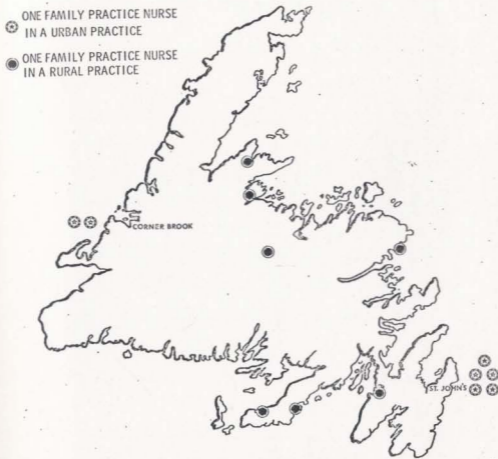
(1) Graduates of the Memorial University of Newfoundland Family Practice Nurse Education Program, like graduates of other health professional training programs are legally eligible to perform procedures and functions which

Table 5
Profiles of Ten Family Practice Nurses *

Family Practice Nurse	Age	Education	Work Experience	Supervisory Experience Before Entering Program
A	25	University School of Nursing B.Sc. (1971)	Victoria Order of Nurses, Newfoundland 1974, Co-ordinator Home Care Program 1972-1973, Public Health Nurse 1971-1972	yes
B	30	Hospital School of Nursing R.N. (1967), Midwifery, Scotland	Cottage Hospital, Newfoundland 1967-1974	yes
C	42	Hospital School of Nursing R.N. (1955), Midwifery, England	Cottage Hospital, Newfoundland 1956-1964 1968-1974, Department of Health Nova Scotia 1964-1968, Acute Care Hospital, Newfoundland 1955-1956	yes
D	29	Hospital School of Nursing R.N. (1967)	Acute Care Hospital, Newfoundland 1967-1974	No
E	22	Hospital School of Nursing R.N. (1972)	Acute Care Hospital, Newfoundland 1972-1974	No
F	30	Hospital School of Nursing R.N. (1965)	Acute Care Hospital, Newfoundland 1965-1974	No
G	24	Hospital School of Nursing R.N. (1967)	Acute Care Hospital, Newfoundland and Ontario 1967-1974	No
H	42	Hospital School of Nursing R.N. (1955)	Acute Care Hospital, Newfoundland 1967-1974, General Practitioner Office 1963-1967	No
I	44	Community College Associated Degree (1966)	Cottage Hospital, Newfoundland 1972-1974 Convalescent Hospital California 1969-1972, Acute Care Hospital California 1968-1969	Yes
J	43	Hospital School of Nursing (1956)	Regional Nurse, Newfoundland 1957-1974, Health Visitor 1955-1957, Midwife 1952-1955	Yes

*Based on student questionnaire replies

FIGURE 1 Family Practice Nurses In Newfoundland 1975-76



have been covered in the Education Program. Although explicitly defined and detailed guidelines written into the law outlining these procedures and functions would leave little room for development and change in the possible activities of expanded role nurses, a formal statement of guidelines outlining procedures and functions of Memorial University of Newfoundland Family Practice Nurse Education Program graduates as members of a health care team was considered necessary. A committee on the legal aspects of the family practice nurse consisting of members representing the Faculty of Medicine, School of Nursing, the Association of Registered Nurses of Newfoundland, the Newfoundland Hospital Association, the Newfoundland Medical Association, the Departments of Health and Justice, produced these guidelines (See Appendix A).

(2) Maintenance of patient records not only reduces the chance of injury of patients due to poor communication, but adequate patient records are a crucial means of defense if the quality of care is questioned in a court of law. For these reasons, emphasis was placed in the Program on the importance of maintenance of patient records by physician and the nurse.

(3) In the event that a malpractice suit arose as a result of the activities of a family practice nurse, both the employer and the employee would be liable together. Physicians practicing in Canada can be insured against such occurrences through the Canadian Medical Protective Association. At present in Canada, other health professions tend not to be covered. Nurses not employed by the Newfoundland government purchased malpractice insurance premiums from a local insurance firm. Malpractice coverage of all nurses in the province began on January 1, 1977 through the Association of Registered Nurses of Newfoundland.

(4) As in other professions, one method of setting a minimum standard of competence for family practice nurses can be attempted through the establishment of specialist licensure for graduates of the Memorial University of Newfoundland Family Practice Nurse Education Program. Also, since the standards by which a professional is judged are the standards of the time the act complained of occurred, and not standards at the time the professional graduated, programs for continuing education after graduation, and the possibilities of limited licensure will have to be contemplated for "long-term" graduates of the Memorial University of Newfoundland Family Practice Nurse Education Program.

(ix) Study Design and Sample

Selection of the sample began with the universe of 14 family practice nurses who had graduated from the Memorial University of Newfoundland Family Practice Nurse Education Program in May, 1974 or May, 1975. In this report, the family practice nurse's impact is examined in urban fee-for-service primary-care practices. Through the excellent co-operation of one rural hospital's medical and administrative staff, the impact of one rural family practice nurse was examined and has been reported elsewhere (Chambers et al, 1977).

To ensure homogeneity among the practices in which family practice nurses worked, eight family practice nurses not employed in urban, fee-for-service, primary-care practices were excluded. The study sample included the six family practice nurses who were employed in primary care practices beginning in June, 1975 and who were monitored over a one year period. Permission to conduct detailed evaluation studies in these practices was possible because they were offered free the services of a family practice nurse (at considerable cost to the National Health Research and Develop-

-ment. Program). The commitment of resources to these practices and the general difficulties in convincing other physicians of the merits of being similarly evaluated as controls without family practice nurses resulted in most comparisons being made only on a before and after basis. Access to the Medical Care Plan computer file enabled some comparisons between the six physicians and all other family physicians in the province whose main source of income was from fees-for-services covered in the physician payment schedule of the Medical Care Plan.

Rather than comparing a few variables across many practices (or sampling units) as is usually done in epidemiologic studies, this report compares many variables across a few practices. The evaluation of six physician/family practice nurse teams on a practice by practice basis involved large numbers of observations. For example, 868 patients were interviewed at two points in time after being randomly allocated to either an experimental group receiving care mainly from a family practice nurse or a control group receiving care mainly from a physician. In conducting the quality of care component of the study, 4401 episodes of care provided by physicians and family practice nurses were assessed before and after the introduction of family practice nurses into the practice. Utilization and financial assessments in all six practices were based on total year, before/after comparisons of services which averaged 10,000 patient services per practice per year. Therefore, despite the limitations in making 'among' practice comparisons, it has been possible to conduct highly detailed 'within' practice assessments.

(x) Organization of the Thesis

Chapters II, III, IV and V of the thesis report on the evaluations of the impact of the family practice nurse on urban fee-for-service

practices from four points of view respectively.

II. The impact of the family practice nurse on the effectiveness of the care provided. Patient outcomes such as physical, social, and emotional function were determined with questionnaires administered in the patient's homes. These questionnaires also enquired about the patient's acceptance of the nurse in certain expanded role activities.

III. The impact of the family practice nurse on the quality of care provided. Written clinical decision-making outlines were developed by a peer advisory group (consisting of three non-university affiliated practising community physicians) for twelve indicator conditions and fourteen drugs commonly used in general practice. Scales of measurement for each indicator condition and drug were described in these outlines. With the assistance of nurses and a medical record librarian, data was extracted from the medical records and each practice was scored quantitatively with the scoring system set out in the clinical decision-making outline.

IV. The impact of the family practice nurse on the service output and organization of an urban fee-for-service medical practice. The practices were monitored using Medical Care Plan of Newfoundland claim forms, family practice nurse daybook diaries and additional questionnaires to measure the number and types of patients cared for, physician delegation of functions to the family practice nurse, and practice personnel professional satisfaction.

V. The impact of the family practice nurse on the financial profitability of an urban fee-for-service medical practice. Medical Care Plan of Newfoundland and the physicians' financial accounts were

used to analyze the implications of employing family practice nurses when taking into account salary and overhead costs of the family practice nurse.

The last chapter of the thesis summarizes the findings from the previous four chapters. Conclusions are drawn from these findings regarding the feasibility and future for family practice nurses.

An annotated bibliography of articles primarily focusing on the material covered in chapters IV and V is provided in Appendix B.

Appendix C is a report on the methods used to collect family practice nurse daybook data and the linkage of this data to the Medical Care Plan of Newfoundland data.

Appendix D consists of copies of the instruments used in this study.

Appendix E consists of additional tables of service and patient volume data which were summarized from the Medical Care Plan computer file on the six practices.

CHAPTER II

HOW EFFECTIVE AND SAFE IS THE FAMILY PRACTICE NURSE

HEALTH OUTCOMES OF PATIENTS IN THE
ST. JOHN'S RANDOMIZED CONTROLLED TRIAL
OF THE FAMILY PRACTICE NURSE

A fundamental assumption in the concept of the family practice nurse model is that in any primary care practice there is a large number of patients whose problems do not require the skills and talents of the physician for effective management, and, furthermore, that a registered nurse with additional training primarily in preventive medicine, physical diagnosis and medical management will have the skills needed to provide effective (White, 1976), safe care to these patients which is equivalent to the care a physician would provide in a conventional model. This chapter describes an evaluation of the effectiveness of the family practice nurse on patients' physical function, emotional function, and social function components of health outlined in the World Health Organization definition of health (The First Ten Years of the World Health Organization, 1958). The evaluation was conducted with patients in one of the family practices in St. John's where a family practice nurse was introduced.

(i) Participating Personnel and Background

The family practice under study previously had no affiliation with a university or other institution. The organization of medical care in Newfoundland was well suited to our study as patients were free to seek any desired source of primary care, and the costs of care regardless of source were completely covered by the Newfoundland Medical Care Plan.

The family physician had received his medical degree in 1961 from the University of Taiwan and had practiced in St. John's for 15 years. The nurse had received her Registered Nurse diploma in

1955 and had been an employee of the physician for four years before becoming a family practice nurse.

Before the study began, the nurse attended a special education program for family practice nurses conducted by the schools of nursing and medicine at Memorial University of Newfoundland as described in Chapter I. During the nine month education program, decision-making and clinical judgement were stressed in classroom and practical work. The students were taught social history taking, physical examinations and the ability to distinguish between abnormal and normal patient symptoms and signs as skills to be applied in clinical settings where the responsibility of continuing care of patients is shared with a family physician. In establishing reciprocal confidence in each other's work, the physician and family practice nurse arrive at a point where the family practice nurse is delegated the responsibility of choosing between three possible courses of action: providing specific treatment; providing reassurance alone, without specific treatment; or referring the patient to the associated family physician, to another clinician or to an appropriate service agency.

(ii) Methods

(a) The Study Population

The study physician's practice records were organized by family because many clinical problems in primary care involve families. A 'family' in the study practice was defined as a person or group sharing a common address and typically included breadwinner, spouse, and dependent children. Families as defined in the practice records

were chosen as the unit of randomization.

Persons judged eligible for the trial were those whose families had an ongoing medical relation with the study physician. Records of families who had not visited the study physician for a number of years were not easily identified from patient records within the practice. Using computer records of the Newfoundland Medical Care Plan which have unique identifying numbers assigned to individual residents, 3090 patients who had visited the study physician prior to the trial were initially identified. Within the group of 3090 patients, 1325 had 60% of their general practitioner services from one physician or 75% of such services from the three man clinic of which the study physician was a member. These patients were from 877 families.

(b) Randomization

With the assumption that a case load half that of a family physician was manageable for a family practice nurse, the eligible families were randomly allocated in a ratio of 2:1. They formed a randomized conventional group, assigned to continuing primary clinical services from a family physician (control group) and a randomized family practice nurse group whose first-contact primary clinical services were to be provided by the family practice nurse (experimental group). The resulting control group contained 585 families and the experimental group comprised 292 families.

After assignment of the patients' charts within the practice, the receptionist scheduled patient appointments after June 1, 1975

in order that an adequate number of patients from families in the experimental group were available for the family practice nurse on a daily basis. During the first visit after the random assignment of a family was known, the study physician introduced each patient to the family practice nurse and briefly described her role in the practice. Results of the process of delegation of functions to the family practice nurse by the physician are reported along with the results of the five other urban family practice nurse/physician teams in Chapter IV.

All families in the experimental group were given the opportunity to refuse to be seen by the family practice nurse and to opt out of the trial.

Figure II shows the timing of these procedures and of subsequent events in the performance of the study.

(c) Selection of Persons for Surveys Before and at the End of the Experimental Period

After the 1325 patients were selected out of the Medical Care Plan computer file (as described above), a household survey was performed involving this group, henceforth referred to as the interview cohort. This group received interviews at the start and at the end of the experimental group to acquire data needed to determine changes in health status. Trained interviewers administered pretested standardized questionnaires to the interview cohort to obtain demographic information and assessments of health status and of satisfaction with health care*. Only patients who

* See Chambers and West, 1977, for copies of the instrument and details of the survey methods used.

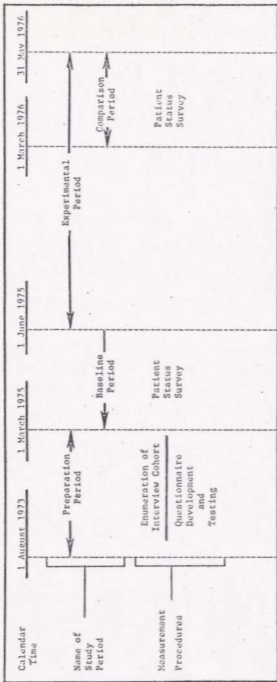


FIGURE II
Schedule of Time and Events During Implementation of the Trial

lived within 30 km. of the study physician's office were interviewed.

At the end of the two years there were 868 patients who had been successfully interviewed in both household surveys with 296 in the experimental group and 572 in the control group. The refusal rates in the surveys were 3 percent in 1975 and 9 percent in 1976.

(d) Health Outcome Measurements

Health outcome measurements were applied using separate composite health status measurements of physical function, emotional function, and social function both before and at the end of the one year experimental period.

Physical Function. A measurement of physical function similar to the one developed by the World Health Organization/International Collaborative Study of Medical Care Utilization (1970) (WHO/ICS MCU) was applied to the same patients both before and at the end of the experimental period. The physical function measurement adapted from the WHO/ICS MCU classified patients into mutually exclusive categories. Each of the following categories referred to the two weeks preceding the interviews:

(1) healthy - no days in bed or restricted and 'good' function responses to all morbidity items, (2) functionally healthy - no days in bed or restricted and an 'intermediate' function response to one or more morbidity items, (3) not healthy - one or more days in bed or restricted, or a 'poor' function response to one or more morbidity items. In our study the morbidity items included:

(1) subjective ill health (based on the question "How is your health these days?"; (2) visual morbidity (reported difficulty in reading the newspaper or watching television); (3) auditory morbidity (reported difficulty in hearing the radio or television), and (4) certain kinds of visits to a physician (for example, visiting for an illness was defined as a poorer health level than visiting for a check-up). (See Appendix of Table 8 for detailed description of morbidity items. Detailed descriptions of all the methods used in this Chapter have been reported by Chambers and West, 1977).

Emotional Function. Measurements of social and emotional function developed in an independent Health Index Study (Sackett et al, 1977; Chambers et al, 1976a; and Chambers et al, 1976b) were applied to members of the control and experimental groups in the present trial. These measurements were chosen on the basis of their positive orientation, clinical validity, applicability to populations and their amenability to scoring without the involvement of a clinician. The development of these measurements of emotional function and social function and their application in other studies has been described in detail elsewhere (Chambers et al, 1976a). Discriminant function analysis identified a subset of the Index of Health Study questions which correlated with the clinician's clinical assessment of function, and these questions were applied in the St. John's Trial to the interview cohort both before and at the end of the one year experimental period.

The emotional function questions dealt with feelings of self-

esteem, feelings toward personal relationships, and thoughts about the future. By using weighting factors derived from the Health Index Study, the responses to each question were combined into a complete emotional function index for each of the St. John's Trial patients in the interview cohort both before and at the end of the experimental period. The resulting emotional function index scores range from 0.0 (poor emotional function) to 1.0 (good emotional function).

Social Function. A composite index of social function was derived from each member of the St. John's Trial who was in the interview cohort before and at the end of the experimental period. The composite index, also developed in the Health Index Study (Chambers et al, 1976a) considered the patient's dealings with others (visits, telephone calls) and interactions with police, the courts, and welfare agencies. As in the case of emotional function, the answers to the individual social function questions were weighted and combined into a composite social-function index with scores ranging from 0.0 (poor social function) to 1.0 (good social function).

(e) Statistical Analyses

Clinical health outcomes among patients in the experimental group were compared with those of patients receiving "conventional" or "standard" care in the control group. In this trial, we have used three measurements of health outcomes (physical function, social function and emotional function) to assess whether the family practice nurse is effective and safe. In order to achieve overall statistical significance at an alpha level of 0.05, we have had to use a 0.01 level

of probability for each chi square contingency test when comparing the control and experimental patients physical function, emotional function and social function score before the trial began and at the end of the trial.

Determination of 'beta' levels of tests of significance would have been desirable as this would have given an indication of the probability that a 'true' difference was missed. Because of the practical limitations in conducting household surveys, not the least of which is their cost (approximate cost per interview in this study was \$30.00) we were unable to increase our sample to a size where we could apply a meaningful power test to the differences between control patients and experimental patients.

(iii) Results

(a) Patient Satisfaction

Of 877 families, only 1 family refused their assignment and this family was in the experimental group. Nine patients in the experimental group were reassigned to the physicians as these patients could speak a language known to the physician but not to the nurse. During the one year period, no families were known to have left the practice because of dissatisfaction. At the end of the experimental period 92% of the control patients and 97% of the patients in the experimental group continued to identify the study practice as their family practice.

In Table 6 we present three measurements of the patient's satisfaction with his medical care. Two of these show a very high level of satisfaction in both groups. They relate to satisfaction with "the

TABLE 6. MEASUREMENTS OF SATISFACTION OF CONTROL AND EXPERIMENTAL PATIENTS

	<u>BEFORE</u>		<u>AFTER</u>	
	<u>Control</u>	<u>Experimental</u>	<u>Control</u>	<u>Experimental</u>
On the whole are you presently satisfied or dissatisfied with the health care you receive from your present doctor/clinic?	(n=562)	(n=289)	(n=562)	(n=293)
Very/fairly satisfied	98%	99%	98%	100%
Very/fairly dissatisfied	2	1	2	0
Do you consider Dr. _____ to be your family doctor?	(n=564)	(n=288)	(n=564)	(n=294)
Study Physician	97%	98%	88%*	96%*
Other	3	2	12	4
In the past few years some doctors and nurses have changed their method of practice so that nurses have more responsibility for decisions about the health of their patients. Is this type of change very acceptable, acceptable, or not acceptable to you?	(n=429)	(n=212)	(n=438)	(n=214)
Very acceptable	11%	10%	16%	24%
Acceptable	63	65	58	58
Not acceptable	26	25	26	18

* All patients included in these tables had identified the study physician or one of his two associates as their family physician when interviewed in the baseline year. Thus the lower "AFTER" figures for this question represent normal attrition from a baseline value of nearly 100%.

health care you receive from your present doctor/clinic", and whether the study physician was still the respondent's family doctor at the end of the year. Both of these questions had heavily positive responses, but wherever a difference was noted it was always in the direction of patients in the experimental group expressing greater satisfaction and more often retaining the study physician as their family doctor. After the experimental year, all the patients in the experimental group reported that they were satisfied with their health care.

The third measurement of patient satisfaction dealt with the acceptability of expanded roles for nurses. As shown in Table 6 approximately 75% of patients in both groups and in both years considered the taking on of expanded roles by nurses "acceptable" or "very acceptable". However, in the second survey there was a small but significant difference ($P (\chi^2) < 0.05$) between the groups with a greater number of patients in the experimental group than controls finding the idea acceptable.

(b) Comparability of the Control and Experimental Interview Cohorts at the Start of the Trial.

Table 7 summarizes the distributions of family size, sex, age and annual household income for the control and experimental cohorts just before the one year experimental period. The groups are highly similar and none of the observed differences approach statistical significance. The initial similarity of the control and experimental groups is further supported in Table 8 which summarizes the physical function of members of the control and experimental groups just before

TABLE 7. Comparison of the Control and Experimental Interview
At the Start of the Trial

	Control	Experimental
Number of patients in the interview cohort	572	296
Mean Number of persons per family	1.5	1.7
Males, %	33	35
Females, %	67	65
Age in Years, %		
0-4	12	11
5-9	8	11
10-14	6	8
15-19	4	4
20-39	37	34
40-59	19	19
60-69	9	7
70 and Over	5	5
Annual Income of head of household, %		
Less than \$5,000	11	8
\$5,000 to \$6,999	9	7
\$7,000 to \$8,999	9	14
\$9,000 to \$10,999	11	9
\$11,000 to \$16,999	33	34
\$17,000 to \$19,999	10	13
\$20,000 or more	17	14

* Control = patients receiving conventional care; Experimental = patients receiving care from the family practice nurse.

TABLE 8. Physical Function (For Patients Both Before and At the End of the Experimental Period)

Level of Physical Function	Prior to the Experimental Period		At the End of the Experimental Period	
	Control*	Experimental**	Control*	Experimental**
	(n=559)	(n=293)	(n=569)	(n=296)
<u>Healthy</u> (No days in bed or restricted and "good" physical function response to all morbidity items**)	59%	59%	50%	61%
<u>Functionally Healthy</u> (No days in bed or restricted, and an 'intermediate' physical function response to one or more morbidity items**)	21	18	18	11
<u>Not Healthy</u> (One or more days in bed or restricted or a poor function response to one or more morbidity items**)	20	23	32	28

* Control = patients receiving conventional care; Experimental = patients receiving care from the family practice nurse.

**See Appendix for Table 8 on page 44.

** Appendix for Table 8

Morbidity Items	'Good' Physical Function Response	'Intermediate' Physical Function Response	'Poor' Physical Function Response
How is your health these days?	Very good, Pretty good.	Not too good	--
Trouble, squint, eyeache or head- ache when reading or when watching television	Never	Sometimes	Always
Trouble hearing radio or television	Never	Sometimes	Always
Visit to a doctor in past two weeks	No	Yes, reason for visit other than a new or old illness or injury	Yes, for a new or old illness or injury

the one year experimental period. Identical portions of patients in the control and experimental groups were classified as healthy with the measure of physical function ($P(\chi^2) > 0.01$). Figure IIIA is a histogram of the distribution of emotional function indexes for patients in the control and experimental groups prior to the experimental period. The distribution of the emotional function index values in the control and experimental groups were found comparable at this time ($P(\chi^2) > 0.01$). Figure IIIB is a histogram of the distribution of social function values prior to the trial; these distributions were also found to be comparable ($P(\chi^2) > 0.01$).

(c) Physical Function at the End of the Experimental Period

Table 8 summarizes also the measurements of physical function at the end of the experimental period. For patients in the control group, 50% were classified in the category "healthy". There were 61% classified "healthy" in the experimental group. This superior physical function status in the experimental group of patients was statistically significant ($P(\chi^2) < 0.01$).

(d) Emotional Function at the End of the Experimental Period

Figure IIIC is a histogram of the distribution of emotional function indexes for the control and experimental groups. The emotional function index values for control patients at the end of the experimental period were comparable to the emotional function index values of the experimental patients ($P(\chi^2) > 0.01$).

(e) Social Function at the End of the Experimental Period

Figure IIID is a histogram of social function index values of

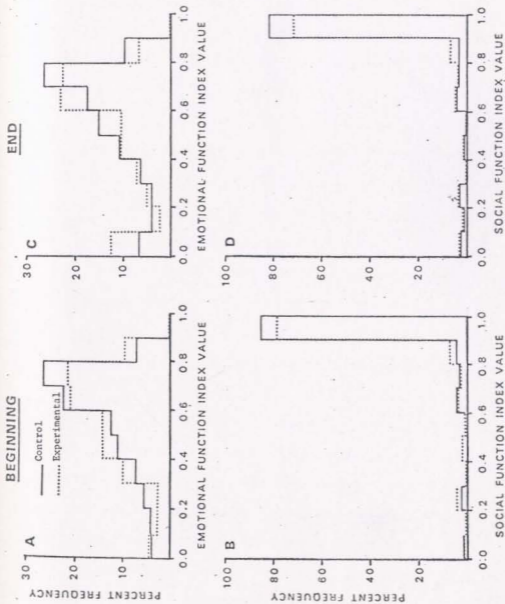


FIGURE III. Social and Emotional Function Scores of Control and Experimental Patients
Control = Patients receiving conventional care, Experimental = Patients receiving care from the family practice nurse.

control and experimental patients. As demonstrated in Figure IIID the distribution of social function index values in the control group of patients was comparable to the experimental group of patients at the end of the experimental period ($P(X^2) > 0.01$).

(iv) Discussion

(a) The Health Status Measurements' Sensitivity to Change

The measurements of physical, social and emotional function used in this trial are subject to the criticism that they may be insensitive to small but clinically significant changes in health status, which would have been occurring during the experiment. The scores resulting from these particular measurements of health status also may have remained fixed at high or low levels unless large changes in health status had occurred.

Table 9 shows the analysis of the group of patients who changed in health status on any of the three measurements during the experiment. A number of patients with poor physical, social or emotional function at the start of the trial no longer were classified with poor function at the end of the experimental period; similarly, there were patients whose physical, emotional, or social function was poor at the end of the trial who were not classified with poor function at the start. The relatively smaller changes in social function than in the other measurements may have been due to the disproportionate grouping of patients with good social function as shown in Figure IIIB-D on page 46. Apart from our concern about the social function measure, the overall migration rate shown in the three measurements has given us confidence that these measurements are sensitive to change.

TABLE 9. Health Status Changes Among Patients Assessed Both Before and at the End of the Experimental Period

	Control* Group		Experimental** Group	
Patients Who Improved as % of All Patients With "Poor" Function at Start of Trial				
	No.	%	No.	%
Physical Function	55/110	50	45/69	65
Emotional Function	53/91	58	23/43	53
Social Function	27/67	40	11/46	24
Patients Who Worsened as % of All Patients With "Poor" Function at End of Trial				
Physical Function	122/177	69	59/83	71
Emotional Function	56/94	60	40/60	67
Social Function	41/81	51	23/58	40

* Patients who continued to receive primary clinical services from a family physician.

** Patients receiving care from the family practice nurse.

It is unlikely that a clinically important deterioration in health status in the experimental group could go undetected.

(b) Comparison With Other Controlled Trials

Controlled experimental trials have been defined as studies in which the investigator deliberately assigns the compared manoeuvre, usually by randomization, to the people who enter the trial (Spitzer et al, 1975). The states (or condition) of the people before and after the manoeuvres are described with the variables chosen for analysis. Controlled trials themselves introduce a climate of critical and scientifically based skepticism with respect to the family practice nurse approach to primary care. There have been five successive controlled trials of family practice nurses (nurse practitioners) reported where the health status of patients was considered (Lewis et al, 1969; Schlesinger et al, 1973; Sackett et al, 1974; Hoekelman, 1975; and Burnip et al, 1976).

In all of these trials and the present trial, the maneuver, that is, the introduction of a family practice nurse, was compared with the "conventional" care provided by physicians in family practice (Lewis et al, 1969; and Sackett et al, 1974), obstetrics (Schlesinger et al, 1975), or pediatrics (Hoekelman, 1975; and Burnip et al, 1976). Sackett et al (1974) have outlined the rationale for not also including a 'no treatment' comparison group. "First, it would be unethical to withhold treatment from a control group of patients. These trials are analogous to the trial in which therapy with a new pharmacologic agent is compared with

current 'standard' therapy. Second, practices of the magnitude of those reviewed here, studied over so many months, generate a volume of clinical conditions (both statistically and clinically significant in number) whose outcomes are profoundly affected by the skill of detection and appropriateness of management".

In one of the five controlled trials (Schlesinger et al, 1973) patients in the experimental and control groups were matched by age, gravidity, marital status and race whereas in the other four controlled trials of the family practice nurse (Lewis et al, 1969; Sackett et al, 1974; Hoekelman, 1975; and Burnip et al, 1976) patients were randomly assigned to control or experimental groups. The incorporation of random allocation or of careful matching into the experimental design avoids 'volunteer bias' by ensuring the comparability of the experimental and control groups at the start of the trial. Data shown above demonstrated the success of the randomization procedure in the St. John's trial. High rates of participation and follow-up in these trials of family practice nurses made it appropriate to compare experimental and control patients throughout the experimental periods.

In the family practice nurse trials, both measurements of the "process" of providing clinical services (for example patients seen, procedures performed, money spent, attitudes of patients and clinicians) and measurements of health outcomes among patients receiving these services (health outcome measurements such as mortality and physical, social and emotional function) have been used to determine the feasibility of the family practice nurse. Table 10

TABLE 10. Summary of Results From Six Controlled Trials of Nurse Practitioners

Similar health status in nurse practitioner patients compared with patients receiving conventional care.

	<u>Physical Function</u>	<u>Emotional Function</u>	<u>Social Function</u>
I Lewis et al (1969)	yes	*	yes
II Schlesinger et al (1973)	yes	*	*
III Sackett et al (1974)	yes	yes	yes
IV Hoekelman (1975)	yes	*	*
V Burnip et al (1976)	yes	*	*
VI Present Study	yes	yes	yes

summarizes the health outcome results of six successive controlled trials of nurse practitioners (including the present study) where similar health outcome measurements were applied to the two study groups in each trial. For each trial we have indicated with a 'yes' if the nurse practitioner patients at the end of the study had similar health status when compared with a group of patients receiving conventional care.

All six trials included measurements of physical function and all six reported the physical function of nurse practitioner patients and the physical function of conventional care patients to be similar at the end of the trial. Indeed in two trials evidence was presented showing, at the end of the trial, fewer patients in the nurse practitioner group with poor physical function than in the group of patients receiving conventional care. Only two trials attempted to measure the emotional function of patients. In these two trials no differences in the proportion of patients with good and poor emotional function were observed in the nurse practitioner patients as opposed to patients receiving conventional care. Three of the six trials included assessments of social function. All three reported family practice nurse patients were no less well off for having been assigned to the nurse.

Each trial, when considered independently, had only a 0.5 probability of obtaining a 'true' result. However, when the six successive nurse practitioner trials are taken as a group, the probability of the reported identical results in the six independent trials is less than 0.05 (binomial distribution, two-tailed test).

We can conclude therefore that this common result among the six successive trials was not due to chance and that collectively these trials have provided the same information as the 'beta' level of probability which we were not able to calculate for the present trial.

(c) Patient Satisfaction

Patients' satisfaction with nurse practitioner care has been assessed in a variety of ways. The methods most often reported fall into two categories: objective indicators, e.g. the number of patients who leave the nurse practitioner's group, or the rate of broken appointments; and subjective measurement of patients' attitudes using questionnaires.

Several of the trials described above reported objective measurements of patient satisfaction. In these studies very few of the patients receiving care from a nurse practitioner transferred to another provider of care (Lewis et al, 1969; and Burnip et al, 1976). Broken appointment rates for these patients were found to be similar to or lower than those for patients receiving conventional care (Lewis et al, 1969; and Schlesinger et al, 1973).

The trials described above reported similarly high levels of satisfaction from the results of their patient questionnaires. In the trial of the Burlington nurse practitioner (Sackett et al, 1974; and Batchelor et al, 1975a) patients expressed a high level of satisfaction with their care, and a high proportion in both groups found the nurse practitioner concept acceptable. One study of well-baby care by pediatric nurse practitioners (Hoekelman, 1975) assessed

mothers' satisfaction and found essentially no differences in satisfaction between mothers of infants in the two groups. Schlesinger's study of nurses who provided prenatal care (Schlesinger et al, 1973) showed that nurse patients felt both satisfied and "safe" at levels comparable to the control patients, although 20% of nurse patients also expressed a wish to spend more time with the physician.

Lewis and his coworkers (1969, 1976) found that after a nurse practitioner trial, patients randomly assigned to the nurse tended to prefer her to perform some specific aspects of care for which they had previously preferred the physician. In the latter study, however, such shifts were only found for patients of one of the two nurses studied -- the one who acted more "independently".

Patient satisfaction with nurse practitioner care has been evaluated in other studies in general practices (Linn, 1976; and Merenstein et al, 1974), pediatric practices (Charney and Kitzman, 1971; and Day et al, 1970), a large prepaid group practice (Levine et al, 1976), and a rural medical center (Batchelor et al, 1975b). Patients treated by practitioners in all of these settings expressed a level of satisfaction comparable to or even higher than that of patients receiving conventional care.

At the end of the present study a higher percentage of experimental than of control patients (96% vs. 88%) reported that they were still members of the study practice. This indicates that no appreciable number of patients in the experimental group transferred to other providers of care. Every patient in the

experimental group expressed satisfaction with his health care, and significantly more experimental than control patients considered expanded roles for nurses as "acceptable". Thus our findings are in agreement with those obtained previously in other studies of expanded-role nurses.

(v) Conclusion

To summarize, in this trial of the family practice nurse in an urban family practice, we have observed close comparability of measurements of physical, social and emotional function between the experimental and control patients. These results agree with the findings of previous controlled trials of family practice nurses and provides further support to the conclusion that patients randomly assigned to receive first-contact care from a family practice nurse enjoy favourable health outcomes, which are similar to those of patients receiving conventional care.

CHAPTER III

WHAT HAPPENS TO THE QUALITY OF CARE?

QUANTITATIVE ASSESSMENT OF THE QUALITY OF
CARE PROVIDED IN PRACTICES WITH FAMILY PRACTICE NURSES

(i) Introduction

Evaluation of the quality of medical care provided by expanded role nurses may be done by an implicit or explicit approach. In evaluations where the implicit approach is used no prior standards of the process of care are established. Usually the evaluation involves recording the opinions of a physician who assesses the care provided by nurses. Several family practice nurse studies (Royal College of General Practitioners, 1968; Schlesinger et al, 1973; Merenstein et al, 1974; Greenberg et al, 1974; Voltmann, 1975; and Schiff et al, 1969) have used the implicit (subjective) approach to assess quality of care finding the care provided by nurse practitioners quite acceptable to the physician judges.

Assessments of the quality of care using explicit (objective) criteria are less common. Recent studies employing explicit process criteria in ambulatory care have relied on the medical record as the main data source (Payne et al, 1976; Brook, 1973; Greenfield et al, 1975; Osborne and Thompson, 1975; and Sibley et al, 1975). Others (Hulka et al, 1976) have included data obtained from patient questionnaires in addition to medical record data. In each of these studies, explicit criteria have been developed for patients with indicator conditions, diseases, or physiologic states which are commonly seen in office practice and about which there is some consensus to the appropriate diagnosis or management. A review of the literature on expanded role nurses revealed three evaluative studies where explicit quality of care criteria were used (Chappel and Drogos, 1972; Sibley et al, 1975; and Levine et al, 1976).

In this Chapter we will report on the adaptation and implementation of the indicator condition method developed originally by Sibley et al (1975) to assess the quality of care in urban private medical practices of six family physicians before and after the introduction of family practice nurses.

The indicator condition approach developed by Sibley and his colleagues (1975) is an extension of the work of Kessner (1973). As mentioned above, an indicator condition is a disease, complaint, injury or state that is reasonably frequently in the practices being studied and for which there is sound evidence of benefit from good medical care in some aspect of its management. The care provided for these conditions is evaluated in the light of previously determined criteria for adequacy, and each episode of care is characterized as adequate or questionable. Spasoff et al (1977) recently made the following observations about this method of assessing quality of care: "An advantage of the method is that the criteria can incorporate fairly elaborate branching structures to permit some individualization of management. An advantage is that it evaluates complete episodes of care rather than simply stating that X% of a list of criteria have been met. On the grounds that the criteria are for minimal adequacy, and that a chain is only as strong as its weakest link, this method of scoring makes much sense. A disadvantage is its very heavy reliance on the written record: critics have contended that it measures record-keeping rather than medical care. It may be argued, however, that good record-keeping is an essential component of good medical care (Donabedian, 1969) and indeed a significant correlation between the two is generally found

(Lyons and Payne, 1974)."

(ii) Methods.

After 6 months of development and pretesting in Newfoundland, the indicator condition methodology was used to evaluate clinical activity in each practice initially between June 1973 and May 1975, before the attachment of family practice nurses to the practices, and then between June 1975 and May 1976, the time of the family practice nurse attachments.

The two explicit assessment approaches used were (a) the management of indicator conditions, and (b) the indication for prescription of drugs commonly used in family practice. As in the Sibley et al (1975) study, indicator conditions were defined as "distinct clinical entities such as diseases, symptoms, states or injuries occurring frequently in the type of practice under surveillance and with related health outcomes that may be affected favourably or adversely by the choice of treatment".

The twelve indicator conditions used in this study are listed on Table II. The development of the explicit criteria for each indicator condition occurred in one of three ways: indicator conditions developed and reported on by Sibley et al (1975) (otitis media, hypertension, prenatal care, care of the newborn, depression, urinary tract infection, knee injury, pityriasis, and anemia); conditions developed but not reported on by Sibley et al (1974) (obesity and vaginal discharge); and, a condition developed in Newfoundland (vomiting and diarrhea in 1st year of life).

The use of 14 drugs was assessed. Explicit criteria for the

satisfactory use of these drugs shown in Table 12 previously had been established and reported on by Sibley et al (1975), or in the case of oral contraceptives were obtained originally from Sibley et al (1975) and adapted for the present study in advance of the practice reviews.

(a) The Development of Criteria for Clinical Judgement

The development of criteria outlined by Sibley et al (1975) was followed closely in Newfoundland. Indicator conditions and drugs selected for review pertained to all age groups and both sexes and occurred frequently in the practices under surveillance. The following general factors were considered in Newfoundland when selecting explicit criteria*: (1) the clinical and laboratory observations (e.g. measuring weight, height, and head circumference of the newborn); (2) indication of sound clinical judgement (e.g. withholding of therapy for pityriasis rosea if the patient was asymptomatic); and (3) recognition of apparently benign symptoms, signs, or laboratory findings (e.g. evidence of further querying when a haemoglobin of 10 grams in a 20 year old man is found -- may be duodenal ulcer or a blood dyscrasia).

(b) Eligibility of Episodes of Care for Inclusion in the Study

An episode of care was defined as a visit and/or a series of encounters for the management of a single indicator condition. Management of the episode had to involve at least partially one of the health professionals being assessed. For example, in group practices, only episodes initiated and followed up by the assessed physician or the physician who took the major responsibility for management of

* See NAPS Document #02920 for 76 pages of criteria and coding forms used in this project. Order from ASIS/NAPS, c/o Microfiche Publications, P.O. Box 3513, Grand Central Station, New York, N.Y. 10017.

complex conditions were considered eligible for inclusion in the record review.

(c) Peer Advisory Group

The peer advisory group consisted of three experienced family physicians respected in their community by their peers. Their involvement in the project required a willingness on their part to spend time carefully reviewing and discussing the indicator conditions and their criteria.

The group consisted of three Newfoundland family physicians who were not full-time members of the University faculty and who had been in general practice for more than five years and less than twenty years.

The peer advisory group made all decisions concerning criteria, "judgement calls" or conflicts in scoring. Indicator conditions developed for the first time or conditions developed by Sibley et al (1975) which were adapted for Newfoundland were pretested in the peer group practices.

After the Newfoundland group had established their own criteria, the peer advisory group used in the Sibley et al (1975) study was asked to review and make comments on the criteria. The exchanges proved most stimulating and there was a generally high degree of agreement on the criteria. Exceptions to the agreement occurred when the two groups differed in the concept of "What is adequate care?". The Sibley et al, (1975) approach was to ask "What would be adequate care for the patient?", while the Newfoundland peer advisory group sometimes agreed on criteria based on what a family physician "ought to do". This

difference in opinion resulted in a few differences in the criteria on those conditions and drugs assessed in each study. On examination, the effects of these differences on the resulting scores were trivial.

(d) The Study Setting

Assessment of indicator conditions and drugs was conducted in four private family practices in St. John's (population 135,000), and a private group family practice in Corner Brook (population 31,000), Newfoundland. Six family practice nurses, who had completed a nine month education program offered jointly by the schools of medicine and nursing began working as expanded role nurses with a physician in each of the St. John's practices and with two physicians in the Corner Brook practice in June 1975. Each physician had been practicing for at least six years prior to this time. One physician was in solo practice and five in group practices. Figure IV, on page 82, in Chapter IV shows that the study physicians' service volume was typical of physicians reimbursed on a fee-for-service basis. Also, the age and sex distribution of patients in the practices was comparable.

Although in one practice the allocation of patients to continue receiving conventional care from a physician or to receive first contact care from a family practice nurse was randomly done in a 2:1 ratio, the episodes of care within each practice were not randomly selected from the 5,000 to 10,000 family charts commonly found in each practice. For reasons of research cost constraints, the research assistants did not actively search further after approximately 35 episodes of a given condition or of a drug used had been found for each physician.

(iii) General Plan of the Study

The general plan was to determine scores that reflected the quality of performance in the practices for approximately one year (May 1974 to June 1975) before and after the attachment of the family practice nurse. The scores indicate the number of episodes judged adequate, expressed as a percentage of all explicit episodes examined. The Peer Advisory Group agreed on the explicit criteria for the adequacy of management of indicator conditions and the use of drugs. The physicians and family practice nurses in the study practices were unaware of the indicator conditions and the drugs being considered. They were unaware of the explicit criteria or the manner in which the data were gathered, scored, and summarized.

The unaltered actual clinical records existing in the primary care practice under assessment were the principal data source for both the before and after period reviews in each practice. One practice filed the clinical records by unique identifying numbers while all the other practices filed them by family name. Two of the practices filed laboratory, x-ray and consultant reports in separate files, while the other practices included this information in one comprehensive clinical record folder. Physicians and family practice nurses recorded their observations and actions on the same clinical records.

(a) Probes

Probes are used to eliminate the need to set up a new clinical record system and prevent any distortion of the usual patterns of practice. In order to maintain the single blind design of his study, Sibley et al (1975) used a series of probes (including daysheet

journals, duplicate prescription forms) to identify indicator conditions. In our study we attempted to use provincial health insurance Medical Care Plan claim forms as probes. However, the information on these forms was not sufficiently complete to narrow down with any efficiency the possible presence of an episode of care falling within the inclusion criteria for the indicator conditions or drugs. The direct record search was found to be the most useful and produced the greatest 'yield' of episodes. In our study 1701 episodes of indicator conditions and 2700 episodes of drug use were identified by direct record search.

(b) Abstractors

Early in the Newfoundland project, a research assistant spent a week with Dr. Sibley's research assistant in Hamilton, Ontario. The details of scoring conditions and guidelines used in the Sibley et al (1975) study for determining the level of abstractor decision-making in difficult to score episodes were reviewed. The two research assistants kept in touch after this meeting. Space constraints in the Newfoundland practices prevented more than two abstractors working in a practice at any one time.

Sibley et al (1975) found high agreement (88%) in independent assessments of research assistants, and 98% agreement with the assessments of physicians. When 51 abstracts were independently assessed in Newfoundland, there was agreement between the research assistants on 49 abstracts. Upon completion of the assessments in the St. John's practices before the arrival of the family practice nurses, one practice was randomly selected and the research assistants abstracted

and scored the same clinical records a second time. Between the first assessment and the second assessment there was agreement on 146 of the 172 episodes of indicator conditions and 204 of the 225 episodes of drug use. Further analyses revealed that chance played a relatively small role in the agreement levels that were attained. The research assistants tended to score fewer drug use episodes as adequate on the second assessment than on the first assessment but this tendency did not occur with the scoring of indicator conditions.

(c) Pretesting of Measuring Instruments and Validation of Clinical Criteria

In a pretest done in three practices of the Newfoundland peer advisors, the research assistants identified 604 indicator conditions and 530 drug use episodes after spending about six weeks in each practice reviewing clinical records. All twelve indicator conditions and all fourteen drug-use criteria were successfully applied to the three Newfoundland practices and assessment scores were derived. The aggregate scores of "adequate" expressed as a percentage of total episodes were similar in the three practices, as was anticipated because of the consensus approach of the criteria setting. For indicator conditions, practice A scored 44% adequate, practice B, 38%, and practice C, 49%. For drugs, the scores were A, 61, B, 59, and C, 62. Review of the results by the Peer Advisory Group led to certain changes being made in explicit criteria, and the research assistants refined their abstracting methods.

The Newfoundland Peer Advisory Group agreed that the pretest evaluation in their practices was useful in determining the quality

of care performance of a primary care practice. They also reported that there had been no unusual occurrences in their practice during the pretesting and validating which would have distorted the results. The extension of the method to Newfoundland seemed feasible and it was decided to proceed with the before and after evaluation of the private medical practices which were to take on family practice nurses.

(d) Statistical Analyses

A categorical scale was used that permitted scoring indicator condition and drug-use episodes as adequate or questionable. The percentage of adequate episodes of all episodes scrutinized was calculated. In the absence of any evidence or criteria by which to assign weights for the aspects of practice assessed, the scores were not averaged to give a "total practice score".

These practice percentage scores suffered from the deficiency that the number of episodes per practice varied, which resulted in marked differences in the variances of these percent scores. Secondly, the scores, depending on the condition, were skewed, with the majority at either the 'high' or 'low' performance end of the scale. Therefore, a standardized score was calculated for each practice for each indicator condition and drug. The formula for standardization follows:

$$Z_i = \frac{p_i - P}{s \sqrt{\frac{1}{n_i} - \frac{1}{N}}}$$

where,

p_i = percent of all episodes scored adequate for the i th practice

P = proportion of all episodes scored adequate for all practices

n_i = number of episodes for the i th practice

N = total number of episodes for all practices

s = standard deviation of all individual episode scores or:

$$s = \sqrt{\frac{P(1-P)}{N}}$$

Z_i = standardized score for the i th practice for each indicator condition

The standardization procedure tended to equalize the variance among practice scores, and resulted in standardized scores which are approximately normally distributed (normal distributions are difficult to discern with only five practices to observe). In addition, the standardization procedure had the effect of accentuating the contribution of practices with a large number of episodes relative to practices with small numbers of episodes. For example, if a practice had a percent score based on only two episodes which was greater than the overall percent P , and another practice had the exact same percent score based on 10 episodes, the standardized scores would be such that the ten-episode practice would have a more positive standardized score than the two-episode practice; similarly, if these same two practices had equal percent scores which were less than P , then the ten-episode practice would have a more negative standardized score for the two-episode practice.

(iv) Results

Tables 11 and 12 list the indicator conditions and drugs evaluated, the average of the percent of episodes scored adequate in the five practices, the range in the number of episodes scored per

TABLE 11

Range in Number of Episodes of Indicator Conditions Assessed Per Practice and Average Scored Adequate (%) Before and After Attachment of Family Practice Nurses to Five Family Practices

Indicator Condition	BEFORE		AFTER		p***
	Average Scored Adequate (%)	Range in Number of Episodes	Average Scored Adequate (%)	Range in Number of Episodes	
Urinary Tract Infection	16	4-35	24	7-32	0.41
Hypertension	17	4-36	28	2-31	0.39
Otitis Media	52	2-37	56	5-35	0.43
Pityriasis	95	0- 9	94	0- 8*	0.45
Prenatal Care	54	22-38	56	21-35	0.26
Care of the Newborn	0	0-14**	14	1-21*	0.41
Vomiting and Diarrhea in 1st Year of Life	13	0- 6**	12	2- 8	0.47
Anomia	47	1-13*	42	0- 8*	0.28
Knee Injury	24	1-11*	50	3- 8	0.44
Depression	28	13-35	35	7-34	0.50
Obesity	27	7-35	4	4-35	0.45
Vaginal Discharge	7	9-35	4	6-37	0.19

* Only 4 practices with 2 or more episodes

** Only 3 practices with 2 or more episodes

*** t-tests (one sided) based on standardized scores described in the text

TABLE 12

Range in Number of Episodes of Drug Use Assessed Per Practice and Average Score Adequate (%)
 Before and After Attachment of Family Practice Nurses to Five Practices

Drug	BEFORE		AFTER		p***
	Average Score Adequate (%)	Range in Number of Episodes	Average Score Adequate (%)	Range in Number of Episodes	
Chloramphenical	100	35	100	35	--
Tetracycline	99	3-36	97	9-34	0.47
Amphetamines	100	0- 1	--	0	--
Multivitamins	96	3-39	96	0-34*	0.46
Haematinics	75	5-36	77	11-22	0.39
Phenylbutazone	84	3-39	82	17-40	0.47
Hypertensive Medication	22	0-36**	35	3-30	0.48
Steroids	95	3-23	90	5-17	0.40
Vitamin B ₁₂	81	6-16	67	4-16	0.49
Antidepressants	4	32-37	15	22-37	0.47
Tranquillizers and Psychoactive Drugs	61	28-38	64	30-38	0.42
Cardiac Glycosides	47	1-11*	60	8-10	0.43
Antibiotics	4	21-36	8	24-37	0.36
Oral Contraceptives	13	28-40	10	35-36	0.49

* Only 4 practices with 2 or more episodes

** Only 3 practices with 2 or more episodes

*** t-tests (one sided) based on standardized scores described in the text

practice, and probability values comparing scores before and after the attachment of a family practice nurse. Judging by the scores for each indicator condition and drug, the overall level of practice performance is high for the drugs but less so for the indicator conditions both before and after the attachment of a family practice nurse. However, significant variability is seen both in the range of scores for individual indicator conditions and drugs and in the number of episodes per practice. The low "after" period scores for 'obesity' were due primarily to the absence of evidence in the practice that a goal of five pounds of weight loss per month was considered. Lack of inquiries regarding use of the pill and antibiotics to some extent accounted for the lower 'vaginal discharge' scores in the "after" period. The high scores assigned to chloramphenicol indicate that it was not used in any of the possible situations.

In order to make comparisons between the two time periods among practices where varying numbers of episodes were identified, standardized scores were created for each practice for each indicator condition and drug. Calculation of the probability of a difference in average scores between time periods was performed only with practices where two or more episodes of indicator conditions or drugs were identified. For each indicator condition and drug the variances of the standardized scores in the five practices were not significantly ($P(F) > 0.01$) different before and after attachment of a family practice nurse. As shown in Table 11 and 12 on pages 68 and 69 the standardized indicator condition scores and standardized drug scores based on assessments obtained before the arrival of the family practice nurse were similar ($P(t) > 0.01$, one sided) to the scores obtained after

attachment of family practice nurses to the five practices.

(v) Discussion

The indicator condition method of external audit of practices employing expanded role nurses is a somewhat limited approach to quality of care assessment. The external audit's reliance on a peer advisory group may have resulted in overly rigid selection of criteria. The system developed to score each episode of care may have been inappropriate in that it may not reflect the logic used by the clinician in everyday practice. Further work needs to be done to determine if indicator condition scores can predict the subsequent health outcomes of patients. After finding low association between the process of care and health outcomes with a single condition, hypertension, Nobrega and his associates (1977) have suggested that the use of sequential judgement based on specific clinical data for each patient may lead to a more rational approach to peer review and to a stronger correlation between the process and outcome.

Methods for developing explicit process criteria in the evaluation of health care provided by physicians with or without the assistance of expanded role nurses have varied along with the extent and precision of the criteria produced (Chappel and Drogos, 1972; Sibley et al, 1975; and Levine et al, 1976). In the current study, explicit process criteria were developed using an informal group setting, with a small but consistent group of practitioners meeting on numerous occasions over an extended time period to achieve an eventual consensus on minimal management criteria for the care of 12 indicator conditions and the use of 14 drugs.

Kroger et al (1965) reported that office records are generally less complete than hospital records and may often be illegible. Particular constraints must be considered when establishing management criteria for medical problems seen in the office setting. The adequacy of records is a problem, when no consistent record format may exist either within or between practices. Clinically pertinent criteria may be inconsistently recorded, such that they are useless for assessment purposes. Therefore, the choice of criteria must be based both on clinical decisions as to what constitutes good care and also practical considerations as to what kind of data can be consistently obtained.

Alternative data sources exist: questionnaire, observation and interview. Hulka et al (1976) found 95% of physicians would complete questionnaires used to follow up patients with indicator conditions but pointed out the transferability of this technique is limited. It is not likely that physicians will find completion of special questionnaires on individual patients acceptable as a continuing means of patient care assessment. Direct observation and interviews are extremely time consuming, costly, and the investigator runs the risk of altering the performance of the person observed. More feasible may be the introduction of a medical record format which stimulates the recording of pertinent data on all patients seen in ambulatory care settings.

The absolute score reported for these practices can only be interpreted relative to each other (that is before and after only) and cannot draw firm conclusions about the meanings of these scores.

The small number of practices means that the power of the tests was quite low, so that failure to demonstrate a significant difference does not mean that no real difference existed. Review of the practices average scores indicated that the physicians, alone and in conjunction with family practice nurses were performing well especially on the use of drugs and somewhat less so with the indicator conditions. The average scores for all 12 indicator conditions ranged from 35% in the before period and 35% in the after period. This level of percent of indicator condition episodes scored adequate compares with average practice scores of 66% reported by Sibley et al (1975) for indicator conditions with quite similar criteria. Spasoff et al (1977) reported average overall scores of 53% and 40% using eight indicator conditions developed by Sibley et al (1975). The average scores for all 14 drugs in our study ranged from 63% in the before period and 57% in the after period. The scores for drug use in the Sibley et al (1975) study averaged 71%. However overall averages give little information on the distribution of scores for individual practices. Due to the varying number of episodes per practice a standardized score was created.

With these minimal process criteria sets, differences in practice scores before and after the attachment of a family practice nurse were not found. In this study, to avoid the pitfall of measuring the completeness of documentation rather than the quality of patient care, the abstractors operated on the assumption that there must be sufficient evidence in the practice records to draw a reasonable conclusion that a particular intervention had been done. The

results from these explicit indicator condition and use of drug process measures concurred with internal audits of family practice nurse performance obtained by questioning each of their physician colleagues in the physical delegation of function questionnaire described in Chapter IV.

In Newfoundland we have assessed the impact family practice nurses have on the quality of patient care using an instrument adapted for specific use in Newfoundland. The instrument is based on predetermined explicit minimal criteria for adequate physician performance when treating patients with indicator conditions or when using ethical drugs. The instrument permitted the derivation of quantitative scores for primary health care units without the need for special medical records. Primary care practitioners cannot be expected to be uniformly "good" or "bad" on their care of patients with indicator conditions or their use of drugs. However, this instrument permits a selective identification of areas requiring improvement in performance and has major implications and potential value in planning and evaluating the results of innovative health and continuing health education programs.

CHAPTER IV

WHAT IS THE ROLE OF THE FAMILY PRACTICE NURSE
AND HOW DOES THE ROLE AFFECT THE SERVICE OUTPUT OF
PRIVATE MEDICAL PRACTICE?

(i) Introduction

Reinhardt (1975), in his book "Physician Productivity and the Demand for Health Manpower: An Economic Analysis", concludes that reorganization of the medical care delivery system to employ allied health personnel more efficiently is a viable, indeed a desirable, alternative to expanding medical education. A number of studies (Hodgkin and Gillie, 1968; Schiff et al, 1969; MacGregor et al, 1971; Smith et al, 1971; Lees, 1973; Merenstein et al, 1974; Spitzer et al, 1974; Nelson et al, 1975; Voltmann, 1975; Draye and Stetson, 1975; Spitzer et al, 1976; and Scherer et al, 1977) have shown that a private medical practice adapts to the attachment of mid-level health professionals* by increasing the number of patient visits per year in the practice. Some of these studies have shown that the increase occurs because 1) more patients are seen in the practice than in previous years (an increase in the size of the practice), and 2) patients have more visits per year in the practice. Some authors (Schiff et al, 1969; MacGregor et al, 1971; Smith et al, 1971; Lees, 1963; and Spitzer et al, 1974) have reported data to show that this latter result is at least partially due to a reduction in hospital utilization, closer monitoring of patients and/or a reduction in the number of patients referred to non-practice physicians.

Alternatively, Lees (1973) found that some practices adapt to the attachment of a mid-level health professional by maintaining the same number of patient visits per year as in previous years. He reported that this was due partially to the physician spending more

* Family practice nurse (nurse practitioner), physician assistant, Medex, see also Chapter I.

time with his patients at each visit. In some practices (Lees, 1973; and Nelson et al, 1975) it was found that the patient visits per year remained constant, but the physician spent less time in the practice and increased his leisure time and/or the time he spent in out-of-the practice professional activities.

MacGregor et al (1971), Nelson et al (1975), and Spitzer et al (1976) have reported that the mix of services provided in the practice changes after the attachment of mid-level health professionals. Charney et al (1972), Chappell and Drogos (1972), and Lewis et al (1969) report that mid-level health professionals provide some services which are outside the physician fee schedule such as geriatric and prenatal counselling.

The purpose of this Chapter is to describe the implications of employing family practice nurses to deliver primary care in the private medical practices of six general practitioners. Data is presented on 1) the impact of the family practice nurse on volume of services, 2) the type of patient seen by the family practice nurse, 3) the types of services she provided, 4) time allocation by the physicians and family practice nurses, and 5) professional satisfaction.

(ii) Methods

(a) Study Sample

As mentioned earlier, six family practice nurses were attached to urban, fee-for-service, primary care practices in Corner Brook and St. John's beginning in June 1975. These family practice nurses were the subjects of the detailed evaluation outlined in this Chapter.

The evaluation of each practice was carried out during three

time periods: two baseline years (from June 1, 1973 to May 31, 1974 and from June 1, 1974 to May 31, 1975) and the year of family practice nurse attachment (from June 1, 1975 to May 31, 1976). For simplicity, these three years will be referred to in this Chapter and Chapter V as 1974, 1975, and 1976.

(b) Data Sources

The data in this paper were obtained using four instruments. A daily log, called the Family Practice Nurse Daybook, was used to gather information on services provided by the family practice nurse alone or in conjunction with the physician. The Newfoundland Medical Care Plan Commission claims stored in a computer data bank were used to provide information on services provided by the physician and permit the linking of this data to the family practice nurse daybook data. Family practice nurse and physician time sheets were used to collect information on the time spent in patient management and other professional activities. Finally, a physician/family practice nurse function delegation questionnaire was administered to collect information on role changes experienced by the physician and family practice nurse.

Family Practice Nurse Daybook: Each family practice nurse maintained a daily log of all patients seen by her during the twelve-month period. For each patient visit the following information was recorded: patient's name, patient's Medical Care Plan number, date of service (day, month, and year), and location of the visit (office, home, out-patient, inpatient, other). For patient visits provided in the absence of the physician the following additional information was

recorded: the presenting complaint(s) of the patient, the diagnosis, the action taken, prescriptions given, and their name and dosage level, and whether the patient was referred to a health professional other than the family practice nurse's physician.

During the last six months of the study year, the family practice nurse indicated for each patient encounter whether she had a major or minor responsibility in providing care during that encounter.

Also, 25 days were randomly selected from all even-numbered calendar working days over the last six months of the attachment. On these days, the family practice nurse recorded the detailed information on all patient encounters whether or not the physician was present during the encounter.

The daybooks were distributed and collected on a regular basis by a research assistant. The daybook data was then coded, keypunched, and entered on a computer file for later linkage with Medical Care Plan data on physician services. Data from the detailed daybooks was analyzed separately using the Statistical Package for the Social Sciences (Nie et al, 1975) computer package.

Medical Care Plan Claim Form: The Medical Care Plan collects data on physician services on a document known as the "Medical Care Plan Claim Form". A physician submits a form for each patient who has been provided a service billable under the Medical Care Plan Payment Schedule (1976). This form is reviewed in the Medical Care Plan Claims Department and then entered on a computer file by means of an automatic optical card reader. The information used to classify patients is the following:-

- a) the patient's Medical Care Plan number (each patient number

- includes a unique identifying number for the patient, as well as codes for his age and sex),
- b) the type of service provided according to the list of service codes billable in the Medical Care Plan Fee Schedule (services may be in the form of visits to office, home, or hospital or less often units indicating the number of time intervals taken in performing a procedure,
 - c) the physician who provided the service (each physician in the province is assigned a unique identifying number and specialty code),
 - d) the day, month, and year the service was provided.

Family practice nurse daybook services were linked to the Medical Care Plan services over the one year experimental period. The computer program which linked services from the two data sources identified services provided by the family practice nurse alone (which were not billable Medical Care Plan services), services shared by the family practice nurse and the physician, and services provided by the physician alone. Details on this linkage procedure are outlined in Appendix C.

Time Study Sheets: Twenty-five days were randomly selected from all odd-numbered calendar working days during the last six months of family practice nurse attachment. On these days, each family practice nurse and physician recorded the time spent in patient management (office, home, hospital), clerical and administrative or other duties. The sheet required the subject to check off his or her activities for each fifteen minute interval during the day. A research assistant collected the forms after each time-study day and substituted time study days with randomly selected alternate days when either the family practice nurse or the physician was ill or on holiday.

A secretary-clerk in each practice maintained a time IN/OUT log for the physician's time in the office during a two week period in the spring of 1975 before the family practice nurse was attached to the practice. This was repeated during the same two week period in 1976, after the family practice nurse had been employed in the practice for a number of months.

Physician/Family Practice Nurse Function Delegation Questionnaire

The physician and family practice nurse were asked to complete this questionnaire after one year of family practice nurse attachment. The questionnaire inquired about the following: the family practice nurse's role in the practice in terms of which patients and complaints she dealt with; what medical procedures and other actions she performed; the protocol which had developed for her seeing, treatment and referral of patients; the problems the physician and family practice nurse had in defining their new roles as members of a team and whether these problems were resolved; the relevance of the nine month Education Program; the future of the family practice nurse in the practice, and the satisfaction of each professional. The information obtained in this questionnaire was supplemented with discussions between family practice nurses and physicians and research personnel throughout the period of family practice nurse attachment.

Copies of the above instruments are shown in Appendix D.

(iii) Results

(a) Volume of Services

Figure IV shows the annual volume of patient services in each of the six practices for the years 1974, 1975, and 1976. For comparison,

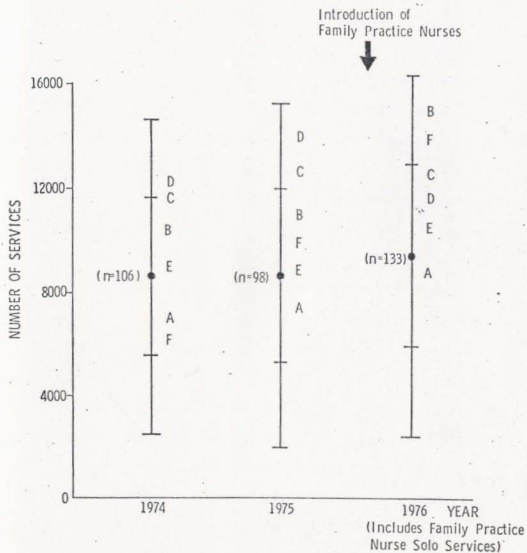


Figure IV. Number of Services Per Year: 1974, 1975 and 1976. (Study Practices A to F and Provincial Mean for all Newfoundland Physicians (vertical bar ± 1 and ± 2 Standard Deviation.)

this figure also shows the mean number of services plus or minus two standard deviations for all general practitioners in the province for these years. General practitioners who did not derive a major part of their income from Medical Care Plan claims were excluded from this figure and from all calculations in this report.

It is apparent from Figure IV, on page 82, that the six study physicians constitute a representative sample of fee-for-service physicians in the province with respect to service volume: they are distributed on both sides of the provincial mean, and during the two baseline years most of the six remained within one standard deviation of the mean. Although the physician sample could not be randomly selected in a study such as this (see Discussion page 95), it would appear that volunteer bias was not a major problem.

The relationships diagrammed in Figure IV, on page 82, are as follows: Between 1974 and 1975 the mean number of services per year increased by 1% for all physicians in the province, and by 15% ($P(t) < 0.05$) for the six study practices. In 1976 the province-wide increase was 9%; for the study practices 14% ($P(t) > 0.05$). However, when "solo" family practice nurse services were excluded from the study practice figures this increase was only 10% (not shown in Figure IV on page 82) ($P(t) > 0.05$). Therefore, the six physicians increased their services at a rate comparable to other physicians during the year of the project, and the additional 4% increase is directly attributable to "solo" family practice nurse services.

It should be noted that the observed increase in patient services could have resulted from two separate factors -- either more frequent

visits by the same patients (increased intensity of care), or an increase in the size of the practices' patient panel (increased access to care). We found that the mean number of patients in the study practices remained virtually constant ($P(t) > 0.05$). The increased service volume was due instead to an increase of 15% ($P(t) < 0.05$) in the mean number of services per patient, from 3.0 in the baseline year to 3.5 during the year of family practice nurse attachment.

All the figures cited thus far come from the patient count based on Medical Care Plan computer files. While pointing to significant trends in the number of patient visits, the number of patients per practice and the number of visits per patient per year, they do not answer the question of who actually sees the patient when they come. The answer can be found in the detailed daybook maintained by the family practice nurses during the last six months of their year of attachment.

Nearly all services involving the family practice nurse (95%) were provided in the office, rather than in the home or the hospital. Figure V shows that, averaged over the six practices, approximately 4% of all office visits were handled by the family practice nurses alone. With the physicians they handled another 26% (8% with major involvement and 18% with minor involvement), and so were involved in a total of 30% of office visits.

Also, family practice nurses alone handled approximately 16% of all home visits in the six practices.

(b) Type of Patients

It is reasonable to assume that if a family practice nurse can

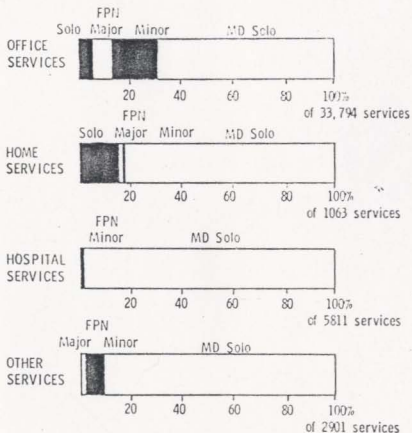


Figure V. Division of Responsibility Between Physician and Family Practice Nurse (Total services over all six practices)

(See page 86 for Legend - Figure V)

LEGEND FIGURE V

- MD Solo = Patient services provided by the physician alone
- FPN Solo = Patient services provided by the family practice nurse alone
- FPN Major = Physician/family practice nurse shared patient services where the family practice nurse indicated she had a major involvement in providing the service
- FPN Minor = Physician/family practice nurse shared patient services where the family practice nurse indicated she had a minor involvement in providing the service.

affect the patient volume of a practice, she might also influence certain characteristics of the patient population. Because all the family practice nurses were female and were trained in gynecological examinations one might predict that any increase in patient volume due to the nurse would consist primarily of females, and/or of infants and children receiving well-child checkups. This is not the case. Table 13 compares the age and sex distributions of office patients in the six practices for the study year and the two preceding years. No major shifts in the distributions are noted; thus, it appears that introduction of the family practice nurses did not affect the age and sex mix in these practices.

Furthermore, the family practice nurses did not spend most of their time giving gynecological or well-child care, but apparently saw a representative sample of practice patients. Our Medical Care Plan linkage data permitted comparisons of the age and sex characteristics of all patients seen by the physicians with those of all patients seen by the nurses; these figures are shown in the two right-hand columns of Table 13. The nurses' figures were not notably higher than the physicians' for either children or female patients, although the nurses did have a slightly higher proportion (20% vs 16%) of children under 5 years.

Presenting complaints of the nurses' patients, as recorded in the detailed daybooks, ran a broad spectrum (Table 14). Most common were complaints of the respiratory and digestive systems, routine pregnancy, followup visits and "other asymptomatic" visits. The single category which the family practice nurses did not report seeing

TABLE 13. Age and Sex Distributions of Office Visit Patients in the Six Practices
1974, 1975, and 1976

	All Office Visit Patients			Breakdown by Provider, 1976	
	1974	1975	1976	Physician	Family Practice Nurse
Total Patients	15,303	15,820	18,768	16,971*	8,826*
Sex					
Male	37%	37%	39%	36%	39%
Female	63	63	61	64	61
Age					
0-4 years	16	16	16	16%	20%
5-14	13	13	14	13	13
15-24	21	21	21	22	20
25-44	30	31	30	30	26
45-64	15	14	14	14	14
65 +	5	5	5	5	7

* These figures sum to more than the 1976 total, because patients treated jointly by physician and family practice nurse are included in both categories.

TABLE 14

Presenting Complaints of Patients for Whom the Family
Practice Nurse took Major Responsibility

<u>Nature of Complaint*</u>	<u>Percent of All Complaints</u>
General Symptoms	2.8
Skin, Nails, Hair	2.5
Respiratory System	9.0
Musculoskeletal System	2.0
Digestive System	7.2
Female Reproductive System including Breast	1.5
Eyes and Ears	3.0
Nonsymptomatic Visits	
Routine Pregnancy	20.4
Well Baby	4.4
Other Examination	4.8
Follow-up Care	20.8
Other	19.3
TOTAL COMPLAINTS	793

* From the National Center for Health Statistics (1974): National Ambulatory Care Survey: Symptom Classification, United States, Vital and Health Statistics. Series 2, No. 63. DHEW Pub. No. (HRA) 74-1335. Health Resources Administration, U.S. Government Printing Office, Washington, D.C.

was complaints of the male reproductive system.

(c) Types of Services

As shown in Figure V, on page 85, most physician and family practice nurse services were provided in the office. The function delegation questionnaires administered to the physicians and family practice nurses provided specific information on what aspects of office diagnosis and treatment were performed by family practice nurses. More than half the family practice nurses reported that they routinely provided total care, i.e. assessment, diagnosis, and treatment (although the physician may have been involved briefly), in well-baby and well-child exams, visits involving contraception, and followup visits for hypertension and for obesity. Some also provided total care in prenatal visits, school physicals, well female exams, and geriatric maintenance. As regards specific procedures, those which most family practice nurses performed independently were giving advice or explanations, taking histories, and performing physicals, pap smears and pelvic exams, blood pressure checks, immunizations, injections, and suture removal. With the physician involved most of them also prescribed medications, performed minor medical and surgical procedures, and made referrals and consultations.

Most family practice nurses reported that the physician would sometimes refer patients to them for explanations of their complaints or treatment. The number of such patients referred to a family practice nurse in a typical week ranged from none up to twenty. Another source of the family practice nurse's patient load is the

patients who went to her with what they considered trivial complaints, in preference to "bothering" the physician. Family practice nurses reported seeing or being phoned by approximately one to 25 such patients per week.

All but one of the family practice nurses sometimes suggested medication for a patient. However, none of the physician/family practice nurse teams developed agreed-upon lists of drugs which the family practice nurse could prescribe. If the family practice nurse felt confident of the proper medication she would either suggest it to the physician (2 practices) or make out a prescription which was then reviewed and cosigned by the physician (3 practices). The detailed daybook reports included 456 instances in which the family practice nurse "prescribed" drugs in this manner; nearly half of these prescriptions were for antibiotics, and most of the rest were for cold remedies, cardiovascular agents, or miscellaneous drugs. (See Table 15).

(d) Clinical and Non-Clinical Apportionment of Time

During the latter six months of the family practice nurse attachment, family practice nurses and physicians were asked on 25 randomly selected days to indicate the time they spent during the day in clinical and non-clinical activities. Only five physician/family practice nurse teams were considered as the sixth team did not complete the forms.

Both providers spent similar proportions of their time in diagnosis and management in the office: on average, 62% for the physicians and 64% for the family practice nurses (Figure VI). For

TABLE 15

Types of Medication "Prescribed"* by Family Practice Nurses

<u>MEDICATION</u>	<u>PERCENT OF ALL MEDICATIONS</u>
Antibiotics	41.0
Cardiovascular Agents	8.3
Cold Remedies	9.0
ASA and Pain Relievers	4.8
Sedating and Tranquillizers	5.9
Oral Contraceptives	5.7
Laxatives and Stomach Medicines	2.9
Replacement Therapy	0.4
Vitamins and Tonics	3.5
Miscellaneous	18.4
Total Number of Medications Recorded in the Family Practice Nurse Daybook	456

* See text for a discussion of family practice nurse responsibility in these "prescriptions".

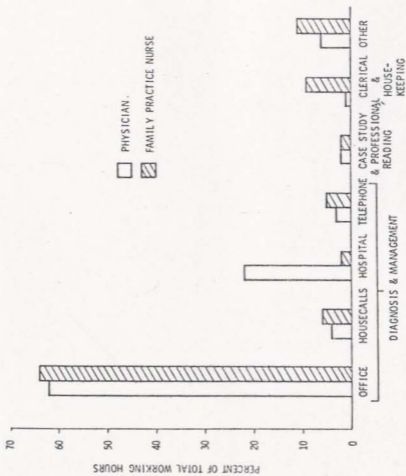


Figure VI. Clinical and Non-clinical Apportionment of Time by Health Professional.

diagnosis and management in the home and on the telephone the corresponding values were 4 and 3% for the physicians and 6 and 5% for the family practice nurses respectively. Diagnosis and management in the hospital occupied 22% of the physicians' time in contrast to 2% for the family practice nurses. Case study and professional reading during working hours accounted for 2% of both the physicians' and the family practice nurses' time. Clerical and housekeeping tasks took considerably less of the physicians' time (1%) than of the family practice nurses' time (9%). There was a minor difference for other miscellaneous activities.

During a two week period before, and another period after, the family practice nurse attachment - at the same time of year -, secretaries in the practices were asked to record the time their physicians spent in the office. When averaged over all physicians the average time spent in the office decreased slightly, from 6.81 hours per day to 6.24 hours per day ($P(t) < 0.05$).

(e) Professional Satisfaction

The function transfer questionnaire included a section of professional satisfaction which was completed by each family practice nurse. Aspects which most family practice nurses agreed on as satisfactory were "prestige in your profession" and earnings (5 out of 6 satisfied). Other fairly satisfactory areas were job-related learning and experience, personal feelings of satisfaction, and scheduling of hours. As might be expected in a one-year experimental program such as this, few family practice nurses expressed satisfaction with their prospects for future earnings, financial

security, or opportunities for advancement and promotion. Responses in each of these areas are summarized in Table 16.

In Appendix E, data on volume of services, types of patients, types of services and clinical and non-clinical apportionment of time are shown in greater detail than the tables reviewed in this chapter, reporting in most instances individual practice observations.

(iv) Discussion

The six community physicians became involved with this project because of their interest in the development of nurses working in an expanded role. Because such physicians were difficult to locate in the province and because of the small number of physicians available at the time, a decision was made not to randomly allocate family practice nurses to some of these six practices and not to others. In addition to their interest in the project, the six study physicians may have been motivated to employ family practice nurses because, at that time in the development of their practices, they perceived a family practice nurse as possibly beneficial. Without random assignment it is difficult to assess physician selectivity factors which may have affected the results of this study. Figure IV, on page 82, does show, however, that the practices were not an atypical sample with respect to their service volume.

In this report we have examined service output, mix of services, and patient characteristics with one purpose being to determine the ways in which the physicians routinely delegated tasks. However, in one of the six practices, a randomized controlled trial was

TABLE 16. Professional Satisfaction of Family Practice Nurses

	<u>Number of Family Practice Nurses Satisfied (Out of 6)</u>
Professional Advancement	
Time and opportunity for professional travel	3
Opportunities for promotion	0
Opportunity to advance professionally	2
<hr/>	
Learning and Experience Aspects	
Time for study in your field	3
Intellectual challenge	3
Chance to improve skills	4
Experience	3
Opportunity to use learned skills	4
Opportunity to use aptitudes and abilities	3
Opportunity to use education	3
<hr/>	
Prestige/Recognition	
Your prestige in the community	4
Your prestige on the job	3
Prestige in your profession	5
Recognition from your superiors	2
Recognition from your peers	3
<hr/>	
Financial Aspects	
Your earnings	5
Financial security	2
Prospects for future earnings	2
<hr/>	
Hours	
Hours on all professional activities	4
Scheduling of regular office hours	3
<hr/>	
Personal Satisfaction	
Feeling of being needed	3
Feeling of accomplishment	4
Personal satisfaction of job well done	4

simultaneously conducted to assess the family practice nurse's impact on patient health status. One third of the patients in this practice were assigned to have first contact care provided by the family practice nurse. In this practice, therefore, the random allocation of patients interfered with the physician's independent determination of which patients should be seen by him and which by the family practice nurse. Upon review of individual practice data, this practice varied little from the other five, and omission of the data obtained from it would not seriously change the summarized results presented here.

Extraordinary caution was exercised in planning the study and collecting the data to minimize the amount of intervention in the practices of the six physicians. However, the fact that this was an experimental project, as well as the possibly inaccuracy and bias of the instruments (especially the recall portions of the physician/family practice nurse function delegation questionnaires), should be remembered when considering the results of this study.

The desire to minimize the amount of intervention in the practice led to the decision not to conduct detailed time and motion or work sampling studies. In these private community practices, intrusions by researchers were not overly welcomed by the physicians. Work sampling would have involved making a randomly selected pre-determined set of instantaneous observations over a protracted time period of the activities in which a practice staff member is engaged (Barnes, 1963; and Krick, 1962). As was mentioned in the justification of the indicator condition methods of assessing quality of care in

Chapter III, the direct observation approach used in work sampling is extremely time consuming, costly, and the investigator runs the risk of altering the performance of the person observed. In place of the Barnes (1963) and Krick (1962) approach to work sampling, physician/family practice nurse function delegation questionnaires, reports from secretaries, family practice nurses and physicians (time study sheets), Family Practice Nurse daybooks and Medical Care Plan encounter forms were used in this study. These latter two instruments provided total year information on the services provided. On twenty-five randomly selected days the family practice nurses were asked to record in detail the tasks involved in providing these services. Although the family practice nurses were quite conscientious when reporting the detailed days, this is less desirable than the structured, non-participant approach of work sampling where a mutually exclusive and exhaustive list of activities are established before the direct observations are performed. The results of work sampling studies which aim at producing unbiased minute by minute estimates of an array of tasks performed (which may or may not be specific to the office practice being observed) may not have agreed with the findings presented here on a total year basis.

The number and type of tasks observed in work sampling determines the validity of this approach. Smith et al (1972) identified 369 tasks performed by mid-level health professionals and physicians in general practice whereas Reid (1975) identified only 34. In Figure VI, on page 93, clinical and non-clinical apportionment of time was divided into seven categories. Smith used the results of work sampling to develop

simulation models which would predict the impact of mid-level health professionals on practice service output. Reid (1975), Patterson and Bergman (1969) and Silver and Duncan (1971) have used time and motion studies to determine optimal staffing configurations (reduce redundant labor) after the attachment of a mid-level health professional to a practice. The differences in the number and type of tasks identified and monitored in these studies, the reports of Hodgkin and Gillie (1968) and Lees (1973), and the present study make comparisons of the various study results difficult. Application of the results of simulation model studies and observational studies are further complicated by the variation in functions delegated not only to family practice nurses but also to receptionists and secretaries in the practices of the six study physicians in addition to the differences in the organization and financing of health care in the United States, the United Kingdom, Canada and Newfoundland.

(a) Service Output

If one of the main goals of the family practice nurse program is to increase the service output of primary care practices and thereby make health care more available (Reinhardt, 1975), we must tentatively conclude that the program was a success. However, while patients seen in the practice remained virtually constant during this time. Reasons for this may be:

- 1) These practices were all well-established; in fact, one practice was not taking new patients.
- 2) In 1975 and 1976 there was an increase in the number of general practitioners in St. John's which may have

reduced the pool of potential patients for the four practices located in St. John's.

Whatever the reasons for the lack of a substantial increase in patient volume the proportionally greater increase in services resulted in the provision of more services per patient in the six practices.

It is difficult to determine if there was a true need for the increased service per patient ratios from a quality of care point of view. Informal reports from the family practice nurses and physicians suggest that the nurses were improving the care of patients by closer monitoring.

Although the 14% increase in services is comparable to increases reported elsewhere, it must be remembered that in this case the increase was achieved over a period of only one year. Nelson et al (1975) have reported a 12% increase in visits in the first year, and a 37% increase in 2 3/4 years, after the introduction of a Medex, with evidence of levelling-off during the second year at the individual practice's saturation level. In their study of nurse practitioners in two urban practices, Spitzer et al (1976) reported a 9% increase in visits and a 22% increase in families under care after one year. After two years, there was a 24% increase in visits over the baseline figures, and a 41% increase in families under care.

Nelson et al (1975) and Yankauer et al (1972) found that practices already saturated were less likely to show observable effects of family practice nurse attachment, and there is some evidence of this in the present study. It is likely, however, that had this project been continued for an additional year even larger

increases in service volume, and perhaps in number of patients, would have occurred. One year is too short a time for all of the effects of family practice nurse attachment to stabilize. Unfortunately federal government funding for the study terminated, and hesitation by the provincial government and the physicians to plan for the future of family practice nurses led to dissolution of the attachments after the initial one-year period.

(b) Practice Organization

The 10% increase in physician services plus the slightly decreased physician office time reported in the secretaries' logs indicate that the physicians were working perhaps even more efficiently than before. However, in the absence of data on out-of-office physician working time from a more sophisticated time and motion study, which was outside the scope of this project, firm conclusions regarding changes in physician efficiency are not possible.

From questionnaires administered to the physicians and family practice nurses it was clear that physicians did a good deal of "checking" of the family practice nurses' treatment decisions, the details of this arrangement being worked out informally, and over time, by the physician and the family practice nurse as they grew accustomed to working together. In three of the six practices the family practice nurse would see, assess, and perhaps treat patients but was then referred to the physician except for certain agreed-upon situations such as injections or diet counselling. In the remaining two practices the physician saw most patients treated by the family practice nurse, but this was left to the family practice nurse's

discretion rather than being a mandatory part of the visit.

This time spent in supervising apparently did not increase the time the physician spent in his office. Our data do not allow us to assess how much supervision was considered medically necessary by the physician, and how much was performed because of the regulation that Medical Care Plan will not pay for a service provided by the family practice nurse with no physician involvement. Had family practice nurses been attached to the practices for a longer period, their roles might have evolved further as each professional developed increased understanding of the other's areas of competence (Bates, 1975, and see Chapter I of this thesis).

(v) Conclusion

The data suggest that the impact of the family practice nurse is very much a function of what each physician chooses to do with his practice. The family practice nurse may be used alternatively to speed the flow of patients through the office, increase the number of patients seen, or enable the physician to spend more time with patients requiring his special skills. Fundamentally, then, the real impact of the family practice nurse is an increase in the options available to the physician in organizing his practice.

CHAPTER V

WHAT IS THE FINANCIAL IMPACT OF FAMILY PRACTICE NURSES IN
MEDICAL PRACTICE?

(i) Introduction

Several studies have suggested that mid-level health professionals in primary care settings provide safe, effective care (Lewis et al, 1969; Schlesinger et al, 1973; Sackett et al, 1974; Hoekelman, 1975; Burnip et al, 1976; and Chapter II of this thesis), are well accepted by patients and physicians (Lewis et al, 1976; Linn, 1976; Merenstein et al, 1974; Charney and Kitzman, 1971; Day et al, 1970; Levine et al, 1976; Batchelor et al, 1975; and see Chapter II), increase the service output of medical practice (Hodgkin and Gillie, 1968; Rodgers et al, 1968; Schiff et al, 1969; Smith et al, 1971; MacGregor et al, 1971; Smith et al, 1972; Yankauer et al, 1972; Chapell and Drogos, 1972; Lees, 1973; Pondy et al, 1973; Merenstein et al, 1974; Lairson et al, 1974; Sells and Herdener, 1975; Nelson et al, 1975a; Voltmann, 1975; Spitzer et al, 1973, 1974b, 1976; Holmes et al, 1976; Burnip et al, 1976; Scherer et al, 1977; and see Chapter IV), improve access to health services (Chambers et al, 1977) and enhance quality of care (Chapell and Drogos, 1972; Sibley et al, 1975; Levine et al, 1976; and see Chapter III. According to Nelson et al (1975a), the "ultimate test" of the usefulness of mid-level health professionals must include estimates of the financial impact of the attachment of one to a medical practice. Glenn and Hofmeister (1976) put "physician's increased net income" at the top of a list of potentially positive incentives that might influence a private practicing physician to employ a mid-level health professional.

Few empirical studies assessing the impact of expanded role nurses on medical practice have considered financing and fewer still

provide sufficient detail on the financial impact to make possible comparisons across studies. Several studies (Hodgkin and Gillie, 1968; Merestein et al, 1974; Burnip et al, 1976; Smith et al, 1972; Garfield et al, 1976; Draye and Stetson, 1975; Pondy et al, 1973; and Lairson et al, 1974) report separately on revenue generated by the physician and mid-level health professional or report separately on the salary and overhead expenses ascribed to the 'nurses' but do not report whether the income generated by the 'nurses' is sufficient to meet their expense to medical practice. Rodgers and his colleagues (1968) report that in a practice employing mid-level health professionals, depending on whether the rate of payment is based on physician clinic fees or hospital outpatient fees, physician and non-physician gross revenue in the practice would either exceed practice overhead expenses by \$13,589 or fall short by \$13,998. Schiff and his associates (1969), studying an individual pediatric nurse practitioner, report that income generated by her in one year amounted to \$16,800 well above the salary of \$7,620 paid to her. Yankauer and his colleagues (1972) estimated that the average gross revenues generated by 26 nurse practitioners exceeded salary and overhead expenses by an average of \$2,500 per year. In a study of the financial impact of employing physician assistants (MEDEX) in 12 private medical practices, Nelson et al (1975b) found that 10 of the 12 practices experienced substantial gains of estimated revenue over expenses ascribed to the activities of the MEDEX. Over a ten and a half month period, Draye and Stetson (1975) reported that \$10,085 of the salary of a family nurse practitioner generated \$31,000 of billed patient charges. Spitzer

et al (1974a) found that the income of six private practices employing nurse practitioners declined slightly during a two-year period whereas four control practices had modest increases in income. The decrease was attributed to increased overhead and to the inability to reimburse directly for services given by a nurse practitioner. Scherer et al (1977) reported on a mailed questionnaire survey of 32 family practice nurse physician teams who worked under the same physician-nurse payment mechanisms as in the Spitzer et al (1974a) study. Scherer et al (1977) also reported appreciable financial disadvantages to physicians and only modest income incentives to nurses.

This Chapter reports on the financial impact of employing a family practice nurse in the six urban private medical practices.

(ii) Methods

(a) Study Sample

The study sample included the six family practice nurses who were full-time, salaried employees in primary care practices beginning in June, 1975. Quality of care and other aspects of these practices have been described in Chapters III and IV.

(b) Data Sources

Three data-collection instruments were employed in the study. A daily log, called the Family Practice Nurse Daybook, was used to gather information on services provided by the family practice nurse alone or in conjunction with the physician. Universal health insurance plan claims stored in the province of Newfoundland Medical Care Plan computer data bank were used to provide information on revenues

generated by the physician and to permit the linking of this data to the family practice nurse daily log data. An income statement was used to compile data on annual-practice operating revenues and expenses.

Family Practice Nurse Daybook: Each family practice nurse maintained a daily log of all patients seen by her during a twelve-month period through 1975 and 1976. For each patient visit the following information was recorded: patient's name, patient's Medical Care Plan number, date of service (day, month, and year), and location of the visit (office, home, outpatient, inpatient, other). The daybooks were distributed and collected on a regular basis by a research assistant. After the daybooks were coded and keypunched for computer analysis, the data were verified using specially prepared edit programs.

Medical Care Plan Claim Form: As outlined in Chapter IV, data on the form used for this study included:

- (a) the patient's Medical Care Plan number (each patient number includes a unique identifier number for the patient, the patient's age and the patient's sex),
- (b) the fee amount which can be billed for the service according to the Medical Care Plan Fee Schedule,
- (c) the physician who provided the service (each physician in the province is assigned a unique identifying number and specialty code),
- (d) the day, month, and year the service was provided.

Family practice nurse daybook services were linked to the Medical Care Plan services over the one year experimental period. The computer program which linked the services from the two data sources identified

services provided by the family practice nurse alone, services shared by the family practice nurse and the physician, and services provided by the physician alone.

Income Statements: The accountant or practice manager in each practice furnished a detailed financial statement of income and expenses for the time of the study. This data was used in computation of estimates of the annual cost to the practice of employing a family practice nurse. Unfortunately, longitudinal income and expense data have limited utility in measuring pre-family practice nurse and post-family practice nurse financial trends because most practices experienced major changes in the number of physicians and other personnel, in corporate status, or in capital expenditure for new space and equipment which make meaningful interpretation difficult.

(c) Analysis

In this project, the Research Programs Directorate of Health and Welfare Canada provided funds to cover the salaries for the six family practice nurses who had completed the Memorial University of Newfoundland Family Practice Nurse Education Program. All six study physicians were being paid on a fee-for-service basis by the provincial Medical Care Plan prior to the start of the study. Early negotiations with these physicians revealed the physicians' favourable attitudes towards the fee-for-service method of reimbursement and their reluctance to accept the family practice nurse into their practice while at the same time giving up the fee-for-service method of payment. In addition to their wanting to remain within the Medical

Care Plan fee-for-service system, the physicians bargained with the study organizers for financial guarantees (based on the previous year's gross income from the Medical Care Plan) to cover the agreed upon one-year duration of the family practice nurse attachment. The physicians also insisted there be no upper limit on the amount of Medical Care Plan generated fee-for-service income they could earn during the one-year attachment of the family practice nurse.

During the year of family practice nurse attachment, the Medical Care Plan allowed the physician to claim a fee for all shared physician family practice nurse services regardless of the extent of physician involvement. All services provided by the family practice nurse alone were not paid for by the Medical Care Plan. Therefore, physician Medical Care Plan gross earnings included claims for services provided by the physicians alone and claims for services shared by the physician and family practice nurse.

In this project, the family practice nurse did not generate income for services she provided. In this analysis, the family practice nurse's salary and other practice overhead expenses ascribed to the family practice nurse are assumed not to be covered by the Medical Care Plan or by some special arrangement as for example in our project where these funds came from the National Health Research and Development Program. These expenses ascribed to the family practice nurse therefore must be viewed by the physician as an additional expense in the practice. Under such circumstances, we will want to determine if the physician's gross income from Medical Care Plan fees will be increased sufficiently after the attachment

of the family practice nurse to cover practice costs attributable to the family practice nurse salary and family practice nurse overhead expenses.

(d) Determination of Family Practice Nurse Practice Overhead Expenses

Regardless of the method of payment of physician and family practice nurse, practice overhead expenses must be paid. Overhead includes rent, utilities, supplies etc. needed to conduct an office practice.

Estimates of practice overhead expenses that could be attributable to the family practice nurse were determined by the following two methods:

(i) Physician's own estimate: Each physician was asked to complete a questionnaire in which we asked them to identify for us practice overhead expenses incurred by the family practice nurse during the experimental period. This was often difficult for the physician or his accountants to do because of the "lumpy" expenditures incurred by a physician managing an office practice. For example, the employment of secretaries cannot be finely tuned to the gross income of the physician from week to week. One, two or three secretaries must be employed during reasonable working hours, for example on a half-time or full-time basis. Similarly, most equipment, medical and other supplies needed to operate an office practice either are purchased only once or are purchased in bulk amounts which may last for a few weeks to many months, even years. Most of these practice expenses have to be incurred by the physician whether or not he employs a family practice nurse in his practice. The extent to

which the family practice nurse increases the use of secretaries or medical supplies for example is difficult to estimate. If additional clerical and nursing services were required or if a larger office became necessary the physicians were asked to report these expenses (along with salary).

Difficulties in identifying these expenses may well understate the actual cost involved and thus overstate actual net profit.

(ii) Proportional Salary Method: In this method, the family practice nurse is charged with her share of the total practice overhead that is proportional to her salary in relation to total practice salaries. The formula used is as follows:-

$$\text{Total Family Practice Nurse Expense} = \text{Salary} + \left[\frac{\text{Family Practice Nurse Salary}}{\text{Total Practice Salaries}} \times \text{Practice Overhead} \right]$$

The underlying assumption of this method is that the health-manpower marketplace (in the economic sense) determines the family practice nurse salary, which accurately reflects the cost and benefits of employing her. Allocation of pre-existing overhead to the family practice nurses may well overstate the actual cost involved and thus understate actual net profit.

(iii) Results

(a) Annual Increases in Income

Table 17 shows the financial performance of the physician/family practice nurse teams as compared with the baseline period level of 100 percent. After the introduction of the family practice nurse into the practices, the change in total number of patients provided

TABLE 17. Performance of Practices

Practice No.	Base-Year = 100%	Change in Number of Patients (Under Care of Physician and Family Practice Nurse)		Change in Number of Services (Provided by Physician and Family Practice Nurse)		Actual Change in Gross Income	Actual Dollar Value* of the Change in Gross Income	Estimated Dollar Value* of Increased Service if Family Practice Nurse Solo Services Reimbursed at 100% of Physician Fee.
		%	Practice Nurse	%	Practice Nurse			
A	100	1	12	17	7,520	1,750		
B	100	15	33	37	25,700	3,000		
C	100	-8	-1	7	4,990	1,370		
D	100	-23	-15	-5	-4,480	1,070		
E	100	0	10	14	7,680	4,030		
F	100	3	30	37	26,700	4,900		
	Mean**	-3%	10%	17%	11,350	2,690		

*Dollar Value rounded to nearest \$10

**Mean percent changes are computed from 1975 and 1976 values averaged over the six practices.

services by the physician alone or by the physician working with the family practice nurse ranged from -23% to +15% with a mean decrease of 3% per year. Before/after differences in services provided to these patients ranged from -15% to +33% with a mean increase of 10% per year. This compares with a 9% increase in services during the same year for the population of general practitioners in the province whose major source of income was from Medical Care Plan fee-for-service payments. The percentage change in physician gross income from the Medical Care Plan ranged from -5% to +37% with a mean increase of 17% per year.

When these latter percentages are converted into dollar values, we find that the actual dollar value of the before versus after differences in gross income to the physicians from the Medical Care Plan ranged from -\$4,480 to \$26,700 with a mean increase of \$11,350 per year.

(b) Annual Expenses Ascribed to Family Practice Nurses

Estimates of the total annual expense ascribed to the family practice nurse include her salary and a portion of the overhead expense of the practice. The salary paid to the family practice nurses was \$14,420 (Table 18). Four of the six study physicians reported no additional overhead expenses related to the family practice nurse; the other two listed moderate amounts. Using the physicians' estimates the total expense -- salary plus related overhead -- attributable to family practice nurses averaged \$14,700 per year (range of \$14,420 to \$15,270). The average expense increases to \$19,770 per year (range of \$17,460 to \$22,860) when overhead is

Table 18 Estimates of Annual Expenses* Ascribed to Family Practice Nurses

Family Practice Nurse No.	Salary Only (Direct Expense)	Annual Expenses (\$)		
		Salary + Overhead (Based on Estimate of Physicians)	Salary + Overhead (Based on Salary)	Salary + Overhead (Based on Salary)
A	14,420	14,420	21,180	21,180
B	14,420	14,420	17,460	17,460
C	14,420	14,420	22,860	22,860
D	14,420	14,420	19,300	19,300
E	14,420	15,270	19,930	19,930
F	14,420	15,270	17,900	17,900
Mean	14,420	14,700	19,770	19,770

*Expense estimates rounded to nearest \$10.

calculated according to the ratio of family practice nurse salary to all salaries. Since each of the family practice nurses received the same salary, the variability in total expense is due to differences in practice overhead ascribed to the family practice nurse using the salary method of deriving overhead.

(c) Annual Profitability of Family Practice Nurses

Within the constraints of the methods used to measure the dollar value of increased services and practice overhead expenses after attachment of the family practice nurse, estimates of annual profitability are given in Table 19. Expense estimates (Table 18 on page 114) were subtracted from potential dollar value of increased services estimates (Table 17 on page 112) producing four estimates of gain or loss of income for the practice. Gains were experienced in two practices regardless which method of estimating annual profitability was used with the dollar value of increased services due to attachments of family practice nurses exceeding expenses by more than \$8,240 per year. Losses were estimated to be as high as \$23,780 per year in the other four practices. The averages of the four alternative profitability estimates are negative with the mean ranging from -\$8,420 to -\$670 per year per family practice nurse.

The degree of family practice nurse independence (i.e. proportion of patients seen exclusively by the family practice nurse or where the nurse had the major share of the involvement in services provided) was found to be correlated with the profitability of employing a family practice nurse ($r = 0.79$, $p(t) = 0.06$ and $r = 0.68$, $p(t) = 0.14$ two-tailed respectively).

Table 19 Estimates of Annual Profitability of Family Practice Nurses*

Practice No.	Dollar Value of Change in Physician Services	Dollar Value of Change in Physician Services plus Psuedo (based on 100% of Physician Fee)	Dollar Value of Change in Physician Services plus Psuedo (based on 100% of Physician Fee)	Dollar Value of Change in Physician Services plus Psuedo (based on 100% of Physician Fee)
	Dollar Values for Family Practice Nurse Solo Services	Dollar Values for Family Practice Nurse Solo Services	Dollar Values for Family Practice Nurse Solo Services	Dollar Values for Family Practice Nurse Solo Services
	Salary and Overhead (Based on Salary)	Salary and Overhead (Based on Salary)	Salary and Overhead (Based on Estimates of Physicians)	Salary and Overhead (Based on Salary)
	\$	\$	\$	\$
A	-6,900	-13,660	-5,150	-11,910
B	11,280	8,240	14,280	11,240
C	-9,430	-17,870	-8,060	-16,500
D	-18,900	-23,780	-17,830	-22,710
E	-7,590	-12,250	-3,560	-8,220
F	11,430	8,800	16,330	13,700
Mean	-3,350	-8,420	-670	-5,730
Range	-18,900 to 11,430	-23,780 to 8,800	-17,830 to 16,330	-22,710 to 13,700

*Profitability estimates rounded to nearest \$10.

(iv) Discussion

The work reported here differs from most of the earlier investigations of the financial impact of family practice nurses (or mid-level health professionals), because of the following characteristics: comparable total year financial data derived from the provincial Medical Care Plan was available for each of the six practices; the role of "experimental subject", assumed by the collaborating physicians and nurses, was almost entirely divorced from the specially trained abstractors and observers who acted as "data gatherers"; all the data, including the baseline data, were simultaneously gathered purposefully and prospectively; and the study was carried out in previously saturated practices that were non-university and non-institutional.

The analysis of profitability which has been outlined makes the basic assumption that both the physician and family practice nurse are remunerated on a fee-for-service basis. By doing this we do not mean to imply that we think this necessarily should be the method of paying physician-family practice nurse teams. On the other hand, the long term possibilities of physicians and family practice nurse teams operating where the method of payment differs for physician and family practice nurse is fraught with difficulty. For example, if the family practice nurse is paid a salary and the physician is reimbursed on a fee-for-service basis, the following disincentives to obtaining an optimal working relationship between physician and nurse exist: the fee-for-service method of remuneration discourages physician delegation of billable functions to other health personnel and the

fee-for-service method of remuneration discourages family practice nurse teaching because this activity is a money loser in terms of billable services which could have been carried out in the same time.

In the present study, despite our method of analysis of profitability, these physician disincentives were to some extent in effect because the family practice nurse was paid a salary and the physician, while guaranteed an income during the year of family practice nurse attachment, had no upper limit of payment of increased services placed on him. This may explain to some extent the mean increase of 10% in services for which the physicians were reimbursed in the study. (This increase in services may have been necessary but impossible to provide before the family practice nurse attachment.) Also, the fee-for-service payment of physicians may explain the small mean decrease (3%) in patients as this payment method only encourages increases in volume of services, not increases in the number of patients served in the community. This lack of an increase in patient volume may be explained also by the influx, at the same time of the study, of general practitioners which may have reduced to some extent the available "patient pool" in St. John's during the year of the family practice nurse attachments.

In this chapter we have provided four estimates of the profitability related to employment of family practice nurses. Their applicability to real world situations either in the practices observed or in other practices is limited by the assumptions which were made in arriving at these estimates. For example, the methods used in

estimating family practice nurse overhead expenses possibly could be improved with more detailed inventory use and time studies of office personnel. Family practice nurses may never be paid on a fee-for-service basis in Newfoundland, let alone at a rate 100% of the physician's Medical Care Plan fees. Medical Care Plan revenue for some physicians may be supplemented by other sources of income (for example, certain federal government employee health insurance plans, workmen's compensation, or direct payment from patients for services not included in the Medical Care Plan fee schedule) which in the present study was the case with one physician whose Medical Care Plan revenue represented less than 90% of his gross income. Profitability estimates provided in this paper refer to incremental income (or deficits) before taxes. It is beyond the scope of this report to discuss fully the personal income tax implications for the physician who more than likely uses elaborate accounting procedures tailored to maximize his net income. In the present study there were no incentives to inflate the number of services which were shared by the physician and family practice nurse; however, if the Medical Care Plan were to refuse to cover the costs of employing a family practice nurse, the physician employing a family practice nurse may bill for services where his involvement is minimal or non-existent.

The lack of profitability in the one year of family practice nurse attachment must be considered as just that, short term results. Measurement of the financial impact of family practice nurses was not the prime purpose of the family practice nurse attachments. The priorities and pre-occupations of the physicians and family practice

nurses were more oriented in this first year to establishing a working relationship, evolving routines and acquiring experience and understanding of each others competencies. Spitzer et al (1976) and others (Nelson et al, 1975) have reported increments in dollar earnings past the first year of attachment.

The organizational impact of the nurses on the practices is difficult to quantify. The majority of the physicians when asked at the end of the year of family practice nurse attachment listed the following advantages: shorter working hours, increased patient flow, more efficient practice management and feeling less tired after a working day. A few physicians indicated the workload of other non-physician personnel in the office was lessened after the attachment of the family practice nurse. Also there was some indication that family practice nurse supervision was sometimes time consuming (see also Chapter IV).

The willingness and ability of the physician to delegate tasks and the personal and professional qualities of the family practice nurses were observed to be major catalysts in the viability of attachment both in this study and elsewhere. Granting a family practice nurse some level of independence should not necessarily be equated with loss of supervision. The degree of supervision varies with physician/family practice nurse teams and must evolve with the help of on the job training and agreement on treatment protocols to be used by the family practice nurse. The association between degree of family practice nurse independence and profitability indicates that the physician who develops a good working relationship with the family practice nurse stands to

gain financially.

There are some advantages of team work which cannot readily be assigned dollar values. The physicians in our study have volunteered that the family practice nurse attachment resulted in: higher quality and more readily available patient care, more explanation of problems to the patient and better nutritional care and behavioural assessment of the patients (see Chapters III and IV).

CHAPTER VI
SUMMARY AND CONCLUSIONS

Four identifiable interest groups have been behind the movement to train and deploy nurses to work in an expanded role in primary care settings -- 1) Educationists - who see the need for co-ordinated health education programs (Evans, 1971), 2) Economists - who would like to see the health care system run more efficiently with the same or if possible better quality of care (Reinhard, 1975), 3) Nurses whose interests have broadened and education programs have expanded (including the University) creating a desire for more on-the-job responsibility (Burrough, 1977; and Sadler et al, 1971), and 4) Politicians and the public who are mainly concerned with access (Pickering, 1973) to health care whether it be in the isolated north, in the crowded downtown ethnic community in a large city or after five o'clock on weekdays and all day on the weekends.

As discussed in Chapter I, the School of Nursing and the Faculty of Medicine of Memorial University of Newfoundland elected to develop co-operatively a program for education and deployment of expanded role primary care nurses. The suggestions of members of the Department of Health, the Association of Registered Nurses of Newfoundland, the Newfoundland Medical Association, the Newfoundland Hospital Association, and the College of Family Physicians of Newfoundland and Labrador, were incorporated into the planning and implementation of the program. Health and Welfare Canada's Health Research and Development Program provided financial support for part of the education program and employment of the nurses for a period of one year in order that evaluation studies could be

conducted. The aim was to explore the potential of this model approach as one possible solution to the problems of providing improved urban primary health care services in Newfoundland and Labrador.

Chapter II reported on a randomized clinical trial which was conducted in one of the St. John's practices between June 1975 and May 1976. Before and after the trial, standardized measures of physical, social and emotional function were administered to patients who received conventional care by the family physician and to patients who received care mainly from the family practice nurse. At the beginning of the trial, statistical analyses revealed the comparability of the two groups of patients with respect to all three health outcome measurements. At the end of the trial, the health outcomes of the two groups of patients were found comparable. We concluded, therefore, that the family practice nurse was providing safe and effective patient care. This result provides further evidence from those controlled trials previously reported.

In Chapter II, also, the satisfaction and acceptance of patients cared for by the family practice nurse was reported to be high. Satisfaction with and acceptance of family practice nurses was excellent as reported by the physicians and allied health professions. This latter conclusion was reached through informal discussions and the physician function delegation questionnaires described in Chapter IV.

Quality of patient care standards were maintained after the introduction of family practice nurses. Chapter III reports on before and after evaluations using the indicator condition methodology. Minimal explicit process criteria for the management of patients with 12 indicator conditions and the use of 14 drugs were approved by an ad hoc peer group of community physicians. These criteria were applied to the practices using a single blind design and abstracting unaltered medical records. A standardized score for each practice was used to compare management of indicator condition scores and clinical use of drug scores before and after attachment of the family practice nurses. The adequacy of care provided to patients with the indicator conditions or prescribed drugs was found similar between study periods. These explicit (objective) audit results agreed with the implicit (subjective) assessments of the family practice nurses by their physician colleagues according to informal discussions with the physicians and the physician function delegation questionnaire described in Chapter IV.

The data gathering instruments described in Chapter IV included daily logs of family practice nurse activity, physician claims to the Provincial Medical Care Plan, time study sheets, and function delegation questionnaires. As in Chapter III measurements were obtained before and after introduction of the family practice nurses into the practices of six physicians. Results presented in Chapter IV showed the physicians delegated a wide variety of primary

care tasks to the family practice nurse. Also, in this Chapter the addition of a family practice nurse to an urban medical practice was reported to increase service output in four out of six cases. Physicians employing family practice nurses increased the annual number of services provided to patients on average by 14% in the first year of family practice nurse attachment; the average increase for all physicians in the province was 9%. The annual number of patients seen in the six study practices changed only slightly while annual services per patient increased by 15%. No consistent changes were noted in the age and sex of patients seen or in the amount of the physician time spent in the office.

In Chapter V the findings from family practice nurse daily service diaries were used to make annual estimates of family practice nurse-generated revenues. Data from these diaries were linked by computer to yearly physician service data maintained by the Medical Care Plan. Estimated losses were experienced by four of six of the family physicians (whose income was on a fee-for-service basis) after detailed assessments of the revenues generated and expenses incurred by the six family practice nurses who had held salaried positions for one year in private medical practices. The physicians, on average, would have experienced slight reductions in their established net income in the first year of family practice nurse attachment if the physicians and not the project paid for family practice nurse salaries and overhead.

The termination of the family practice nurse attachments in urban areas of the province shortly after one year was due to a

combination of the following factors:

- 1) substantial increases in the number of general practitioners in St. John's during the time of the family practice nurse attachments which caused concern among some general practitioner members of the Newfoundland Medical Association in St. John's;
- 2) reluctance on the part of the provincial government to introduce incentive programs to employ family practice nurses in urban settings due at least partly to (1) above, and the governments low priority given to improvement in the organization of primary care settings (Government of Newfoundland, 1971);
- 3) general hesitancy on the part of the physicians and/or the family practice nurses to give up financial security in order to extend the program past the period of federal government financial support;
- 4) problems of two payment systems -- physicians on fee-for-service and family practice nurses on salary.

With regards to the problems of two payment systems, the Newfoundland experience with family practice nurses placed in rural settings has been more longlasting. After the termination of federal funding, either the board-operated hospitals or cottage hospital division of the provincial Department of Health have continued to employ family practice nurses who were graduates of the 1974 and 1975 Education Program. Family practice nurses now have established roles in the following Newfoundland communities:

Jackson's Arm, Baie Verte (Fleur de Lys and Coachman's Cove), Musgrave Harbour, Placentia and Burin. In these settings both physicians and family practice nurses are paid a salary. The absence of "fee-for-service" professionals has removed all concerns about income and resulted in an across the board willingness to accept a new type of health professional. A controlled trial was conducted in one rural setting where extensive service output, cost and quality of care measures were obtained to assess the family practice nurse's impact (Chambers et al, 1977). There was a major shift in primary care visits from the hospital to the family practice nurse community clinic. In addition to substantial increases in total number of services provided to the community served by the family practice nurse, there were substantial increases in preventive services such as prenatal visits, well-baby visits and school exams. This study also showed that adequate management of certain indicator conditions and drugs was maintained by the family practice nurse when compared to the adequacy rating for the physician during the same time period. Due to a unique situation where data on all health services provided to the family practice nurse and control communities were available, it was possible to show that total annual health service costs per 1000 persons increased only slightly more than in a comparable control community.

Glenn and Hofmeister (1976) and Hodgkin (The Family Practice Nurse, 1977) have alluded to the literature on nurse practitioners from the United States and Canada where on the whole the results in Newfoundland have been reproduced. Both authors point to the method

of payment of physician and family practice nurse as the central motivating factor which will determine more widespread deployment of family practice nurses. In Canada, both the McMaster studies and the present study have shown that the family practice nurses' activities resulted in appreciable financial disadvantage to the urban general practitioners concerned, because their income was largely fee-for-service. Physician acceptance of the family practice nurse was dependent on the extent to which this loss could be avoided either by direct subsidy or by a physician workload heavy enough to ensure that the family practice nurse generated more income than her salary. Reports from the six fee-for-service Newfoundland physicians stated that overhead costs of the family practice nurse in the practice were insignificant after the family practice nurse's salary had been covered. The number of dollars involved for the physician is small especially when related to the total overhead costs of a medical practice.

The urban Newfoundland physician estimated losses in net income, though real, were not substantial (see Chapter V). It should be noted that these losses occurred in the first year of the family practice nurse attachment, and therefore the long term effects are not known. The purposes of the family practice nurse attachment in this project were exploratory to determine and establish the family practice nurse's role in the practice. The purpose of the project was not only to assess the profitability of employing a family practice nurse. It should also be noted that the short term estimated losses occurred in the fee-for-service method of physician payment

environment which discourages delegation of tasks and allocation of time to teaching. As pointed out above, the family practice nurse attachments to salaried physicians in rural Newfoundland have tended to become permanent on a long term basis with active physician support of the role of the family practice nurse (Bruce-Lockhart et al, 1977).

The future of the concept of family practice nurses will depend on:

- 1) the physician's motivation to hire family practice nurses,
- 2) the opportunity to employ one, and
- 3) the ability and willingness to use the family practice nurse effectively.

Glenn and Hofmeister (1970) suggest that physician motivation is a necessary and sufficient condition for family practice nurse deployment if potentially positive incentives are within reach of the private practicing physician. The following positive physician incentives will have to be present if the deployment of family practice nurses in primary settings is going to go beyond the "analysis paralysis" in Atlantic Canada:

- 1) Increased net income
- 2) More control over working hours
- 3) Positive mental set carried over from medical school or residency experiences with family practice nurses
- 4) A desire to reward a trusted employee/associate by training him/her as a family practice nurse
- 5) Provide expanded patient care (more patients and/or new services)
- 6) A desire to be innovative

- 7) Competitive pressures from local colleagues who already employ a family practice nurse
- 8) Case studies, research reports, and positive exhortations in the literature
- 9) A desire to make the practice optimal (Glenn and Hofmeister, 1976).

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Appendix A

Legal Guidelines for Family Practice Nurses

THE FAMILY PRACTICE NURSE

Role and Functions

The Association of Registered Nurses of Newfoundland

1975

INTRODUCTION

The following guidelines relating to the role and function of the Family Practice Nurse were formulated by a Committee established to consider the Legal Aspects of the Nurse in the family practice setting. The School of Nursing, and the Division of Community Medicine of the Faculty of Medicine of Memorial University of Newfoundland, the Newfoundland Medical Association, The Association of Registered Nurses of Newfoundland, the Newfoundland Hospital Association, the Departments of Justice and Health, were represented on this Committee.

The above Committee has taken into consideration The Report of the Committee on Nurse Practitioners¹, the Joint Statement of the Canadian Nurses Association and the Canadian Medical Association on the Expanded Role of the Nurse, and the functions of the Family Practice Nurse as developed in the Program at Memorial University of Newfoundland. This Committee has attempted to identify the commonalities respecting the role and functions of the Family Practice Nurse and the licensing of this member of the health team in the Province of Newfoundland.

¹Health and Welfare Canada. Report of the Committee on Nurse Practitioners, T.J. Boudreau, Chairman. Ottawa: 1972.

ROLE OF THE FAMILY PRACTICE NURSE

In Canada, a Family Practice Nurse is, in the first instance, a nurse who is registered by the appropriate authority in the jurisdiction of practice. In Newfoundland, that specifically means a person who is registered as a member in good standing with The Association of Registered Nurses of Newfoundland.

This Committee has adopted the role of the Family Practice Nurse as outlined in A Joint Statement of the Canadian Nurses Association and The Canadian Medical Association on the Expanded Role of the Nurse.

"The roles of the nurse and of the physician are inter-dependent. An increasing role is envisaged for the nurse in health maintenance. Moreover, selected responsibilities now tending to be handled by physicians can reasonably be delegated to nurses. Ultimate responsibility for diagnosis and establishment of a medical therapeutic plan will remain with the physician.

As the associate role is an evolving one, the Committee believes that for the present it is important to maintain a flexible and experimental approach to the matter of deciding what responsibilities for patients a nurse should undertake. Differences in patient populations, in how they are served, and in the mix of professionals working in a setting, will influence what a nurse would regularly do. Existing modes of providing primary health care and the educational and experience backgrounds of nurses immediately available to fulfill such roles must also be considered.¹

¹Report, "The Expanded Role of the Nurse: A Joint Statement of CNA/CMA", The Canadian Nurse. May, 1973, p. 24.

FUNCTIONS OF THE FAMILY PRACTICE NURSE

The following broad functions, as developed for the Program at Memorial University of Newfoundland, are accepted as the guidelines for practise by the Family Practice Nurse. Under the supervision of a physician he/she may:

- (a) act as initial contact for persons entering the health care system;
- (b) assess the health status of the individual and the family;
- (c) determine the required response from the health care system, e.g., initiation and maintenance of treatment for patients with health problems which the family practice nurse has been prepared to handle, referral of the patient after work-up to appropriate health care personnel;
- (d) provide health counselling to all age groups and to all socio-economic strata, with particular reference to the adolescent and the geriatric patient;
- (e) provide health education, reinforcing the individual's and the family's knowledge and ability in the maintenance of health, in the prevention of illness, in self-care and care of family members in the home in the event of illness;
- (f) give pre- and post-natal care of the normal healthy mother, excluding delivery;
- (g) conduct preventive programs, e.g., infant and pre-school examinations, immunizations, geriatric health maintenance clinics;
- (h) follow-up patients with long-term illness, adjusting therapy, often on her own initiative, but always in consultation with the physician;
- (i) co-ordinate the health care of individuals and families;
- (j) intervene in emergency situations.

In order to carry out the foregoing functions, the Family Practice Nurse must have attained the level of knowledge and skill requirements established as objectives in the course content of the Family Practice Nurse Program at Memorial University of Newfoundland.

LICENSING OF THE FAMILY PRACTICE NURSE

Every person wishing to practice as a Family Practice Nurse in the Province of Newfoundland shall

- (a) hold a valid licence from the Association of Registered Nurses of Newfoundland to practise nursing in the Province; and
- (b) either be a graduate of the Family Practice Nurse Program of Memorial University of Newfoundland; or

satisfy a joint committee representative of the Association of Registered Nurses of Newfoundland, the Newfoundland Medical Association, the Faculty of Medicine and the School of Nursing of Memorial University, that he/she possesses educational qualifications which meet the standards established, from time to time, by the Family Practice Nurse Program of Memorial University of Newfoundland.

Appendix B

Annotated Bibliography of Selected Articles on
Mid-Level Health Professionals

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ANNOTATED BIBLIOGRAPHY OF SELECTED ARTICLES ON
MID-LEVEL HEALTH PROFESSIONALS

INTRODUCTION

This appendix serves several functions:

1. It is an annotated bibliography of studies on mid-level health professionals where quantitative methods were used to assess the mid-level health professional's impact on the following criterion variables:
 - number of visits and patients seen in a clinic
 - amount of time taken for visits and/or the distribution of time of health professionals' activities in the clinic
 - the proportion of services provided by the mid-level health professional
 - change in the type of patients seen in the clinic
 - change in hospital use of patients
 - change in the types of services provided
 - income or potential income generated by physicians
 - income or potential income generated by mid-level health professionals
 - costs attributable to mid-level health professionals including salaries and overhead

2. It is an annotated bibliography providing summary information on each article including study setting, number and type of health professionals, study design, the duration of the study, and results on each of the criterion variables.

3. It contains charts in which the bibliographic entries are classified according to their subject matter, study design, and results on the criterion variables.

DEVELOPMENT OF THE ANNOTATED BIBLIOGRAPHY

Over the four years of the project terminating February 1977, articles relating to the subject of mid-level health professionals were collected from the following sources:

1. A "Medline" computer search using the key words: nurse practitioners in conjunction with any of the following: evaluation studies; cost benefit analysis or costs and cost analysis; economics; nursing; quality of health care; epidemiologic methods or follow-up studies or sampling studies; health status indicators or health surveys; research; attitudes to health; and patient acceptance of health care for 1969 through 1977.
2. References cited in review articles and original articles.
3. Published and unpublished bibliographies on mid-level health professionals.
4. Published and unpublished contributions from other interested workers.

In Section A of this Appendix, these articles are listed chronologically.

Only mid-level health professionals employed in primary care activities in family medicine, pediatrics or obstetrics were considered. The focus of the collection is on one type of mid-level health pro-

-fessional, that is, family practice nurses (nurse clinicians, nurse practitioners, family nurse practitioners) although a few articles are included on Medex and physicians' assistants.

METHODOLOGIC STANDARDS FOR REPORTS ON MID-LEVEL HEALTH PROFESSIONALS

Many articles of an impressionistic or anecdotal nature have been written on mid-level health professionals by those who have and have not worked with them. In this bibliography such reports have not been included.

Only reports where quantitative methods were used to assess the impact of mid-level health professionals on the criterion variables were included in this bibliography.

This bibliography includes only articles where counts of visits, patients, services, time and motion studies, the use of standardized questionnaires, and/or dollar values assigned to items were reported. The design of the studies were classified as:

- experiments (either mid-level health professionals were randomly assigned to practices or patients were randomly assigned to mid-level health professional(s) care or conventional care.)
- before and after with a comparison group (the impact of the mid-level health professional(s) on the criterion variables was assessed before and after the introduction of the mid-level health professional(s) and the criterion variables also were assessed in an appropriately selected group of

patients, physicians or other clinic(s)
not involved with mid-level health
professional(s).

- after with a comparison group (the impact of the mid-level health professional(s) on the criterion variables was assessed after the introduction of the mid-level health professional(s) and the criterion variables also were assessed in an appropriately selected group of patients, physicians or other clinic(s) not involved with mid-level health professional(s).)
- before and after (the impact of the mid-level health professional on the criterion variables was assessed before and after the introduction of the mid-level health professional(s).)
- after only (the impact of the mid-level health professional(s) on the criterion variables was assessed only after the introduction of the mid-level health professional.)

- NOTES
- (a) If two or more studies were reported in a single article, each study was assigned a study design classification.
 - (b) The assignment of a study design classification only related to the assessment of the impact of mid-level health professional(s) on the criterion variables.

ADVANTAGES AND DISADVANTAGES OF THE FIVE DIFFERENT STUDY DESIGNS

Experiments:- The control group does not necessarily consist of patients who receive no primary care at all. That is a fruitful comparison only if the decision to be made is a choice between care provided by family practice nurses and no care provided at all. Assessments can be made between family practice nurse care and the usual treatment for the group, that is physician care. The control group in this case receives the standard (conventional) treatment. Inclusion of a control group in a study removes the possibility of a "Hawthorne effect", a positive response that is due merely to the attention participants (patients, nurses or physicians) receive.

Randomized designs (experiments) provide the investigator with the most effective way of ruling out the possibility that something other than the introduction of family practice nurses to the practice is causing changes that are observed. Campbell and Stanley list eight major threats to valid interpretation of program evaluations, that is, eight classes of outside (non-program) variables that can affect the outcomes of an experiment if they go uncontrolled. Randomization protects against confusion in analyzing results which may be confounded by:

- (1) history - events outside the scope of a study have an effect on patients, nurses and physicians. They are exposed to a multiplicity of influences, from changes in the economy and the availability of jobs to changing emphasis on television shows. The controlled experiment effectively rules out the contention that it was this outside "history" that brought about the observed changes.

- (2) maturity - people (patients, nurses and physicians) mature with time and might conceivably change on their own.
- (3) testing - the effects of taking a test upon the scores of a second testing.
- (4) instrumentation - changes in the calibration of measuring instruments or changes in the observers or scorers.
- (5) statistical regression - this operates when groups have been selected on the basis of their extreme scores and on a second testing tend to move back toward the mean score of the group.
- (6) selection - choosing experimental and control units with different characteristics.
- (7) experimental mortality - differential loss of respondents from experimental and control groups.
- (8) selection maturation interaction - the differential maturation of members of experimental and control groups.

Problems can be created by the randomized assignment procedure of the experiment. Physicians generally want to assign people to "treatment" on the basis of their professional knowledge and experience. They want to decide which patient or practice can most benefit from service and which kind of service is most suitable, and not leave the process to chance.

In addition, even when randomized assignment has been achieved participants may drop out during the course of the program, a factor over which the investigator has no control. Those remaining in either

the experimental or the control group, or both, may be unrepresentative of the original groups in important and unknown ways. Experiments are particularly vulnerable to Hawthorne effects. The conspicuous machinery often required with randomization, may result in the participants being unduly aware of their specialness. Also in experiments, the controls may be angry, perhaps relieved, but in some way affected by their rejection by the program. At times, control groups become contaminated because the members associate with people in the program and learn what they have been doing. Other agencies have been known to come along and provide the "controls" with the same kinds of services that program participants are receiving.

Measures of the relevant criterion outcome or output variables before the program begins are not a necessary condition for an experiment. However, before-and-after measures provide a check on the adequacy of the random assignment. Before and after measures are particularly useful if numbers are small (and the sampling error might cause initial differences between the two groups even with randomization). With before-and-after measures, individuals who change can be analyzed separately during the data analysis to learn something about how they differ from those who did not change. However, "before" measures may sensitize subjects to the measurement instrument and cause a change in scores due solely to the effect of retesting. This effect can be prevented if there can be two control groups, one of which is pretested and one which is not.

Before and After with a Comparison Group:- Studies such as these have the benefits of the before and after measures outlined above for experiments; however, because the experimental and control (comparison)

groups are not randomly assigned, these studies have to contend with the selection as a possible source of misinterpretation - as well as the interaction of selection with other factors and possibly, if groups were selected for extreme scores, regression effects.

Investigators using this study design must be concerned with how to make the comparison group as similar to the experimental group as possible. Matching procedures are sometimes resorted to pairing up members of the experimental group to a similar group (for example, private medical practices with and without family practice nurses) at the start of the program. At the conclusion of the study, when one group has been exposed to the benefits of the program (the introduction of family practice nurses) and the other group has not, the difference between them should be due to the program. However matching is much less satisfactory than randomized assignment for several reasons. Often a major dilemma involves definition of the characteristics on which people (or practices) should be matched. Frequently, we do not know which characteristics will affect whether the person (or practice) benefits from the program or not. We may have matched on age, sex and residence, when the important factor is motivation.

Selection of a comparison group by matching is sometimes done on the basis of pretest scores. If the measures are not highly reliable, this tends to be a poor procedure. (Note that we are referring here to only matching without randomization. If units are matched, then randomly assigned to each group, the procedure increases the statistical precision of the experiment. Matching conducted before random allocation may even be essential when there are few units such

as private medical practices.) Matching on the basis of pretest scores can produce particularly misleading results when experimentals and controls are drawn from basically different populations. Regression effects prevent valid interpretation. Regression though not intuitively obvious can be understood using a simple example. All measurements contain some component of "error", and some, such as test scores and attitude measures, contain a large amount. On any single testing, some individuals will score artificially high and others artificially low; on a subsequent testing, their scores are likely to be closer to the mean. In studies where the participants and "controls" are chosen on the basis of their extreme scores, their subsequent test scores are likely to regress toward the mean, with or without the program. At a second testing, artifacts of statistical regression may disguise actual program effects.

Another problem in selecting a comparison group involves self-selection. People (for example volunteers) who choose to enter a program are likely to be different from those who do not. The prior differences (in interest, aspiration, values, initiative) of self-selected persons make post-program comparisons between "participant" and "comparison" groups difficult.

Even in situations where randomized assignment is not feasible, it is usually better to have a nonequivalent comparison group than no controls at all. The investigator benefits if he is able to rule out some possible explanations for observed effects than not rule out any. At times it is possible to locate natural groups (physicians in solo, urban, private medical practices) to use for comparison purposes. The more similar they are in their annual volume of patients, the more

effective they will be as controls. The differences that exist between them and program participants should be measured and reported. The investigator should indicate the direction of bias stemming from non-comparability and note whether it tends to understate or overstate program effects.

After-only with Comparison Group:- The after-only design can be strengthened by adding a comparison group which is as similar to program recipients as possible. Some studies use private medical practices in the same community, patients in the same hospital, practices of physicians associated with the physicians being studied. Sometimes data for similar groups can be retrieved from national and local surveys. For example, if the program involves urban general practice it may be possible to get tabulations of data for the sub-sample of urban general practices from the U.S. National Ambulatory Care Survey. However, it is often difficult to find data that are relevant, complete, and accurate enough, and measures that are reliable and stable enough to serve the investigator's purposes.

Regardless of the devices used, the comparison group almost without exception differs from the participant group in important ways; the fact that participants selected themselves into the program is a convincing clue. Without the pretest data that are available in the "before and after with a comparison group" design, although perhaps with makeshift pretest data, it is especially difficult to disentangle the prior differences from the effects of program service. It is possible to use statistical procedures (usually analysis of covariance) to attempt to "equate" program and comparison groups. At best, such

adjusted rates only provide relative comparisons between the groups and do not show absolute or "true" differences which can be observed in experiments.

Extension of the data collection procedures is highly desirable when faced with this study design. Starting with his post-test measures of one group, the evaluator can take similar measures of new groups entering the program; the post-tests of the first group can be compared with pretests of the next group; pretests of this group can be compared with their post-tests. In this interactive fashion, more valid conclusions can be drawn. Similarly, additional measurements can be "patched on" to test whatever other rival hypotheses challenge the validity of evaluative conclusions.

Before and After:- This type of study design need not be limited only to pretest and post-test measures. Improved before-and-after study designs take a series of measures of participants as they move through the program and see how well they attain the sequential steps that have been hypothesized. Data from such studies can be supplemented by exhaustive qualitative analysis of the events of the program in an attempt to understand relationships between program services and participant progress. Although results from a single case study are not readily generalizable to other programs, they can provide insights that will help the program improve its operations.

After-Only:- In the ex post facto design, interpretation of results is most difficult of the five designs discussed here. Evaluation of how program recipients are faring after the innovation has been in operation has meaning only if there is good reason to expect what their condition

would be without service. This is not often the case. Although there may be clues from past experience from earlier research, they rarely take into account all the current contingencies. The 'after only' design can be improved with retrospective reports from participants on their status prior to the program, thus providing a pseudo-pretest measure. Retrospective self-reports are not always reliable, particularly on attitudinal measures. People often distort their reports on the past, usually in the direction of congruence with present attitudes. But on "hard" items, such as age, number of years of schooling, whether they are employed or unemployed, the responses are fairly trustworthy. The design may be supplemented with measures at various stages of the program - some just entering others part-way through, others nearing the end. Comparisons with program "graduates" on these measures can give some indications of program effectiveness. Whatever the elaboration, the design remains vulnerable to many confounding effects (history, maturation, selective dropouts, the particularities of program implementation), and the investigator has to determine how relevant such factors are likely to be.

In Tables 1 and 2, we have summarized the studies reviewed according to the type of study design, type of mid-level health professional and criterion variables used in each study.

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2. Weiss CH: Evaluation Research: Methods for Assessing Program Effectiveness. Prentice-Hall, Inc. Englewood Cliffs, New Jersey, 1972.
3. White KL, Henderson MM, ed: Epidemiology as a Fundamental Science: Its Uses in Health Services Planning, Administration and Evaluation. Oxford University Press, New York, 1976.

TABLE 1

SUMMARY OF ARTICLES BY STUDY DESIGN AND TYPE OF MID-LEVEL HEALTH
PROFESSIONAL

Design of Study	Type of Mid-Level Health Professional	Citation
Experiment	Family Practice Nurse Physician Assistant Medex	4,18,21,22,25,32,34
Before and After with a Comparison Group	Family Practice Nurse Physician Assistant Medex	30
		6,28
After-Only with a Comparison Group	Family Practice Nurse Physician Assistant Medex	7,12,14,33
		10
Before and After	Family Practice Nurse Physician Assistant Medex	1,2,5,8,13,19,31
		16
After-Only	Family Practice Nurse Physician Assistant Medex	3,9,11,14,24,29,35,36
		17,23 20,26,27

TABLE 2

SUMMARY OF ARTICLES BY TARGET VARIABLES

Criterion Variable	Type of Mid-Level Health Professional	Citation
Total Visits and Visits per Patient	Family Practice Nurse	1,2,3,4,5,7,8,11,12,13,14,19, 21,29,30,31,33,34,36
	Physician Assistant	10,16,23
	Medex	6,26,27,28
Proportion of Visit by Health Professional	Family Practice Nurse	1,2,3,5,8,9,14,15,19,21,29, 30,31,32,33,35,36
	Physician Assistant	16,23
	Medex	20,26,27,28
Change in Type of Patients	Family Practice Nurse	8,30
	Physician Assistant	
	Medex	20,28
Change in Hospital Use	Family Practice Nurse	8,12,13,18,19,31,34
	Physician Assistant	
	Medex	6
Time per Visit and Time in Office	Family Practice Nurse	1,2,5,7,8,11,13,18,19,22,24, 25,30,32,33,34,36
	Physician Assistant	10,16,17
	Medex	26,27,28
Change in Mix of Services	Family Practice Nurse	1,2,3,4,5,7,8,9,11,12,13,18, 19,22,25,29,30,31,32,33,34, 35,36
	Physician Assistant	10,17,23
	Medex	20,26,28
Physician Revenue	Family Practice Nurse	3,19,21,22,34,36
	Physician Assistant	
	Medex	27
Mid-Level Health Professional Revenue	Family Practice Nurse	5,7,11,19,21,30,31,32,34
	Physician Assistant	
	Medex	27
Costs Attributable to Mid-Level Health Professional		
	Salary	
	Overhead	
	Family Practice Nurse	2,5,7,11,22,30,32,36
	Physician Assistant	10,16,23
	Medex	27
	Family Practice Nurse	7,11
	Physician Assistant	
	Medex	27

ORIGINAL ARTICLES ON MID-LEVEL
HEALTH PROFESSIONALS

1. Royal College of General Practitioners: Reports from General Practice, no. 10, the practice nurse, London, Sept. 1968.

Study Setting

Urban
North East England

Number and Type of Health Professionals

One nurse (full-time) in partnership of five physicians (A)
One nurse (full-time) in a two physician practice (B)
One nurse (part-time) in a two physician practice (C)
One nurse (part-time) in a solo physician practice (D)

Study Design

Before and After

Duration of Study

The month of March, 1965 was the control period, following which the nurses were installed and training carried out.

In December, 1965 records kept for two weeks, then again for a four-week period in March, 1966.

Special consultation slips used to collect activities and time data.

Total Visits and Visits per Patient

Average visits by nurse per week.
Practice A - 204 (151 office, 54 home)
Practice B - 56 (23 office, 36 home)
Practice C - 32 (25 office, 8 home)
Practice D - 30 (6 office, 25 home)

Proportion of Visits by Health Professionals

Practice A
45% MD only
55% MD and nurse
Practice B
47% MD only
53% MD and nurse
Practice C
58% MD only
42% MD and nurse
Practice D
48% MD only
52% MD and nurse

1. Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

Estimates of physician time-saving, for tasks and patient load held constant, to be between 4 and 8% when nurse employed.

Change in Mix of Services

With exception of practice C, there was some tendency for the time spent on "new" consultations and visits to show a slight increase while the time for "old" consultations and visits shows a considerably larger increase.

Repeat consultations increased with the presence of the nurse.

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary - No data

Overhead - No data

2. Hodgkin K, Gillie C: Relieving the strain by work study and a practice nurse in a two doctor urban practice in Royal College of General Practitioners Council: The Practice Nurse: further development of her role in general practice and its effect on the doctor's work. London, 1968.

Study Setting

Urban
Redcar

Number and Type of Health Professionals

One nurse and two physicians in one practice.

Study Design

Before and After

Duration of Study

Work study conducted March, 1965 (control period)
April 1964, nurse introduced into practice
March, 1966 time study
March, 1968 (two weeks) time study.

Total Visits and Visits per patient

Average items of service per patient per year
Before 5.2
After 4.28 MD only
4.76 MD and nurse
Practice increase in size by about 700 patients
Before 4,528
After 5,246
Nurses had 1,700 visits in year

Proportion of Visits by Health Professional

Approximately
50% MD and nurse
50% MD only

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

Nurse worked on average of 19 hours per week.
A time saving of 7 hours and 30 minutes per physician per week, i.e. 15.7% of physician time.
If the practice size had remained static the physician time

2. Time Per Visit and Time in Office (Cont'd)

savings would have been 11 hours and 15 minutes per week or 27% of physician time.

Each physician averaged 41 3/4 hrs. of work a week in 1965 and 35 1/2 hrs. in 1968 in the office seeing patients.

Change in Mix of Services

The following changes made in practice routines of MDs and nurses after nurse in practice for one year:

repeat visits and consultations for certain trivial diseases, discontinued responsibility for repeat visit given to intelligent patients (by telephone or return visit), time between consultation or visits for chronic illness increased, patients were taught how to use thermometer sensibly. The nurse was used for primary visiting in well defined instances and in certain cases when the patient asked for the nurse and not the MD. The nurse was taught how to do certain investigations - taking cervical smears, blood tests, swabs, ECG, etc. - previously done by MDs. There was a decrease in driving time in the after period.

Physician Revenue

Physicians paid a salary

Mid-Level Health Professional Revenue

Nurse paid by the hour

Cost Attributable to Mid-Level Health Professionals

Salary -

Average salary (19 hours at 7/3d per hour) was

£ 6.317d9.

Overhead -

No data

3. Rodgers KD, Mally M, Marcus FL: A general medical practice using non physician personnel. JAMA 206: 1753, 1968.

Study Setting

Urban
Pittsburg

Number and Type of Health Professionals

Medical practice staffed by a physician, social worker,
office nurse, public health nurse.

Study Design

After only

Duration of Study

One year period observed activities of personnel.

Total Visits and Visits per Patient

8,076 visits by 2,003 persons i.e. 4.03 visits per patient per
year.

Proportion of Visits by Health Professional

MD chief responsibility for managing 55% of total patient
problems presented.

Change in Type of Patients

No data because of limitations of study design.

Change in Hospital Use

No data

Time per Visit and Time in Office

No data

Change in Mix of Services

Office Nurse was involved in:
22% physical exams given patients.
17% counseling and education services.
36% dressing and treatment services.
23% laboratory tests
32% screening tests and immunizations
1% medication dispensed/prescribed
5% other (includes besides nursing),

Physician Revenue

Total potential revenue for all services provided in year

3. Physician Revenue (Cont'd)

(physician and non-physician services) was (1) based on prevailing general practice fees \$45,075. (2) based on hospital out-patient fees \$72,663. The annual total costs of the clinic (physicians, non-physicians and overhead) was \$59,073.

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary -

No data

Overhead

No data

4. Lewis CE, Resnik BA, Schmidt G, et al: Activities, events and outcomes in ambulatory patient care. N Engl J Med 280: 645, 1969.

Study Setting

Urban
Kansas

Number and Type of Health Professionals

Two nurses working in nurse clinic.
Internists working in a general medical clinic.

Study Design

Experiment

Duration of Study

Patients randomly allocated - with stratification according to diagnosis, age, sex and race.
After one year, records of 86 patients in experimental group and 118 in control group reviewed.

Total Visits and Visits per Patient

In nurse clinic, 53 patients made 363 visits in the first 9 months of the study.

Proportion of Visits by Health Professional

Not clear

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

No data

Change in Mix of Services

The nurses spent considerably more time than the MD in the following activities:

- professional manner
- physical exam
- history
- availability
- psychological support
- psychological perception
- review of problem

4. Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

5. Schiff DW, Fraser CH, Walters HL; The pediatric nurse practitioner in the office of pediatricians in private practice. Pediatrics 44: 62, 1969.

Study Setting

Urban - Denver

Number and Type of Health Professionals

Multispecialty group practice with two pediatricians and one Pediatric Nurse Practitioner (PNP).

Study Design

Before - After

Duration of Study

Before - one year

After - one year

(Details on time studies not given)

Total Visits and Visits per Patient

PNP sees 8 children per day.

18.8% increase in visits in After period compared to total of the two MD's Before.

Proportion of Visits by Health Professional

Proportion of PNP patients who are ill varies from 9.5% to 52% (depending on time of year)

Change in Type of Patients

No data

Change in Hospital Use

No Data

Time per Visit and Time in Office

PNP 30 min./visit

MD 14 min./visit

MD more time to concentrate on significant portions of the examination.

Change in Mix of Services

More thorough work-up in routine visits

Physician Revenue

No data

5. Mid-Level Health Professional Revenue

PNP generated revenue \$1,400/month

or

\$16,800/year

Costs Attributable to Mid-Level Health Professionals

Salary -

PNP salary \$7,620/year

(37% to 46% greater than RN's in the same practice)

Overhead -

No data

6. Smith RA, Anderson MA, Okimoto JT: Increasing physician productivity and the hospitalization characteristics of practices using Medex -- a progress report. Northwest Med 70: 701, 1971.

Study Setting

Rural and Urban
(not clear)
Seattle

Number and Type of Health Professionals

9 Medex in 9 practices
9 control practices matched according to:
1) geographic location
2) size of target population
3) proximity to major referral centres.

Study Design

Before - After
with Comparison Group

Duration of Study

Before and After visits during Nov., Feb., May and Aug. of each year.

Total Visits and Visits per Patient

Practice average 30,002 visits per 4 months in Before period
vs.
4,058 visits per 4 months in After period (40% increase)
Control practices only 1% increase

Proportion of Visits by Health Professionals

No data

Change in Type of Patients

No data

Change in Hospital Use

Only reported on Medex
- MD teams and other MD's in 5 communities
- no significant difference in mean hospital stay between groups and over time.

Time per Visit and Time in Office

No data

Change in Mix of Services

No data

6. Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary -

No data

Overhead -

No data

7. Charney E, Kitzman H: The child-health nurse (pediatric nurse practitioner) in private practice -- A controlled trial. N Engl J Med 285: 1353, 1971.

Study Setting

Urban (not clear) Rochester

Number and Type of Health Professionals

4 Registered Nurses completed 4 months training at
U. of Rochester
3 pediatric practices

Study Design

After only with comparison group

Duration of Study

In September 1970 reviewed records of children born between
January and September 1969.
Alternate well-child visits assigned to nurse.

Total Visits and Visit per Patient

Well-child office visits (average)
Experimental patients
nurse 2.5
MD 3.5
MD + nurse 6.0

Control patients
MD 6.0

Difference between experimental and control in total
visits not significant statistically.

Proportion of Visits by Health Professional

Not possible to determine because of study design

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

Well-child office visits by:
Nurse: 21.0 min. per visit
MD : 12.8 min. per visit

7. Change in Mix of Services

Telephone calls
Experimental patients
 MD 26
 Nurse 92
Control patients
 MD 40

Physician Revenue

No data

Mid-Level Health Professional Revenue

2 offices charged \$5/nurse visit
Other office charged \$9/nurse visit

Costs Attributable to Mid-Level Health Professionals

Salary -

Nurse salary \$4/hr.
- usually 20 hr. week plus 10% fringe benefits
(\$4,400 per year)

Overhead -

Ranged from \$2,400 to \$3,800 per nurse per year
(authors outline office deployment of nurse versus
office and home - hospital visit deployment estimated
overhead).

8. MacGregor SW, Heasman MA, Kuensberg EV: The Evaluation of a direct nursing attachment in a north Edinburgh practice. Scottish Health Service Studies No. 18, Scottish Home and Health Department, 1971.

Study Setting

Urban
West Granton

Number and Type of Health Professionals

Two nurses
Seven physicians located in same practice (both nurses worked in the practice in the before period but not in an expanded role capacity).

Study Design

Before and After

Duration of Study

Before period of 28 days in February, March, 1968 and
After period of 28 days, November to December, 1968
when physician and nurse activities were recorded on specially designed forms.

Total Visits and Visits per Patient

Total visits over 28 days

Before and After

MD's

5867 to 5764

(-1.6%)

Nurses

1779* to 2264

(+ 27.3%)

*taken from records of the district nurse

Proportion of Visits by Health Professional

MD's and nurses shared in many visits before and after
but fraction of nurses work increased in after period

Change in Type of Patients

Increase number of visits to MD's by younger people
Nurse also increased visits with younger age groups

Change in Hospital Use

Fewer patients referred to hospital

8. Time per Visit and Time in Office

Only two MD's showed change in proportion of time taken in different activities and these were due to finding more time to do other work in the After period
Average MD time in hospital increased.

Change in Mix of Services

Change in MD Services

- 9.9% procedures requiring minimal MD input
- 14% histories taken
- 4.3% local exams
- 20.3% systemic and full exams

Changes in diagnostic tests by MD equivocal

More MD visits involving "major" listening and supportive therapy

Nurses increased: histories and examinations, technical procedures, amount of information exchanged with MD

Increase in non-chronic contacts, chronic contacts remained the same

Nurses increased ratio of visits to older people

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary -

No data

Overhead -

No data

9. Hunter AT, Clark M: The Work of Nurses in a Family Medical Center. Canadian Family Physician, July, 1971.

Study Setting

Urban
London

Number and Type of Health Professionals

Four registered nurses four physicians with each physician supervising two to three residents.
A family medical centre in a general hospital consisting of the four administrative units.

Study Design

After only

Duration of Study

Three week period assessed office and telephone activities of the nurses.

Total Visits and Visits per Patient

Data presented as procedures of nurse not visits (one visit could involve more than one procedure)

Proportion of Visits by Health Professional

Nurse was involved in 47% of the procedures carried out on 1,231 patients

Nurse was involved in 53% of the telephone calls

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

No data

Change in Mix of Services

Nurses involved with:
assisting MD while he carries out procedure
interview and history taking
telephone calls
prescription repeat, telephone calls from pharmacists
arranging appointments
telephone advice calls
telephone calls for MD intercepted by nurse

9. Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary -

No data

Overhead -

No data

10. Smith KR, Miller M, Golladay FL: An analysis of the optimal use of inputs in the production of medical services. J Human Resources 7: 208, 1972.

Study Setting

Urban and rural
Wisconsin, Vermont, and North Carolina

Number and Type of Health Professionals

2 practices each with physician assistants
10 practices as controls

Study Design

After only - with Comparison Group

Duration of Study

Yearly projections made on the basis of 2,692 visits and task
(141 tasks) analysis of 171 visits.

Total Visits and Visits per Patient

Model estimates when

1. unclassified tasks delegable
 - without PA 147 visits/week
 - with PA 265 visits/week
(46%) increase
2. unclassified tasks not delegable
 - without PA 136 visits/week
 - with PA 206 visits/week

An RN can be efficiently employed in a practice with more
than 138 visits/week

PA efficient when more than 150 visits/week.

Proportion of Visits by Health Professional

No data

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

Assumed MD 28 hrs. per week patient contact time.

If MD delegates at all times when possible, then the
MD patient contact time is reduced to 13.9 hrs/week.

10. Change in Mix of Services

141 tasks were identified in primary care and assumed PA could be involved in all of them.

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary-

Reduction in MD patient contact time by 14 hrs/week leads to an increase in non-MD personnel costs by \$196/week.

This 'cost' of MD leisure increases as tasks delegated require higher level (eg. PA) skills of non-MD personnel.

Overhead-

No data

11. Yankauer A, Tripp S, Andrews P, et al: The costs of training and the income generation potential of pediatric nurse practitioners. Pediatrics 49: 878, 1972.

Study Setting

Urban and Rural

Pediatric Nurse Practitioner Program of the Bunker Hill Health Center of the Massachusetts General Hospital.

Number and Type of Health Professionals

26 PNP's in private practices

44 PNP's in public settings

Study Design

After only

Duration of Study

Six month to 2½ year follow-up

Total Visits and Visits per Patient

Following adjusted to 38.75 hour week for PNP average (n=2)

46 office visits/week

(33 well-child)

(13 sick child)

(18.7 other visits/week)

(17.7 hospital)

(1.0 home)

Practices already oversaturated less likely to have observable affect of PNP.

Proportion of Visits by Health Professional

No data

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

When adjusted to 38.75 hour week PNP worked on average 34.2 hours per week.

Change in Mix of Services

PNP estimated 40 telephone calls per day on average

11. Physician Revenue

No data

Mid-Level Health Professional Revenue

When assume shared visits are charged the same as MD alone,
the average potential increase in gross income is \$19,400
per year.

Difference between salary and adjusted (see overhead column)
income averaged \$2,500 per year

Costs Attributable to Mid-Level Health Professionals

Salary -

Average PNP salary in private practice was \$9,100
per year

Overhead -

Assumed 40% overhead costs of PNP based on other studies
of office practice (i.e. 40% of \$19,400 = \$11,600)

12. Chappell JA, Drogos PA: Evaluation of infant health care by a nurse practitioner. Pediatrics 49: 871, 1973

Study Setting

Urban
Pittsburg

Number and Type of Health Professionals

Pediatric Nurse Practitioner (PNP)
Three pediatricians in a separate private group practice

Study Design

After only with comparison group

Duration of Study

All 110 infants born over a two year period
Charts were reviewed for the first year's health experience
After initial study 3 month review of frequency and reasons NP requested consultation
100 randomly selected infants from group practice served as controls

Total Visits and Visits per Patient

Mean number in first year of life of well baby
PNP 5.8
MDs 8.4
Sick visits
PNP 3.3
MDs 1.3

Proportion of Visits by Health Professional

No data due to limitations of study design

Change in Type of Patients

No data

Change in Hospital Use

Mean days in first year of life of hospitalization
PNP 1.0
MDs 0.8

Time per Visit and Time in Office

No data due to limitations of study design

12. Change in Mix of Services

In order for PNP to function effectively, even if her practice is limited to "well" children, she must be prepared to identify and manage certain problems beyond routine physical appraisal, immunization, and counselling.

Examples of PNP services

- Well child visit
- Weight measurement
- Length measurement
- Head measurement
- DPT
- Oral polio
- Rubella
- Hemoglobin
- Tuberculin Skin Test
- Urinalysis
- Denver Developmental Scale

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

13. Lees REM: Physician time-saving by employment of expanded-role nurses in family practice. Can Med Assoc J 108: 871, 1973.

Study Setting

Urban
Kingston

Number and Type of Health Professionals

5 Physicians
4 Nurses
(2 M.D.'s shared one nurse)
Nurses received 30 hours instruction and preceptorship
at Queen's University

Study Design

Before and After

Duration of Study

Ten days observation period over a ten week period
Observation periods were one year apart.

Total Visits and Visits per Patient

In only two practices were the changes large enough to
attribute to the nurse
In these practices there was over a 5% increase in
visits at the same time reducing M.D. time in the
office by 23%.

Proportion of Visits by Health Professional

No data

Change in Type of Patients

No data

Change in Hospital Use

Two M.D.'s terminated all hospital in-patient and
emergency department visits after arrival of nurse.

Time per Visit and Time in Office

Average M.D. time per visit was 6.7 min.
In After period average time for all professional
personnel was 10.1 min. per visit
All the M.D.'s reduced their time per visit but only
3 reduced the total time in office
One M.D. maintained time in office but increased visits
M.D. total time in office reduced from 1 hr. 4 min. to
9 hr. 3 min. per week

13. Change in Mix of Services

No change in phone calls handled by nurse and M.D.
No change in laboratory investigations

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary
No data
Overhead
No data

14. Coulehan JL, Sheedy S: The Role, Training and One-Year's Experience of a Medical Nurse Practitioner. Health Serv Rep 88: 827-833, 1973.

Study Setting

Urban
Pittsburg

Number and Type of Health Professionals

1 Medical Nurse Practitioner (MNP)
Located in a health center of M.D.'s, social workers
and Community Health workers

Study Design

After only

Duration of Study

One year of observation
Assessed charts of first 100 patients who had "normal"
health assessments and information of subsequent use of
health center by this cohort

Total Visits and Visits per Patient

M.D. and MNP managed 3,094 visits of patients aged 15
and over in one year

Proportion of Visits by Health Professional

MNP "handled" 40% of all patient contacts
During final quarter of study year the MNP consulted
the physician on 27% of the visits handled by the MNP

Change in Type of Patients

Not possible to determine because of study design

Change in Hospital Use

Not possible to determine because of study design

Time per Visit and Time in Office

No data

Change in Mix of Services

No data

Physician Revenue

No data

14. Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

15. Schlesinger ER, Lowery WD, Glaser DB, et al: A controlled test of the use of registered nurses for prenatal care. Health Serv Rep 88: 400, 1973,

Study Setting

Urban
Pittsburg

Number and Type of Health Professionals

Three nurses located in a hospital out-patient obstetrical clinic

Study Design

After only with comparison group

Duration of Study

Study and control group matched by age, gravidity, marital status, and race
246 women in study group
84 women in control group (seen by obstetricians)
Study duration not clear

Total Visits and Visits per Patient

No data presented in terms of visits per given time period or patients seen over given time period

Proportion of Visits by Health Professional

In about 1,800 clinic visits of pregnant women, nurse examiners requested 277 consultations

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

No data

Change in Mix of Services

No data

Physician Revenue

No data

15. Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

16. Pondy LR, Jones JM, Braun JA: Utilization and productivity of the Duke physician's Associate. Socio-Econ Plan Sci 7: 327, 1973.

Study Setting

Urban and Rural
Vermont and North Carolina

Number and Type of Health Professionals

9 practice sites all employing at least one physician, one nurse and one physician assistant (two of the practices employed two physician assistants)
Four small town practices (solo and 2 physician practices)
Five institutional sites - fee-for-service, prepaid group, prison clinic, industrial clinic, and two medical wards in VA hospital.

Study Design

Before and After (in four practices)
After only (in eleven practices)

Duration of Study

Collected data on all patient contacts during 2 week period
Task analysis questionnaire to physicians and physician assistants

Total Visits and Visit per Patient

Patient contacts per week
Pre P.A. (4 practices) range 68-219
Post P.A. MD + PA (5 practices) range 42-120
Entire practice (9 practices) range 103-258
Contacts = Visits?

Increase in patient contacts fell well below 30-50% increase originally predicted.

Proportion of Visits by Health Professional

MD + PA
range 14-98%
PA alone
2-86%

Change in Type of Patients

No data

16. Change in Hospital Use

No data

Time per Visit and Time in Office

Patient contact time per week MD (5 practices range
17.9 - 32.7 hours)

PA (9 practices range 6.8-36.2 hours)

Authors suspect this data unreliable

Change in Mix of Services

No data

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

\$14,000 average starting salary of PA's in 1971
with promise of \$18,000 in 1 year

Overhead

No data

17. Scheffler RM, Stinson OD: Characteristics of Physicians' Assistants: A Focus on Specialty. Med Care 12: 1019, 1974.

Study Setting

Urban and rural
18 training programs

Number and Type of Health Professionals

151 Physician Assistants

Study Design

After only

Duration of Study

Questionnaire survey of 55% (151) graduates of 18 training programs in the U.S. in March and April, 1972.

Total Visits and Visits per Patient

No data

Proportion of Visits by Health Professional

No data

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visits and Time in Office

Of the 59 PA's working in general practice, time in the following tasks on an average day was

27% Directly supervised by MD
45% Indirect surveillance by MD
10% Technical or Laboratory
4% Clerical or Secretarial
12% Administrative or Supervisory
5% Teaching in a Health Profession
3% Other

17. Change in Mix of Services

PA's were employed in with MD's from the following specialties

General Medicine	59
Anesthesiology	5
Cardiology	8
Ophthalmology	22
Orthopedics	15
Pediatrics	6
Radiology	3
General Surgery	16
Urology	6

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

18. Flynn BC: The Effectiveness of Nurse Clinicians' Service Delivery. Am J Public Health 64: 604, 1974.

Study Setting

Urban (name of town withheld)

Number and Type of Health Professionals

Nurse clinicians (number not given)

Physicians (number not given)

Located in a hospital medical clinic, a neighbourhood health centre, and three private group practices.

Study Design

Experiment

Duration of Study

Two-thirds of 60 patients in the hospital clinic referred to the NC's comprise the experimental patients and the remainder were sent back to the MD's and called control patients.

Another comparison group all patients seen by MD's at the hospital clinic between April 5-9, 1971 and May 3-7, 1971.

Total Visits and Visits per Patient

No data

Proportion of Visits by Health Professional

No data due to study design

Change in Type of Patients

No data

Change in Hospital Use

24% experimental patients and 11% of controls hospitalized during the study

Time per Visit and Time in Office

NC's approximately 1 hr. per visit versus MD's approximately 40 min. per visit

Change in Mix of Services

NC's ordered more electrocardiogram studies, bacteriology studies, urinalysis studies and minor x-rays than MD's caring for controls.

18. Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

19. Merenstein JH, Wolfe H, Barker KM: The use of Nurse Practitioners in a general practice. Med Care 12: 445, 1974.

Study Setting

Urban
Pittsburg

Number and Type of Health Professionals

3 nurse practitioners
2 physicians, all working in same office

Study Design

Before and After

Duration of Study

Work sampling one week of December 1969 and again in December 1970

Six randomly selected days in October, November, and December, both 1969 and 1970 on practice characteristics.

Total Visits and Visits per Patient

Shared M.D. and NP Visits

Before: 793 visits per 18 days
After: 906 visits per 18 days

Proportion of Visits by Health Professional

NP involvement

Before: 10.9% of 793 office visits
After: 28.9% of 906 office visits

Change in Type of Patients

No data

Change in Hospital Use

No significant change occurred in hospitalization rate or number of patients requiring follow-up after NP's assumed responsibility for patient care.

Time per Visit and Time in Office

The 3 NP's together worked the equivalent of 60 to 70 hours per week.

19. Change in Mix of Services

NP's spent less time doing administrative, clerical and preparatory tasks in new role in After period,

NP's more time on patient care, inter-office communications and telephone advice

NP's shifted to the major providers of pediatric care

Physician Revenue

Before/After

Average cost per individual visit

Pediatric visits

\$7.18 to \$7.42 (+ 3.3%)

Patients over 20

\$7.66 to \$9.61 (+ 25.4%)

Mid-Level Health Professional Revenue

Patients were charged 50% of M.D. fee-for-services provided by NP (75% following study)

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

20. Jacobs AR, Johnson KG, Breer P, Nelson EC; Comparison of Tasks and Activities in Physician-Medex Practices. Public Health Rep 89: 339, 1974

Study Setting

Urban and rural Dartmouth

Number and Type of Health Professionals

22 Medex
12 Physicians

Study Design

After only

Duration of Study

Activity logs for 14 consecutive days in each of five collection periods

Total Visits and Visits per Patient

No data

Proportion of Visits by Health Professional

1464 M.D. alone
588 Medex alone
566 Shared by M.D. and Medex
504 Other providers, nurses, medical assistants
(with M.D.?)

Change in Type of Patients

Medex patients young mostly
M.D. patients old mostly

Change in Hospital Use

No data

Time per Visit and Time in Office

No data

Change in Mix of Services

Medex more involved in patient exams and less involved in patient instruction, treatment, planning, and administration tasks than M.D.

20. Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

21. Spitzer WO, Sackett DL, Sibley JC, et al: The Burlington Randomized Trial of the Nurse Practitioner. N Engl J Med 290: 251, 1974.

Study Setting

Urban
Burlington

Number and Type of Health Professionals

2 nurse practitioners
2 physicians

Study Design

Before - After Experimental Study

Duration of Study

Time and motion - one week of practice Before and After
Daybook Activities 8 weeks, then one experimental year
Patients randomized 2:1 ratio to NP

Total Visits and Visits per Patient

22% increase in families (this would have increased M.D. income by 9%)

One year follow-up 41% increase in families (now "saturation" plateau)

Proportion of Visits by Health Professional

M.D. involved in 86% of Randomized M.D. patients
M.D. involved in 33% of Randomized NP patients

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

No data

Change in Mix of Services

No data

21. Physician Revenue

5% drop in gross revenue in first year

Loss in net revenue of \$12,000 (due to no payment to NP for unsupervised services)

Mid-Level Health Professional Revenue

Potential gross revenue generated by NP work \$16,000.

50% of these services provided by NP alone.

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

22. Spitzer WO, Hackett BC, Russell WAM: Changes in income with nurse practitioner. Ontario Medical Review: 269, 1974.

Spitzer WO, Kergin OJ, Yoshida MA, et al: Nurse practitioners in primary care. III. The Southern Ontario Randomized Trial. Can Med Assoc J 108: 1005, 1973.

Study Setting

Urban Ontario

Number and Type of Health Professionals

6 practices with nurse practitioners
4 practices as controls

Study Design

Experimental
Randomly allocated nurse practitioner to practice
Before and After
Observation of financial data

Duration of Study

Fiscal year 1970 and fiscal year 1972 (NP began in each experimental practice in 1971)

Total Visits and Visits per Patient

No data

Proportion of Visits by Health Professional

No data

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

Compared with conventional nurses, NP's spend about 50% more time in clinical activities and 50% less time in clerical and housekeeping duties.

22. Change in Mix of Services

The following tasks were more inter-changeable between NP and M.D. in the experimental practices:

- "procedures"
- "patient assessment"
- "clinical judgement"
- "health maintenance"

Physician Revenue

Before/After Average Gross Revenue

Experimental

\$68,764 to \$67,767 (-1.45%)

Control

\$67,174 to \$78,909 (+17.47%)

Before/After Average Net Revenue

Experimental

\$38,975 to \$37,146 (-4.7%)

Control

\$36,531 to \$39,285 (+7.54)

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

Before/After Average Salaries of Nurses

Experimental

\$6,185 to 8,044 (+30.06%)

Control

\$6,208 to 6,618 (+6.60%)

Overhead

No data

23. Lairson PD, Record JC, James JC: Physician Assistants at Kaiser: Distinctive patterns of practice. Inquiry II; 207, 1974.

Study Setting

Urban
Washington and Oregon

Number and Type of Health Professionals

One physician assistant.
Six physicians (internists)

Study Design

After only

Duration of Study

5% sample of all visits over a 10 month period

Total Visits and Visits per Patient

PA 32.2 visits per day
M.D. 22.1 visits per day

Proportion of Visits by Health Professional

PA consults M.D. on approximately one visit out of 5

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

No data

Change in Mix of Services

PA more acute medical and fewer preventive services than M.D.'s.
PA less frequent use of laboratory and more frequent use of radiology.
PA saw proportionately more younger patients.

Physician Revenue

No data

23. Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

PA salary \$13,000 per year plus \$2,288 fringe benefits and \$250 education allowance per year

Overhead

No data

24. Reid RA: A Work Sampling Study of Mid-Level Health Professionals in a Rural Medical Clinic, Med Care 13: 241, 1975.

Study Setting

Rural
New Mexico

Number and Type of Health Professionals

One family nurse practitioner

Alone in a rural clinic with a laboratory aid and a clerk-receptionist

Study Design

After only

Duration of Study

Ten randomly selected days in a two-month period

Work study 10 observations of each clinic member's activities were made per hour

The procedure produced 800 observations for each clinic member.

Total Visits and Visits per Patient

No data

Proportion of Visits by Health Professional

No data

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

FPN 33% of her time in direct patient care activities and almost $\frac{1}{2}$ day devoted to indirect (record keeping, telephone, talking to staff) and MDs (professional communications) patient care tasks

Change in Mix of Services

No data

24. Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

25. Hoekelman RA: What constitutes adequate well-baby care?
Pediatrics 55: 313, 1975.

Study Setting

Urban
Rochester

Number and Type of Health Professionals

Three pediatric nurse practitioners (two in a clinic
and one in a private practice)

Four physicians (two in the clinic and two in the
private practice)

Study Design

Experiment

Duration of Study

246 full-term, first-born, well infants randomly
assigned to receive well-baby care during their first
year in one of four ways:

6 visits by an MD
3 visits by an MD
6 visits by an NP
3 visits by a PNP

116 babies received care in a clinic setting and 130
in a private practice setting.

Total Visits and Visits per Patient

No data on annual basis due to study design

Proportion of Visits by Health Professional

No data due to study design

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

PNP visits longer in both study settings than MD visits
(27.7 to 32.9 minutes per visit versus 14.3 to 22.3
minutes per visit)

PNP's talked longer on telephone than MD (4.8 to 7.7
minutes per call versus 3.0 to 5.3 visits per call)

25, Change in Mix of Services

The mothers in the PNP groups made more calls (mean 6,2 to 9,9 versus 3,3 to 5,3 in MD group)

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

26. Sells CJ, Herdener RS: Medex: A time-motion study, Pediatrics 56: 255, 1975.

Study Setting

Rural
State of Washington

Number and Type of Health Professionals

6 Medex in separate practices

Study Design

After only

Duration of Study

Time study conducted during 3 days in the summer of 1973

Total Visits and Visits per Patient

Medex 19 visits per day (8 pediatric and 11 adult office visits per day)

Proportion of Visits by Health Professional

Medex 38% visits

M.D. 52% visits

Shared Medex and M.D. 2% of the visits
(no explanation why total 102%)

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

Medex 30% of time spent in patient contact

Change in Mix of Services

25 to 100% of pediatric patients seen by Medex

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

26. Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

27. Nelson EC, Jacobs AR, Cordner K, et al: Financial impact of physician assistants on medical practice. N Engl J Med 293: 527, 1975.

Study Setting

Mostly rural
12,000 to 30,000 population
Hanover

Number and Type of Health Professionals

12 Medex
5 Solo Physicians
4 Partnerships
3 Groups

Study Design

After only

Duration of Study

Daily logs for four weeks in Spring 1974
After Medex in practice for one or more years.

Total Visits and Visits per Patient

Medex averaged 14.8 visits per day (8.6 solo and 6.2 shared)

Proportion of Visits by Health Professionals

On the average 58% of Medex visits provided by Medex alone
Remaining 42% shared with M.D.

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

Visits by Medex alone average 15 min/visit
Visits shared by M.D. and Medex average 26 min/visit

Change in Mix of Services

No data

27. Physician Revenue

Estimated annual profitability of Medex:

revenues generated by 10 Medex exceeded expenses by more than \$2,000 per year whereas two fell somewhat below the breakeven point.

Mid-Level Health Professional Revenue

Estimated average generated revenue of Medex (shared and solo) per year \$28,190 (when shared portion based on time)

\$30,210 (when shared portion based on major provider)

Costs Attributable to Mid-Level Health Professionals

Salary

Average Medex salary \$10,000

Overhead

Estimated average Medex overhead (based on revenue)
\$10,000

Estimated average Medex overhead (based on salary)
\$5,800

28. Nelson EC, Jacobs AR, Breer PE, et al: Impact of physician's assistants on patient visits in ambulatory care practices, Ann Intern Med 82: 608, 1975

Study Setting

Urban (not clear)
Dartmouth

Number and Type of Health Professionals

11 Medex practices
9 control practices

Study Design

Before - After with comparison group

Duration of Study

January, April, July and October of each year between 1969 and 1972.

Total Visits and Visits per Patient

Average number of visits per day in practice:

21.6 (before)
22.3 (one year later)
27.1 (2 3/4 years later)
i.e. 12% increase after 1st year and 37% increase
2 3/4 years later

Practices with largest number of visits showed smallest increase in visits after introduction of Medex

Proportion of Visits by Health Professional

Medex by himself provided care in 28% of the visits, and in company with the M.D. in another 10%

Change in Type of Patients

Sex, age, and problem type of visits of patients did not differ between before and after

Significant increase in patients with appointments (as opposed to walk-ins) in after period

Change in Hospital Use

No data

Time per Visit and Time in Office

No consistent changes across practices were noted in patient waiting time or time physicians spend with patients

28. Change in Mix of Services

Increase in scheduled visits which lead to increase
in M.D.'s control over patient flow in the practice

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

29. Voltmann, JD: Jamestown medical clinic system. JAMA 234: 303, 1975.

Study Setting

Rural
Appalachia

Number and Type of Health Professionals

6 nurse practitioners in one medical clinic.
All under supervision of one physician at any given time

Study Design

After only

Duration of Study

After NP's in clinic for two years observed clinic for one year

Total Visits and Visits per Patient

NP's and MD together provided 20,266 services to 4,875 patients over one year (about 4.2 services per patient per year)

80 visits per day increase from previous time from 300 to 400% (taken from abstract of paper)

Proportion of Visits by Health Professional

MD able to shift from 50% to 75% of his usual tasks to the NP

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

No data

Change in Mix of Services

After a maximum of two clinic visits, each patient is required to undergo a multi-phasic screening exam at the hospital

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

29. Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

30. Draye MA, Stetson LA: The nurse practitioner as an economic reality. Medical Group Management 22: 24, 1975.

Study Setting

Urban

Number and Type of Health Professionals

One family nurse practitioner

Group practice of 27 physicians with one assigned to the FNP

Study Design

Before and After with comparison group

Duration of Study

200 patients sent questionnaire 4 months and 7 months after attachment of the FNP

Examined FNP and MD clinic encounter forms during first 10.5 months of the FNP attachment

Total Visits and Visits per Patient

Over 10.5 months

FNP 2,962 diagnoses

MD 6,486 diagnoses

Total Medical Department 29,263 diagnoses

Diagnoses = Visits

MD's diagnoses increased by 4% from previous year

Total Medical Department diagnoses increased by 6% from previous year

Proportion of Visits by Health Professional

FNP 31%

MD 69%

Change in Type of Patients

FNP 74% females

MD 65% females

Pediatric Patients seen by Pediatrician

Change in Hospital Use

No data

Time per Visit and Time in Office

FNP averages 32 hours per week in the office

30. Change in Mix of Services

FPN provides care to patients with acute and chronic health problems, patients requiring annual exams and general physicals.

Most frequently seen diagnoses (top 35) FNP upper respiratory tract infections are number one vs number two for MD and number 29 for whole department.

Physician Revenue

No data

Mid-Level Health Professional Revenue

Over 10.5 month period \$28,000

Costs Attributable to Mid-Level Health Professionals

Salary

\$10,085 (determined by number of hours worked)

Overhead

No data but mentioned professional liability coverage and fringe benefits as overhead expenses.

31. Spitzer WO, Roberts RS, Delmore T: Nurse practitioners in primary care. VI. Assessment of their deployment with the utilization and Financial Index. Can Med Assoc J 114: 1103, 1976.

Study Setting

Urban and rural
Burlington and Smithville

Number and Type of Health Professionals

Burlington
2 nurse practitioners
2 physicians

Smithville
1 nurse practitioner
1 physician

Study Design

Before and After

Duration of Study

Burlington
817 patients interviewed once Before and one year After

Smithville
1130 patients interviewed once Before and once 2 years After

Daysheet journals kept in each practice of MD and NP activities for two years of NP attachment.

Total Visits and Visits per Patient

Burlington:

After 1 year, 4300 patients
9% increase in visits
22% increase in families under care

After 2 years, 6100 patients
24% increase in visits
41% increase in families under care

Smithville:

After 1 year, 7700 visits
After 2 years, 9725 (4.9 visits per person)

31. Proportion of Visits by Health Professional

Burlington:

Almost 50% of NP visits in first year unsupervised

Smithville:

NP provided care on 1475 additional services in the last six months of the second year of attachment for which MD and NP did not receive reimbursement.

Change in Type of Patients

No data

Change in Hospital Use

Burlington:

Hospital Days Before (May-June 1971) 592

After (May-June 1972) 444 (decrease of 22%)

Admissions decreased from 92 to 79 and average duration of stay decreased from 6.2 to 5.6 days

Smithville:

After only average stay 6.8 days vs. Ontario provincial average 9.1

Time per Visit and Time in Office

No data

Change in Mix of Services

In spite of large increases in use of ambulatory services by practice populations served by MD-NP teams, the ultimate effect has been a substantial reduction in total use of health services (based on household survey data)

Physician Revenue

No data

Mid-Level Health Professional Revenue

Burlington potential value of NP visits in 1st year
\$16,000

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

32. Garfield SR, Collen MF, Feldman R, et al: Evaluation of an ambulatory medical care delivery system. N Engl J Med 294: 426, 1976.

Study Setting

Urban
Oakland

Number and Type of Health Professionals

Nine nurse practitioners trained to strictly follow physician-prepared protocols

Physicians (number not recorded)

Study Design

Experiment after establishing eligibility criteria for comprehensive work-up, patients randomly assigned to "health testing service" (NP's and multiphasic testing) or traditional system.

Duration of Study

After 12 months of the experiment had passed, made a retrospective review of a random sample of 4,369 patients

Total Visits and Visits per Patient

No data

Proportion of Visits by Health Professional

Patients receiving prepaid health care and constituting the "uncertainty demand" (well, worried well, and asymptomatic sick) totaled 72.3 percent; these patients are most appropriately handled by entry through the health evaluation service (NP).

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

Saving for entry work-up in the well group was 0.52 physician hours, for the worried well 0.52 hours, the asymptomatic sick 0.59 hours and in the sick group 0.43 physician hours

An average saving of about 70 percent in physician time for entry work-up in the new compared to the traditional system.

32. Change in Mix of Services

The health evaluation triage referred only 26.1 percent of the entrants to traditional physician services; the remaining 73.9 percent were referred to the health-care (55.4 percent) and preventive-maintenance (18.5 percent) paramedical services.

Physician Revenue

Physicians paid a salary

Mid-Level Health Professional Revenue

Saving in the entry work-up in the well group was \$29.03 in cost per patient, for the worried well \$29.37 per patient, for the asymptomatic sick \$36.98 and for the sick group \$24.79 per patient.

Costs Attributable to Mid-Level Health Professionals

Salary

\$8,220 for physical examinations by NP in the entry work-up per standard 1000 entrants (plus \$17,460 for automated multi-phasic health testing)

Overhead

No data

33. Holmes G, Livingston G, Mills E: Contribution of a nurse clinician to office practice productivity: Comparison of two solo primary care practices. Health Serv Res: 21, 1976.

Study Setting

Urban
Kansas

Number and Type of Health Professionals

Practice I
Physician and Nurse

Practice II
Physician, nurse and nurse clinician (NC)

Study Design

After only with comparison group
Comparison practice matched according to demographic,
socio-economic and racial characteristics of patients.

Duration of Study

Activity data collected in each practice on 12
consecutive work-days

Total Visits and Visits per Patient

Estimates based on 8 hour work-day and 240 work-days
per year.

9,192 visits per year

Practice II was 12% more productive than Practice I

Proportion of Visits by Health Professional

M.D. 56% (6,768)

NC 15% (1,848)

Shared 28% (3,432)

MD and NC managed 31% more visits a day than M.D. in
Practice I (a difference of 2,856 visits) based on
8 hrs. a day and 240 days per year.

Change in Type of Patients

No data

Change in Hospital Use

No data

33. Time per Visit and Time in Office

NC visits alone 10 min/visit vs. nurse visits alone
2.8 min/visit

On average NC invested about 2½ min. more in a visit
than M.D. I and almost 5 min. more than MD II

Change in Mix of Services

NC performed some tasks M.D. would normally have performed
during visits they managed jointly

Nurse spent most of her time performing procedures, whereas
NC invested only small percentage of her time in procedures
and much more in history-taking, examination of patient,
special tests, charting, and education and counselling.

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

34. Burnip R, Erickson R, Barr GD, et al: Well-child care by pediatric nurse practitioners in a large group practice. Am J Dis Child 130: 51, 1976.

Study Setting

Urban
San Francisco and Oakland

Number and Type of Health Professionals

6 pediatric nurse practitioners
Attached to two medical centers.

Study Design

Experimental - Randomly allocated newborns and mothers to PNP for well-child care

Duration of Study

While all patients entered study at birth, periods of participation varied from a few months to more than a year (average 0.92 years)

Total Visits and Visits per Patient

San Francisco
PNP appointment visit
6.4 median yearly rate
M.D. appointment visit
5.6 median yearly rate

Oakland
PNP 5.0 median yearly rate
M.D. 4.8 median yearly rate

Concluded PNP's more accessible

Proportion of Visits by Health Professionals

Not possible to determine because of study design

Change in Type of Patients

Not possible to determine because of study design

Change in Hospital Use

M.D. patients in Oakland only had more hospital admissions than PNP patients

Time per Visit and Time in Office

Scheduled M.D. visits for 15 to 30 min.
Scheduled all PNP visits for 30 min.

34. Change in Mix of Services

PNP prescribed significantly more vitamins than M.D.

Follow-up exams similar for PNP and M.D.

More tests ordered by PNP in San Francisco

Physician Revenue

M.D. Patients

Median yearly costs of visits:

San Francisco - \$24/year

Oakland - \$25/year

Mid-Level Health Professional Revenue

PNP Patients

Median yearly costs of visits:

San Francisco - \$20/year (This was 83% of the M.D.
patient group cost)

Oakland - \$16/year (This was 64% of the M.D.
patient group cost)

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

35. Levine DM, Morlock LL, Mushlin AI, et al: The role of new health practitioners in a prepaid group practice: provider differences in process and outcomes of medical care. Med Care 14: 326, 1976.

Study Setting

Urban
Columbia

Number and Type of Health Professionals

12 Health Associates (most nurse practitioners with some physician assistants)
10 physicians NPs and MDs located in one clinic.

Study Design

After only

Duration of Study

After first five years of NP attachment administered

- (1) visit questionnaire (two weeks)
- (2) provider forms (two weeks)
- (3) telephone follow-up (1 week after visit)
- (4) mailed follow-up (one month after follow-up)

Total Visits and Visits per Patient

No data due to limitations of study design

Proportion of Visits by Health Professional

After five years first contact

38% MD
72% NP

NPs delivered 56% of problem oriented care in adult medicine and 28% of problem care in pediatrics

Overall 68% of visits with NPs did not involve MP in any way

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

No data

35. Change in Mix of Services

NPs increasingly involved treatment of acute conditions and injuries where MD maintained role in treatment of chronic conditions

Degree of NP autonomy varied by type of task performed, category of problem treated and specialty.

Physician Revenue

No data

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

No data

Overhead

No data

36. Scherer, K, Fortin F, Spitzer WO, et al: Nurse practitioners in primary care VII. A cohort study of 99 nurses and 79 associated physicians. Can Med Assoc J 116: 856, 1977.

Study Setting

Urban and rural Ontario

Number and Type of Health Professionals

99 nurse practitioners
79 physicians

Study Design

After only

Duration of Study

Follow-up questionnaire

Total Visits and Visits per Patient

Model caseload of physicians within range 1000 to 1999 families

NP's on average 50 visits per week

Average increase in practice size of 14%

Proportion of Visits by Health Professional

NP's referred approximately 15 visits per week to M.D.

Change in Type of Patients

No data

Change in Hospital Use

No data

Time per Visit and Time in Office

NP average hours worked per week:

Before: 37.8

After: 37.2

M.D. supervision of NP's on average 8 hours per week

Change in Mix of Services

NP's time invested in patient care activities increased 105%;
time devoted to clerical and housekeeping duties decreased 42%

Changes in roles for both categories of co-practitioners were marked

36. Physician Revenue

Gross income increase 2% (ranged from -34% to +34%)

Net income decreased 5% (ranged from -99% to +125%)

Mid-Level Health Professional Revenue

No data

Costs Attributable to Mid-Level Health Professionals

Salary

Salary before program \$6,962.00

NP's salary in 1975 \$10,969.85 per year

Overhead

No data

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7. Charney E, Kitzman H: The child-health nurse (pediatric nurse practitioner) in private practice -- A controlled trial. N Engl J Med 285: 1353, 1971.
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35. Levine DM, Morlock LL, Mushlin AI, et al: The role of new health practitioners in a prepaid group practice: provider differences in process and outcomes of medical care. *Med Care* 14: 326, 1976.
36. Scherer K, Fortin F, Spitzer WO, et al: Nurse practitioners in primary care VII. A cohort study of 99 nurses and 79 associated physicians. *Can Med Assoc J* 116: 856, 1977.

Appendix C
Collection and Linkage of Family Practice
Nurse Daybook Data With Medical Care Plan Data

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COLLECTION AND LINKAGE OF FAMILY PRACTICE
NURSE DAYBOOK DATA WITH MEDICAL CARE PLAN DATA

I. Introduction

Each of the six physicians in the project was contacted to inquire about (1) their methods of processing Medical Care Plan claim forms in their practice, and (2) possible methods of collecting information for those patient encounters where the family practice nurse was involved. The physician was informed that we did not wish to impose any system of information gathering upon the practice which would be perceived by the physician or his office staff as disruptive to the routines established in the practice. These discussions with the physicians and their staff revealed that the established routines for processing Medical Care Plan forms varied considerably from practice to practice. For example, one physician completed the forms himself, some physicians never saw the forms, in some practices more than one member of the office staff was involved in completing the forms, sometimes in an area of the office cut off from the flow of patients and in still other offices the forms were completed several hours after the patient encounter itself had occurred. In addition, the completion of Medical Care Plan claim forms was usually considered a thankless and tedious job which could not be overburdened any more. Tampering with this important income generating activity for the physician would be risky at best.

After these discussions, it became abundantly clear that the Medical Care Plan claim forms could not be used in the practices to record additional information regarding family practice nurse-patient

encounters. In short, a decision was made to design an information gathering system regarding the family practice nurse patient encounters which was not dependent on the continual cooperation and efforts of the physician and/or his office staff. A separate system from the Medical Care Plan claim form system was designed to obtain family practice nurse-patient encounter information applicable to all six nurses over the one year experimental period. If sufficient identification information were recorded for each family practice nurse-patient encounter, it would be possible to link this data to the Medical Care Plan claim form data during the experimental period at a later date using the Medical Care Plan claims payment computer file. The Medical Care Plan claims processing system (physician information only) now will be described and this will be followed by a description of the methods used to gather family practice nurse-patient encounters.

II. Description of Medical Care Plan Claims Processing

Medical Care Plan claims (physician encounter forms) used in the study were also the source document for the operation of the fee-for-service physician payment system of the Medical Care Plan. Claims were prepared at the physician's office, in duplicate, at the time of the physician patient encounter. The original claim was submitted by the physician to the Medical Care Plan for payment while the duplicate was retained by the physician. Information on each claim includes: the patient's name, patient Medical Care Plan number, date of service, location of service, procedure performed and appropriate fee. (See Medical Care Plan Payment Schedule (Chapter IV reference list) for further details.)

The Medical Care Plan Claims Processing System subjected each claim to an extensive edit and assessment procedure. Claims which satisfied all criteria were retained on the Month Payment Computer file and eventually used to generate physicians' payments. Claims which violated edit and assessment criteria were returned to the physician's office for correction. In this way, physicians determined whether all claims originally submitted were accounted for.

A series of Month Payment computer files, thus verified, served as the base from which claims data were extracted for the study.

Worthy of note is the fact that this same Month Payments file serves as a base for most of the statistical reports generated by the Medical Care Plan and reports to Health and Welfare Canada.

The feasibility of this study was enhanced by the fact that the Medical Care Plan system is based upon individual patient registration. In many other provinces in Canada, family registration prevails and the ability to accurately associate services with individual patients is difficult, if not impossible. The Newfoundland system uses a patient identity number which contains the patient's date of birth and sex. These characteristics of the MCP system have enabled this study to employ statistical summaries of individual patients and services per patient for different age and sex categories of patients.

III. Description of Family Practice Nurse Daybook Processing

Each of the family practice nurses was asked to complete a specially designed encounter form called the Family Practice Nurse

Daybook (see Appendix C). This was done with no reference to the Medical Care Plan physician's claim forms. Each Family Practice Nurse Daybook had up to 51 pages with each page to be used for a new family practice nurse-patient encounter. On each page in the daybook, space was provided for the family practice nurse to record: patient's name, patient Medical Care Plan number, date of service, page number, location of service, presenting complaints, diagnosis, actions taken, prescription given, referral and additional comments.

Encounters shared by the physician and family practice nurse or involving the family practice nurse alone were differentiated on the Family Practice Nurse Daybook. If the encounter involved both physician and family practice nurse, the family practice nurse was asked to complete only 'the top line' of the daybook: patient name, patient Medical Care Plan number, date of service, page number, and location of service. If the encounter involved only the family practice nurse, she was asked to complete the whole page of the daybook. After the third week in November 1975 each family practice nurse was asked to indicate on the top line also whether she had a major or minor involvement during patient encounters shared with the physician. The determination of 'major' or 'minor' involvement was left to the family practice nurse to decide. All six family practice nurses discussed this method of coding in November 1975 during a meeting where the family practice nurses all agreed upon this definition of a shared encounter. It was agreed that a major or minor did not refer to the severity of the patient's illness. After December 1, when the research assistant visited the family practice nurse to monitor and collect the daybooks, the major and minor codes were discussed in order to identify and

resolve possible misunderstanding of the family practice nurse regarding appropriate use of these involvement codes.

(i) Collection of Family Practice Nurse Daybooks

During the study period, a research assistant kept in constant contact with the six family practice nurses. Completed daybooks were gathered and new daybooks were provided whenever the practice was visited. Each of the daybooks were reviewed at this time to determine if the family practice nurse had failed to complete any portion of the daybook. Some daybooks were left with the family practice nurse until she was able to complete them properly. Quite frequently, the Medical Care Plan numbers of newborn babies were not immediately available in the practice. These numbers were obtained later by the research assistant returning to the practice. When the missing information was appropriately entered in the daybooks, the research assistant accepted them.

An identifying number (one digit) was given to each nurse and a three digit number identified each daybook. A log was kept by the research assistant showing each daybook and the number of pages completed by the family practice nurse.

The number of pages used in the daybook was recorded by the research assistant on the cover of the daybook. Telephone calls were included in this total. Blank pages were not included. When an incomplete page was found, the family practice nurse was consulted and any other ambiguous or incorrect entries were reviewed and corrections made. For example, the dates recorded in each book often were not consistently completed. Any difficult decisions regarding this coding were referred to the principal investigator for consultation.

(ii) Coding, Abstracting and Keypunching of Family Practice Nurse Daybooks

The family practice nurse numbers, the book number, the known number of pages in the book, the involvement code, (major or minor), the Medical Care Plan patient identification number, date of encounter, and location of encounter were recorded on abstracting forms by three coders (including the research assistant). This step was necessary because of the difficulties which were experienced with the legibility of family practice nurse writing. These abstracting forms were chosen because they could be easily used by the keypunchers to enter the data on computer cards. Counts of abstracted daybook days (lines on the abstracting form) were recorded in a log by the research assistant.

The keypunching of the abstracting form data was sent to a computer company. Two keypunchers did this work. The first keypuncher's work was verified by having the second keypuncher punch the data a second time. Any differences from the first keypuncher's work were identified and corrected by the second keypuncher.

(iii) Computer Editing and Assessment of Family Practice Nurse Daybooks

In addition to the verification reviews conducted on the data before it was read into the computer, a series of edit and assessment reports were programmed in order that the computer could be used to conduct the tedious job of checking each record (one record equalled one page in the Family Practice Nurse Daybook which equalled one family practice nurse encounter. The edit and assessment computer

program included a series of rules for acceptance of records. These rules assessed patient and family practice nurse identification numbers, page and book counts for internal consistency and the date and location of the encounter. The program also cross-checked the Medical Care Plan patient identification number with the known valid Medical Care Plan identification number file used by Medical Care Plan in their claims processing system. Table D2 in Appendix C1 summarizes the record acceptance rules. This computer program produced a series of record control reports which are summarized in Appendix C1.

(iv) The Audit Sample

Whereas the computer edit and assessment procedures concentrated primarily on internal consistency of the records, the Audit Sample was developed to conduct detailed cross referencing on accepted records with the source records (Family Practice Nurse Daybooks themselves). Because of the large size of the accepted data file a sample consisting of every 32nd record in the total accepted record file was selected by the computer program. For each record accepted, the following information was provided for cross-checking with the source record: the family practice nurse identification number; the Family Practice Nurse Daybook number; the known number of pages in this daybook; the level of involvement of the family practice nurse in the nurse/patient encounter; the Medical Care Plan patient identification number; the date of the nurse/patient encounter; the page number in the Family Practice Nurse Daybook for this nurse/patient encounter; the location of this nurse/patient encounter, and the name and address of the patient.

(v) Linkage of Family Practice Nurse Daybook Data with
Medical Care Plan Physician Claims

The Medical Care Plan physician claims information was used as the standard on which to base the accuracy of the Family Practice Nurse Daybook records. As pointed out elsewhere, the six study physicians were fully participating in the Medical Care Plan fee-for-service system during the months of family practice nurse attachment -- June 1, 1975 to May 31, 1976. The Medical Care Plan Claims Processing System, outlined in Section above, was applied to the six physicians' Medical Care Plan claims in order that these physicians would receive payment for the patient services they provided over this period. There existed a considerable financial incentive for both the physician and the Medical Care Plan that these claims be accurate. Discrepancies in the Medical Care Plan claims submitted by the physician were not paid for by the Medical Care Plan until the information on the claim was acceptable to the Medical Care Plan.

A computer program was developed to identify the physician-patient encounters recorded on the Medical Care Plan payment computer file which had a corresponding family practice nurse-patient encounter on the same day with the same patient. The Medical Care Plan patient identification number and the date of service were used to locate these encounters. Thus encounters were identified where:

- (1) there was a Medical Care Plan physician claim for a specific patient on a certain day but no corresponding family practice nurse - patient encounter for that patient on the same day.

- (2) there was both a Medical Care Plan physician claim and family practice nurse - patient encounter occurring for the same patient on the same day.
- (3) there was a family practice nurse - patient encounter with a specific patient on a certain day but no corresponding Medical Care Plan physician claim for that patient on the same day.

Obviously, if the Family Practice Nurse Daybook and Medical Care Plan claim information was accurate, the resulting number of services reported for these three patient encounter possibilities will be accurate. However, if the Family Practice Nurse Daybook information is not accurate, the computer program will have difficulty finding corresponding Medical Care Plan physician claims for the same patients on the same days, thus artificially inflating the number of family practice nurse alone encounters' reports.

IV. Results

Of the 16,879 Family Practice Nurse Daybook pages completed by the six family practice nurses, a total of 16,467 or 98% were accepted for the matching of these records with the Medical Care Plan physician payment file. This acceptance rate compares favourably with reported 98% acceptance rate of Medical Care Plan physician claims in the Medical Care Plan Claims Processing System.

As shown in Table C1, 15,859 records were accepted the first time they were checked by the edit and assessment computer programs. There were 608 records which the research assistant corrected and which were

subsequently accepted by the edit and assessment program. This proportion of corrected records closely approximates the proportion of Medical Care Plan physician claims which are corrected by the Medical Care Plan staff before the data is accepted on the payment computer file.

In Table C2 we have summarized the breakdown of the source of errors. Of 17,448 records initially keypunched, 1,589 records were not accepted by the edit and assessment computer program. Family practice nurse errors occurring when the Medical Care patient identification number did not agree with the Medical Care Plan microfiche file of Medical Care Plan numbers accounted for 17% (or 276) of the 1,589 records not accepted. Transposition errors such as errors in transcribing information from the source document (the Family Practice Nurse Daybook) to the encoding forms used by the keypunchers, in addition to duplicate records account for 45% (or 709) of the 1,589 records not accepted. There were 1% (or 8) of the 1,589 records found to have keypunch errors. The family practice nurse was unable to locate the patients Medical Care Plan number for 16% (or 260) of the records. Finally, 22% (or 346) records had errors which were due to poor instructions being given to the family practice nurse regarding methods of recording information of the Family Practice Nurse Daybook.

An audit sample of 548 records accepted by the edit and assessment computer program revealed only 12 (or 3%) records with errors or a 97% accuracy rate for the accepted records.

TABLE C1

Results of Family Practice Nurse Daybook Data Processing

Initial Records (family practice nurse- patient encounters)	16,879
First Time Accepted Records (by the edit and assessment computer program)	15,859
Corrected Then Accepted Records	608
Final Accepted Records	16,467
Unacceptable Records (records which were not accepted by the edit and assessment computer program)	392

TABLE C2

Sources of Errors: Phase I of the Computer Verification Procedures

Source of Error	No.	%
I. Family Practice Nurse	276	17
II. Transportation		
Encoding form different from source record	92	6
Duplicate records without errors	571	36
Duplicate records with errors	46	3
III. Key punching	8	1
IV. Medical Care Plan Number Not Available	260	16
V. Instructions Given to Family Practice Nurse		
Family Practice Nurse not asked to record the patient's address on the Family Practice Nurse Daybook needed to verify Medical Care Plan patient number	330	21
Changes in recording format of the Family Practice Nurse Daybook after the study period began	16	1
Records not accepted by the edit and assessment computer program	1589	100

45

22

APPENDIX C1

Special Reports from the Edit and Assessment Computer Program

The edit and assessment computer program produced a series of data reports. These reports, which included "The Accepted Data Control List", "The Page Control List", "The Validation Error Report", "The Accepted Detailed Listing", and "The Audit Sample Report" were reviewed carefully and the records were correct.

(i) The Accepted Data Control List. The Accepted Data Control List produced a line for each Family Practice Nurse Daybook which was read into the computer (Table 1). The following summary information on each Daybook read included: the family practice nurse identification number (FPN/ID); the Family Practice Nurse Daybook number (BOOK #); the known number of valid reports in the source document (the Family Practice Nurse Daybook itself) (PAGE/CT); the number of records which were read in by the computer (PAGES READ); the number of records which were read in and accepted by the computer (PAGES ACC), and finally, the number of records which were rejected by the computer (PAGES REJ). Rules for acceptance of data are listed in Table 2. If a record failed on any one of these rules, it was listed as a rejected record.

At the end of this report, a summary table (Table 3) gave (1) the total number of records read in by the computer, (2) the total number of records rejected by the computer, (3) the total number of records which were rejected because they were duplicate records, and (4) the total number of records which were accepted.

(ii) The Page Control Report. The Page Control Report produced a line for each page which was identified 'missing'. When the Family

Practice Nurse Daybooks were coded, the number of valid records (pages) in each book was recorded and this number was keypunched as part of the record. The Page Control Report used this number to identify missing records in the data which was read into the computer. This listing of missing pages was used to verify the number of pages which were listed as read in according to the Accepted Data Control List. As shown in Table 4, for each missing record the report gave: the family practice nurse identification number (FPN/ID); the number of records which were read in by the computer plus one (PAGE/CT); the number of the missing pages (PAGE) and the phrase 'MISSING PAGE' was printed out at the end of each line in the report.

(ii) The Validation Error Report. For each record which was rejected using the Rules for Acceptance listed in Table 2, a line of information was produced in the Validation Error Report. For example, Table 5 is the first page of this report and each line indicates that a record has been rejected. For each rejected record listed in this report, the following information was given: daybook number (BOOK #); the level of involvement of the family practice nurse in this nurse/patient encounter (1/1); the Medical Care Plan patient identification number (PIN); the date of the nurse/patient encounter (DATE); the FPN daybook page number for this nurse/patient encounter (PAGE #); the location of the nurse/patient encounter (LOC), and, finally, the error message indicating the type of record acceptance rule which has been violated.

(iv) The Accepted Detailed Listing. In addition to the above three reports, a listing of accepted records was printed out which was

used to further verify and cross-check the above three reports (see Table 6). Each line on this report referred to records which passed the rules for acceptance outlined in Table 2. For each accepted record, the following information was given in this report: the family practice nurse identification number (FPN/ID); the Family Practice Nurse Daybook number (BOOK #); the page in the FPN daybook for this record (CONTROL PAGE); the Medical Care Plan Patient Identification Number (LIST PIN), and the date when this family practice nurse - patient encounter occurred (DATE).

In summary, the Accepted Data Control List, the Page Control Report, the Validation Error Report and the Accepted Detailed Listing were used to determine whether all the known records (according to the Family Practice Nurse Daybook log and the daybooks themselves) were read in by the computer. Once the records were read in, these reports produced detailed information on: (1) the accepted records, (2) the duplicate records, (3) the missing records, and (4) the records which were rejected using a set of rules for accepting records. These reports provided sufficient information to identify the location of incorrect or missing data.

TABLE 1. Accepted Data Control List

FPN ID	BOOK #	PAGE CT	PAGES READ	PAGES ACC	PAGES REJ
	304	64	04	00	03
1	001	49	47	47	00
1	002	48	48	48	00
1	003	47	47	47	00
1	004	49	49	49	00
1	005	49	49	48	00
1	006	49	49	47	00
1	007	49	49	48	00
1	008	49	49	49	00
1	009	49	49	49	00
1	010	49	49	48	00
1	011	49	49	47	00
1	012	49	49	48	00
1	013	49	49	48	00
1	014	49	49	49	00
1	015	49	49	46	00
1	016	49	49	48	00
1	017	49	49	48	00
1	018	49	49	49	00
1	019	49	49	48	00
1	020	49	49	49	00
1	021	49	49	49	00
1	022	49	49	48	00
1	023	49	49	48	00
1	024	47	47	45	00
1	025	48	48	46	00
1	026	49	49	46	00
1	027	49	49	49	00
1	028	49	49	48	00
1	029	49	49	48	00
1	030	49	49	43	00
1	031	49	49	49	00
1	032	49	49	48	00
1	033	49	49	47	00
1	034	49	49	47	00
1	035	49	49	46	00
1	036	49	49	46	00
1	037	49	49	45	00
1	038	49	49	48	00
1	039	46	45	46	00
1	040	49	49	48	00
1	041	49	49	49	00
1	042	49	49	47	00
1	043	49	49	47	00
1	044	49	49	48	00
1	045	48	48	47	00
1	046	49	49	47	00
1	047	48	48	47	00
1	048	42	42	42	00
1	049	49	49	47	00

TABLE 2

Record Acceptance Rules

<u>Error Message</u>	<u>Identification and Tabulation of:</u>
INVALID FPN ID	The family practice nurse's code number is outside the range of 1 to 8
INVALID BOOK SEQUENCE NUMBER	The book sequence number is not numeric or is less than "001"
INVALID PAGE COUNT	The page count is not in the range of "01" to "51"
INVALID INVOLVEMENT INDICATOR	The codes for 'minor' (6) or 'major' (9) responsibility in the second six months are given code values other than "3", "6", or "9"
INVALID PIN	The patient's Medical Care Plan number contains information which is not numeric
INVALID DATE	The date of service fields are outside the following ranges: day: "01" to "31" month: "01" to "12" year: "75" to "76"
INVALID PAGE NUMBER	All family practice nurse encounters which are found to contain a page number which is (1) not numeric, (2) outside the range "01" to "50" and/or (3) greater than the page count indicated on the front of the daybook
INVALID LOCATION CODE	The digit indicating the location of the family practice nurse encounter is outside the range "01" to "04"
PIN NOT ON MASTER	When the patient's Medical Care Plan number recorded on the Family Practice Nurse Daybook cannot be found on the Medical Care Plan patient master file used by Medical Care Plan.

TABLE 3

Accepted Data Control List

FPN ID	BOOK #	PAGES CT	PAGES READ	PAGES ACC	PAGES REJ
7	053	49	49	44	00
7	054	49	98	46	00
7	055	49	47	44	00
7	056	49	48	44	00
7	057	49	49	47	00
7	058	49	48	46	00
7	059	19	18	13	00

END OF JOB CONTROL REPORT

FPN RECORDS READ	17,448
REJECTED ERROR	989
REJECTED DUP	600
ACCEPTED	15,859

Table 4 Page Control Report

FPN ID	BOOK #	PAGE CT	PAGE	
	304	01	61	MISSING PAGE
1	001	01	01	MISSING PAGE
1	001	23	23	MISSING PAGE
1	005	26	26	MISSING PAGE
1	006	33	33	MISSING PAGE
1	006	49	49	MISSING PAGE
1	007	26	26	MISSING PAGE
1	010	48	48	MISSING PAGE
1	011	37	37	MISSING PAGE
1	011	42	42	MISSING PAGE
1	012	43	43	MISSING PAGE
1	013	48	48	MISSING PAGE
1	015	13	13	MISSING PAGE
1	015	23	23	MISSING PAGE
1	015	38	38	MISSING PAGE
1	016	40	40	MISSING PAGE
1	017	36	36	MISSING PAGE
1	019	08	08	MISSING PAGE
1	022	41	41	MISSING PAGE
1	023	16	16	MISSING PAGE
1	024	22	22	MISSING PAGE
1	024	38	38	MISSING PAGE
1	025	42	42	MISSING PAGE

Table 5 Validation Error Report

FPN ID	BOOK #	PAGE CT	II	PIN	DATE	PAGE #	LOC	
	304	65	0	349942160401	219017	61	90	INVALID FPN I.D. INVALID PAGE COUNT INVALID INVOLVEMENT INDICATION INVALID DATE INVALID PAGE NUMBER INVALID LOCATION CODE NO MATCHING MASTER
1	001	49	3	499750455029	020675	01	01	NO MATCHING MASTER
1	001	49	3		050675	23	01	INVALID PIN NO MATCHING MASTER
1	005	49	3	449620395016	100775	26	01	NO MATCHING MASTER
1	006	49	3	819221469011	290775	33	01	NO MATCHING MASTER
1	006	49	3	480071385012	300775	49	01	NO MATCHING MASTER
1	007	49	3	339180870012	190875	26	01	NO MATCHING MASTER
1	010	49	3	869 63199015	190975	48	01	INVALID PIN NO MATCHING MASTER
1	011	49	3	389552335019	240975	37	01	NO MATCHING MASTER
1	011	49	3	779518155017	240975	42	01	NO MATCHING MASTER
1	012	49	3	889672720013	300975	43	01	NO MATCHING MASTER
1	013	49	3	318721550022	071075	48	01	NO MATCHING MASTER
1	015	49	3	269123645014	151075	13	01	NO MATCHING MASTER
1	015	49	3		151075	23	01	INVALID PIN NO MATCHING MASTER
1	015	49	3	509700225018	161075	38	01	NO MATCHING MASTER
1	016	49	3	489550365014	211075	40	01	NO MATCHING MASTER

TABLE 6 Accepted Detailed Listing

FPN ID	BOOK #	CONTROL PAGE	LIST PIN	DATE
1	001	02	579082725014	030675
1	001	03	219010255012	030675
1	001	04	768931675013	030675
1	001	05	808921385015	030675
1	001	06	859633134019	030675
1	001	07	859732470017	030675
1	001	08	809743395018	030675
1	001	09	569750920013	030675
1	001	10	539243325013	030675
1	001	11	779741745011	030675
1	001	12	859173090019	030675
1	001	13	279152270013	040675
1	001	14	699750675018	040675
1	001	15	199431350016	040675
1	001	16	299691045015	050675
1	001	17	309742155018	050675
1	001	18	469411535013	050675
1	001	19	339591060027	050675
1	001	20	499411790011	050675
1	001	21	649382360018	050675
1	001	22	719513605019	050675
1	001	24	339063115010	050675
1	001	25	448991335010	050675
1	001	26	288981765010	050675
1	001	27	229750655016	050675
1	001	28	348953325019	050675
1	001	29	449500075022	050675

TABLE 7 Audit Sample Report

FPN ID	BOOK #	PAGE CT	I I	PIN	DATE	PAGE	LOC	NAME ADDRESS	
1	001	49	3	718943575016	060675	32	01	LEAH NFLD	P
1	002	48	9	808921385015	100675	13	02	VIOLET T NFLD	P ST. JOHN'S
1	002	48	3	579472365017	170675	43	01	PATRICIA R NFLD	M MOUNT PEARL
1	003	47	3	649121070019	240675	25	01	PATRICK J NFLD	P ST. JOHN'S
1	004	49	3	529371375013	270675	08	01	BRENDA M NFLD	D. ST. JOHN'S
1	004	49	3	419750935027	030775	38	01	KATHERINE M NFLD	H. ST. JOHN'S
1	005	49	3	339591060027	090775	19	01	REGINALD NFLD	F ST. JOHN'S
1	006	49	3	539432625017	230775	01	01	VERONICA M NFLD	W ST. JOHN'S
1	006	49	3	789722920012	290775	31	01	JASON P NFLD	S ST. JOHN'S
1	007	49	3	559680410011	310775	14	01	SHAN M NFLD	M ST. JOHN'S
1	007	49	3	809301180018	200875	45	01	BRUCE J NFLD	I ST. JOHN'S
1	008	49	3	199751270018	220875	26	01	GREGORY C NFLD	B ST. JOHN'S
1	009	49	3	159520285010	040975	07	01	YVONNE NFLD	F

Appendix D

Instruments Developed to Gather Data in the
Family Practice Nurse Project

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THE FAMILY PRACTICE NURSE DAYBOOK

--	--	--	--	--	--

Patient's Name

Patient's MCP Number

Date

Day

Month

Year

No.

--	--	--	--	--	--	--	--	--	--	--	--

--

--

--

--	--

LOCATION

Office 01) Hosp. Inpt. 04)
House Call 02) Phone Call 05)
Hosp. Outp. 03) Other 06)
(Please specify)

PRESENTING COMPLAINT(S)
OR REASON(S) FOR VISIT

DIAGNOSIS

--	--

--	--	--	--	--

--	--	--	--	--

ACTION(S) TAKEN

PRESCRIPTION GIVEN

REFERRAL

Yes 1)
No 2)

If "yes"

--	--	--

Drug Name:

--	--	--	--	--

--	--	--	--	--	--	--	--

Dosage Level:

MD 01) Hosp. Outp. 03)
Hosp. Inpt. 02) Other 04)
(Please specify)

Name of MD or Referral Agency:

FPN Signature

(over)

PHYSICIAN AND FAMILY PRACTICE NURSE TIME STUDY SHEET

TIME STUDY SHEET

NAME _____

PRACTICE NO. _____

TITLE _____

DATE _____

	DIAGNOSIS AND MANAGEMENT				CASE STUDY AND PROFESSIONAL READING	CLERICAL AND HOUSEKEEPING	OTHER (PLEASE SPECIFY)
	OFFICE	HOUSECALLS	HOSPITAL	TELEPHONE			
8:00							
8:15							
8:30							
8:45							
9:00							
9:15							
9:30							
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2:00							
2:15							
2:30							
2:45							
3:00							
3:15							
3:30							
3:45							
TOTAL							

PHYSICIAN TIME IN/OUT LOG

DATE: _____ TO _____

PHYSICIAN OFFICE HOURS CHART

DR. _____

DAY	MORNING						AFTERNOON						EVENING						NO. OF HOUSE CALLS PER DAY	NO. OF OFFICE VISITS PER DAY	NO. OF HOSPITAL VISITS PER DAY	COMMENTS																				
	TIME IN		TIME OUT		TIME IN		TIME OUT		TIME IN		TIME OUT		TIME IN		TIME OUT																											
	hrs	mins	hrs	mins	hrs	mins	hrs	mins	hrs	mins	hrs	mins	hrs	mins	hrs	mins																										
SUNDAY																																										
MONDAY																																										
TUESDAY																																										
WEDNESDAY																																										
THURSDAY																																										
FRIDAY																																										
SATURDAY																																										
SUNDAY																																										
MONDAY																																										
TUESDAY																																										
WEDNESDAY																																										
THURSDAY																																										
FRIDAY																																										
SATURDAY																																										
SUNDAY																																										

FORM COMPLETED BY _____

PHYSICIAN REPORT ON FAMILY PRACTICE NURSE OVERHEAD EXPENDITURES

EXTRA PRACTICE COSTS ATTRIBUTABLE TO THE
FPN (June, 1975 to May 31, 1976)

NAME: _____

Architectural changes: (please be specific)

Amount

_____	_____
_____	_____
_____	_____

Extra staff (please be specific)

_____	_____
_____	_____
_____	_____

Extra medical supplies and equipment (please be specific)

_____	_____
_____	_____
_____	_____

Other

_____	_____
_____	_____
_____	_____

MEMORIAL UNIVERSITY OF NEWFOUNDLAND
FAMILY PRACTICE NURSE PROJECT

FAMILY PRACTICE NURSE FUNCTION-TRANSFER QUESTIONNAIRE

FAMILY PRACTICE NURSE QUESTIONNAIRE

The following questions relate to your employment experience as a family practice nurse. As well, there are some questions which relate to your previous nursing experience. The accuracy with which you answer the questions is very important to the study.

Please check or circle the numbers or write in your responses where indicated. Feel free to use the reverse side of this form whenever you require additional space for your answers, being sure to identify the question.

Please print or write legibly.

NAME: _____

DATE COMPLETED: _____
 Day Month Year

1. When a patient arrives at the practice or phones the practice for an appointment, how is it decided whether he will use the FPN or the physician? (Check one)

- based on presenting symptoms..... 1
 - based on defined families..... 2
 - based on whoever is available..... 3
 - based on a predetermined plan (please specify)..... 4
-
-
-

2. When a new patient is admitted to the practice who sees them initially? (Check one)

- Doctor..... 1
- Family Practice Nurse..... 2
- Either Doctor or the Family Practice Nurse depending on who is available..... 3
- Either Doctor or the Family Practice Nurse depending on the presenting symptoms..... 4

3. If the Family Practice Nurse sees patients initially on the basis of presenting symptoms please check for us the kinds of presenting symptoms or complaints seen initially by the nurse.

- check up, recheck, visit for test, change dressing, repeat prescription..... 1
- lacerations and bruises to extremities..... 2
- respiratory including cold, wheezing 3
- eyes, ears, nose, throat, including swelling and nosebleed..... 4
- pre- and post natal check..... 5
- gastrointestinal including abdominal pain..... 6
- skin including rash and itching 7
- head and neck including injuries and lacerations..... 8
- genitourinary including bleeding..... 9
- back including ache and injury..... 10

(continued on next page)

3. (continued)

- chest including chest pains..... 11
- emotional complaints including fatigue, overdose.... 12
- birth control including pills, IUD..... 13
- others, please specify _____ 14

4. Are there any other "groups of patients" with certain diagnoses who are seen by the FPN initially upon visiting the practice. (Please check)

- communicable diseases 1
- neoplasms, benign or malignant 2
- allergic, endocrine, metabolic and nutritional 3
- blood and blood forms 4
- mental, psychoneurotic, personality and behavior problems 5
- nervous system and sense organs 6
- circulatory system 7
- respiratory system 8
- digestive system 9
- genitourinary system 10
- skin and cellular tissues 11
- bones and organs of movement 12
- congenital disorders of infancy 13
- symptoms and ill defined conditions 14
- accident, poisoning, violence, trauma 15
- other, please specify _____ 16

5. Please check the types of patients for whom the family practice nurse routinely provides total care, that is assessment, diagnosis and treatment.

- well baby and child examinations 1
- prenatal 2
- school physicals 3
- well female examinations 4

5. Please check the types of patients for whom you alone routinely provide total care, that is assessment, diagnosis and treatment. (Check more than one if appropriate.)

- well baby and child examinations 1
- prenatal 2
- school physicals 3
- well female examinations..... 4
- annual physicals 5
- geriatric maintenance..... 6
- other, please specify _____

6. Please check those types of conditions for which you routinely provide total care that is, assessment, diagnosis and treatment. Also indicate if these are new episodes or long term follow-up.

- | | | |
|--|------------------------------|------------------------------------|
| <input type="checkbox"/> 1 hypertension | <input type="checkbox"/> New | <input type="checkbox"/> Follow Up |
| <input type="checkbox"/> 2 obesity | <input type="checkbox"/> New | <input type="checkbox"/> Follow Up |
| <input type="checkbox"/> 3 contraception | <input type="checkbox"/> New | <input type="checkbox"/> Follow Up |
| <input type="checkbox"/> 4 behavioral problems in children | <input type="checkbox"/> New | <input type="checkbox"/> Follow Up |
| <input type="checkbox"/> 5 marital counselling | <input type="checkbox"/> New | <input type="checkbox"/> Follow Up |
| <input type="checkbox"/> 6 other, please specify | <input type="checkbox"/> New | <input type="checkbox"/> Follow Up |
| _____ | <input type="checkbox"/> New | <input type="checkbox"/> Follow Up |
| _____ | <input type="checkbox"/> New | <input type="checkbox"/> Follow Up |
| _____ | <input type="checkbox"/> New | <input type="checkbox"/> Follow Up |

7. In relation to questions 5 and 6 who was it that determined for which patients and conditions you alone would routinely provide total care? (Check)

- FPN made the ultimate decision 1
- Physician made the ultimate decision 2
- FPN and Physician decided together 3
- Other, please specify _____ 4

11. Please check the common procedures which you perform with the involvement of the physician, or without the involvement of the physician.

	with involvement of physician	without involvement of physician
medications prescribed	<input type="checkbox"/>	<input type="checkbox"/>
advice or explanation	<input type="checkbox"/>	<input type="checkbox"/>
history and physicals	<input type="checkbox"/>	<input type="checkbox"/>
lab investigations	<input type="checkbox"/>	<input type="checkbox"/>
minor medical and surgical procedures	<input type="checkbox"/>	<input type="checkbox"/>
prenatal examinations	<input type="checkbox"/>	<input type="checkbox"/>
pap and pelvic	<input type="checkbox"/>	<input type="checkbox"/>
admissions and discharges	<input type="checkbox"/>	<input type="checkbox"/>
blood pressure check	<input type="checkbox"/>	<input type="checkbox"/>
newborn examinations	<input type="checkbox"/>	<input type="checkbox"/>
referrals and consultations	<input type="checkbox"/>	<input type="checkbox"/>
immunization	<input type="checkbox"/>	<input type="checkbox"/>
electrocardiogram	<input type="checkbox"/>	<input type="checkbox"/>
injections	<input type="checkbox"/>	<input type="checkbox"/>
term pregnancy	<input type="checkbox"/>	<input type="checkbox"/>
emergency care	<input type="checkbox"/>	<input type="checkbox"/>
post partum examination	<input type="checkbox"/>	<input type="checkbox"/>
suturing	<input type="checkbox"/>	<input type="checkbox"/>
removing sutures	<input type="checkbox"/>	<input type="checkbox"/>
other (please specify)	<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"/>

12. Does the FPN suggest medication for the patient?

NO

YES

Does the FPN have a list of drugs which the physician and the nurse have agreed that she can prescribe?

NO

YES

If yes please list the drugs which the FPN can prescribe.

Are the prescription forms co-signed by the physician?

NO

YES

If yes, please describe how this co-signing is arranged in the practice?

13. In your practice under what circumstances is the referral of a patient to your physician mandatory? Please be as specific as possible.

14. In your practice under what circumstances is the referral of a patient to your physician left to your discretion? Please be as specific as possible.

15. In reference to question 13 and 14 how were these kinds of rules concerning referrals developed?

16. Has the doctor referred patients to you in order that you might explain to them the nature of their complaint and/or treatment?

NO

YES

Approximately how many patients would he refer to you for this purpose in the course of a normal week?

_____ patients referred per week

17. Have you had patients contact you with complaints which they didn't want to bother the physician with?

NO

YES

Approximately how many times has this happened in the past month?

_____ times in the past month

Could you please describe these complaints which were considered trivial by the patients?

18. Trying to be as accurate as possible about your work as a family practice nurse in your practice, list the number of hours per week involved in the following:

- | | |
|---|-------|
| a. Direct Patient Care | _____ |
| b. Home Visits | _____ |
| c. Hospital Visits | _____ |
| d. Teaching Classes, eg. Prenatal | _____ |
| e. Consultation with your physician | _____ |
| f. Consultations and liaison with other health professionals | _____ |
| g. Supervision of other health workers eg. nursing assistants, interns, residents | _____ |
| h. Telephone contacts eg. booking follow-ups, relaying, lab reports etc. | _____ |
| i. On-going education eg. reading journals, attending | _____ |
| j. Clerical duties eg. filling requisitions etc. | _____ |
| k. Housekeeping duties eg. cleaning exam rooms etc. | _____ |
| l. Hostessing duties eg. ushering patients, making coffee | _____ |
| m. Research | _____ |
| n. Other, please specify | _____ |

Please indicate for each statement about FPN and physician role change if in your practice this is "never a problem", "a problem which has been resolved", "still a minor problem", or "still a major problem".

- | | | | | |
|---|---|--|--|--|
| 1. The physician automatically takes up the position of team leader in all situations. | 1
<input type="checkbox"/>
never a
problem | 2
<input type="checkbox"/>
problem
resolved | 3
<input type="checkbox"/>
still
a minor
problem | 4
<input type="checkbox"/>
still
a major
problem |
| 2. The FPN's role is confined to care, comfort, counselling, guidance and helping the patient to cope and is <u>not</u> involved in diagnosis and treatment. | 1
<input type="checkbox"/>
never a
problem | 2
<input type="checkbox"/>
problem
resolved | 3
<input type="checkbox"/>
still
a minor
problem | 4
<input type="checkbox"/>
still
a major
problem |
| 3. The FPN spends too much of her time as an assistant to the physician (receptionist, gives shots, chaperons pelvics, and answers the phone) rather than taking on an expanded nursing or FPN role. | 1
<input type="checkbox"/>
never a
problem | 2
<input type="checkbox"/>
problem
resolved | 3
<input type="checkbox"/>
still
a minor
problem | 4
<input type="checkbox"/>
still
a major
problem |
| 4. There is disagreement that the FPN should be one who assesses and manages and one who comforts, supports, and helps. | 1
<input type="checkbox"/>
never a
problem | 2
<input type="checkbox"/>
problem
resolved | 3
<input type="checkbox"/>
still
a minor
problem | 4
<input type="checkbox"/>
still
a major
problem |
| 5. The physician does not relinquish any portion of his conventional role -- his protocol must be followed for all activities -- his protocol always calls for physician involvement and the FPN is not encouraged to work beyond the protocol. | 1
<input type="checkbox"/>
never a
problem | 2
<input type="checkbox"/>
problem
resolved | 3
<input type="checkbox"/>
still
a minor
problem | 4
<input type="checkbox"/>
still
a major
problem |
| 6. The sharing of analysis and decision-making is viewed as an infringement on the physician-patient relationship and there is <u>not</u> an attitude of commitment to patients without professional possessiveness. | 1
<input type="checkbox"/>
never a
problem | 2
<input type="checkbox"/>
problem
resolved | 3
<input type="checkbox"/>
still
a minor
problem | 4
<input type="checkbox"/>
still
a major
problem |
| 7. In specific situations there tends to be disagreement on who collects patient data. | 1
<input type="checkbox"/>
never a
problem | 2
<input type="checkbox"/>
problem
resolved | 3
<input type="checkbox"/>
still
a minor
problem | 4
<input type="checkbox"/>
still
a major
problem |
| 8. In specific situations there tends to be disagreement on who makes what decisions. | 1
<input type="checkbox"/>
never a
problem | 2
<input type="checkbox"/>
problem
resolved | 3
<input type="checkbox"/>
still
a minor
problem | 4
<input type="checkbox"/>
still
a major
problem |

9. In specific situations there tends to be disagreement on who decides on which management plan.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
10. In specific situations there tends to be disagreement on who is the principal provider for which patients or whether it can be both physician and FPN.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
11. The responsibility of a physician or nurse in the eyes of the law is raised frequently then deciding on who should do what (for example, being on nights or weekends or making decisions without the physician present).
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
12. The physician does not take time to teach the FPN how to become a significant contributor in the management of patients and member of the practice team.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
13. The FPN finds that in her relations with hospital and extra-practice personnel there is confusion as to whether her role should be a conventional medical one or a conventional nursing one.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
14. The practice has a policy of handing over to the FPN all new and unknown "clinic" patients for which the physician has little interest or time.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
15. The uncertainties of the FPN's future in the practice have prevented her from some activities.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |

20. In relation to question 18. If you have had any other problems in changing into your new role please describe the problems you have encountered with:

(1) Physician _____

(2) Patients _____

(3) Office Staff _____

(4) Hospital Staff _____

(5) Others _____

23. Now that you have been on the job for a little while do you find that there are some areas for which you have been responsible which you would rather hand back to the physician?
(Please check)

NO

YES

If yes which areas would you like to hand back to the physician?

24. Are there some duties which you felt hesitant about in the first place but about which you now feel more confident?

NO

YES

If yes, please describe the duties you feel more confident about.

25. Has your perception of your role altered since you completed the course?

NO

YES

If yes, please describe this change and factors which altered this change.

PROFESSIONAL SATISFACTION QUESTIONNAIRE

The following questions are about your job and the effect it has on other parts of your life.

After each of the following items:

Circle the "S" if you are satisfied with that item.

Circle the "D" if you are dissatisfied with that item.

Circle the "?" if you are not sure.

Circle the "NA" if the item is not present in or not appropriate to your job.

Please mark each item with your present job in mind.

1. Your earnings S ? D NA

2. Financial security S ? D NA

3. Prospects for a comfortable retirement S ? D NA

4. Prospects for future earnings S ? D NA

5. Time for recreation on evenings or weekends S ? D NA

6. Time for holidays S ? D NA

7. Time for family activities S ? D NA

8. Time and opportunity for professional travel S ? D NA

9. Time and opportunity for recreational travel S ? D NA

10. Community in which you live	S	?	D	NA
11. Your prestige in the community	S	?	D	NA
12. Your prestige on the job	S	?	D	NA
13. Opportunities for promotion	S	?	D	NA
14. Prestige in your profession	S	?	D	NA
15. Administrative details of job	S	?	D	NA
16. Committee work required	S	?	D	NA
17. Written reports necessary	S	?	D	NA
18. Time for study in your field	S	?	D	NA
19. Routine activities on the job	S	?	D	NA
20. Non-professional aspects of the job	S	?	D	NA
21. Opportunity to advance professionally	S	?	D	NA
22. Opportunity to talk shop	S	?	D	NA
23. Opportunity to direct work of others	S	?	D	NA
24. Opportunity to help in policy-making	S	?	D	NA
25. Opportunity to be your own boss	S	?	D	NA

26. Interesting co-workers	S	?	D	NA
27. Intelligent competent co-workers	S	?	D	NA
28. Fun and relaxation with co-workers	S	?	D	NA
29. Competition	S	?	D	NA
30. Demands of patients or clients	S	?	D	NA
31. Demands of supervisors	S	?	D	NA
32. Intellectual challenge	S	?	D	NA
33. Variety of activities required	S	?	D	NA
34. Chance to do research	S	?	D	NA
35. Chance to improve skills	S	?	D	NA
36. Experience	S	?	D	NA
37. Physical fatigue	S	?	D	NA
38. Pressure on job	S	?	D	NA
39. Hours (e.g. 9-5, 7 to 9) on all professional activities	S	?	D	NA
40. Scheduling of regular office hours	S	?	D	NA
41. Scheduling of evening duty	S	?	D	NA

- | | | | | |
|--|---|---|---|----|
| 42. Scheduling of weekend duty | S | ? | D | NA |
| <hr/> | | | | |
| 43. Opportunity to use learned skills | S | ? | D | NA |
| <hr/> | | | | |
| 44. Opportunity to use aptitudes and abilities | S | ? | D | NA |
| <hr/> | | | | |
| 45. Opportunity to use education | S | ? | D | NA |
| <hr/> | | | | |
| 46. Feeling of achievement | S | ? | D | NA |
| <hr/> | | | | |
| 47. Feeling of being needed | S | ? | D | NA |
| <hr/> | | | | |
| 48. Feeling of accomplishment | S | ? | D | NA |
| <hr/> | | | | |
| 49. Full credit for work done | S | ? | D | NA |
| <hr/> | | | | |
| 50. Personal satisfaction of job well done | S | ? | D | NA |
| <hr/> | | | | |
| 51. Chance to see results of work | S | ? | D | NA |
| <hr/> | | | | |
| 52. Chance to follow job through to its conclusion | S | ? | D | NA |
| <hr/> | | | | |
| 53. Recognition from your supervisors | S | ? | D | NA |
| <hr/> | | | | |
| 54. Recognition from your peers | S | ? | D | NA |
| <hr/> | | | | |
| 55. Thanks from those you benefit | S | ? | D | NA |
| <hr/> | | | | |
| 56. Chance to evaluate own work | S | ? | D | NA |
| <hr/> | | | | |
| 57. Evaluation of work by others | S | ? | D | NA |
| <hr/> | | | | |

58. Opportunity to use initiative

59. Freedom to make decisions

60. Freedom to use own judgement

61. Personal autonomy

62. Opportunity to do socially significant tasks through work

63. Opportunity to fulfill political civic responsibilities

64. Opportunity to fulfill educational civic responsibilities

65. Opportunity to fulfill recreational civic responsibilities

66. Opportunity to maintain desired religious activities

67. Amount of time free for charitable and/or money-raising activities

MEMORIAL UNIVERSITY OF NEWFOUNDLAND
FAMILY PRACTICE NURSE PROJECT

PHYSICIAN FUNCTION-TRANSFER QUESTIONNAIRE

PHYSICIAN QUESTIONNAIRE

The following questions relate to your experience in working with a Family Practice Nurse. The accuracy with which you answer the questions is very important to the outcome of the study.

Please circle the numbers or write in your responses where indicated. Feel free to use the reverse side of this form whenever you require additional space for your answers, being sure to identify the question.

Please print or write legibly.

NAME: _____

DATE: _____
 Day Month Year

1. When a patient arrives at the practice or phones the practice for an appointment how is it decided whether the patient will see the FPN or the physician? (Please check)

- based on presenting symptoms 1
- based on defined families 2
- based on whoever is available 3
- based on a predetermined plan (please specify) 4
-
-
-
-

2. When a new patient is admitted to the practice who sees them initially? (Check one)

- Physician 1
- Family Practice Nurse 2
- Either Physician or the Family Practice Nurse depending on who is available 3
- Either Physician or the Family Practice Nurse depending on the presenting symptoms 4

3. If the Family Practice Nurse sees patients initially on the basis of presenting symptoms please check for us the kinds of presenting symptoms or complaints seen initially by the nurse.

- check up, recheck, visit for test, change dressing, repeat prescription 1
- lacerations and bruises to extremities 2
- respiratory including cold, wheezing 3
- eyes, ears, nose, throat, including swelling and nosebleed 4
- pre and post natal check 5
- gastrointestinal including abdominal pain 6
- skin including rash and itching 7
- head and neck including injuries and lacerations 8
- genitourinary including bleeding 9
- back including ache and injury 10

3. (continued)

- chest including chest pains 11
- emotional complaints including fatigue, 12
overdose
- birth control, including pills and IUD 13
- other, please specify..... 14

4. Are there any other "groups of patients" with certain diagnoses who are seen by the nurse primarily upon visiting the practice. (Please check)

- communicable diseases..... 1
 - neoplasms, benign or malignant 2
 - allergic, endocrine, metabolic and nutritional..... 3
 - blood and blood forming organs..... 4
 - mental, psychoneurotic, personality, and behaviour problems 5
 - nervous systems and sense organs..... 6
 - circulatory system..... 7
 - respiratory system..... 8
 - digestive system 9
 - genitourinary system 10
 - skin and cellular tissues 11
 - bones and organs of movement..... 12
 - congenital malformations..... 13
 - certain disorders of infancy..... 14
 - symptoms and ill defined conditions..... 15
 - accident, poisoning, violence, trauma..... 16
 - other, (please specify) _____ 17
-

5. (continued)

- annual physicals 5
 - geriatric maintenance 6
 - other (please specify) _____ 7
-

6. Please check those types of conditions for which the family practice nurse routinely provides total care that is, assessment, diagnosis and treatment. Also check if these are new episodes or long term follow up.

- | | | |
|---|------------------------------|------------------------------------|
| <input type="checkbox"/> hypertension | <input type="checkbox"/> New | <input type="checkbox"/> Follow up |
| <input type="checkbox"/> obesity | <input type="checkbox"/> New | <input type="checkbox"/> Follow up |
| <input type="checkbox"/> contraception | <input type="checkbox"/> New | <input type="checkbox"/> Follow up |
| <input type="checkbox"/> behavioral problems
in children | <input type="checkbox"/> New | <input type="checkbox"/> Follow up |
| <input type="checkbox"/> marital counselling | <input type="checkbox"/> New | <input type="checkbox"/> Follow up |
| <input type="checkbox"/> other (please specify) | <input type="checkbox"/> New | <input type="checkbox"/> Follow up |
| _____ | <input type="checkbox"/> New | <input type="checkbox"/> Follow up |
| _____ | <input type="checkbox"/> New | <input type="checkbox"/> Follow up |

7. In relation to questions 5 and 6 who was it that determined for which patients and conditions the FPN alone would routinely provide total care? (Check)

- FPN made the ultimate decision
 - Physician made the ultimate decision
 - FPN and Physician decided together
 - Other, (please specify) _____
-

8. Please check the common procedures which the FPN performs with the involvement of a physician, (yourself or a colleague), or procedures performed without the involvement of a physician.

	with involvement of physician	without involvement of physician
medications prescribed	<input type="checkbox"/>	<input type="checkbox"/>
advice or explanation	<input type="checkbox"/>	<input type="checkbox"/>
history and physicals	<input type="checkbox"/>	<input type="checkbox"/>
lab investigations	<input type="checkbox"/>	<input type="checkbox"/>
minor medical and surgical procedures	<input type="checkbox"/>	<input type="checkbox"/>
prenatal examinations	<input type="checkbox"/>	<input type="checkbox"/>
pap and pelvic	<input type="checkbox"/>	<input type="checkbox"/>
admissions and discharges	<input type="checkbox"/>	<input type="checkbox"/>
blood pressure check	<input type="checkbox"/>	<input type="checkbox"/>
newborn examination	<input type="checkbox"/>	<input type="checkbox"/>
referrals and consultations	<input type="checkbox"/>	<input type="checkbox"/>
immunizations	<input type="checkbox"/>	<input type="checkbox"/>
electrocardiogram	<input type="checkbox"/>	<input type="checkbox"/>
injections	<input type="checkbox"/>	<input type="checkbox"/>
term pregnancy	<input type="checkbox"/>	<input type="checkbox"/>
emergency care	<input type="checkbox"/>	<input type="checkbox"/>
post partum examination	<input type="checkbox"/>	<input type="checkbox"/>
suturing	<input type="checkbox"/>	<input type="checkbox"/>
removing sutures	<input type="checkbox"/>	<input type="checkbox"/>
other (please specify)	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>	<input type="checkbox"/>	<input type="checkbox"/>
<hr/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Does the FPN suggest medication for the patient?

NO

YES

Does the FPN have a list of drugs which the physician and the nurse have agreed that she can prescribe?

NO

YES

If yes, please list all the drugs the FPN can prescribe

Are the prescription forms co-signed by the physician?

NO

YES

If yes, please describe how the co-signing is arranged in the practice?

Please indicate for each statement about FPN and physician role change if in your practice this is "never a problem", "a problem which has been resolved", "still a minor problem", or "still a major problem".

- | | 1 | 2 | 3 | 4 |
|---|--|---|---|---|
| 1. The physician automatically takes up the position of team leader in all situations. | <input type="checkbox"/>
never a
problem | <input type="checkbox"/>
problem
resolved | <input type="checkbox"/>
still
a minor
problem | <input type="checkbox"/>
still
a major
problem |
| 2. The FPN's role is confined to care, comfort, counselling, guidance and helping the patient to cope and is <u>not</u> involved in diagnosis and treatment. | <input type="checkbox"/>
never a
problem | <input type="checkbox"/>
problem
resolved | <input type="checkbox"/>
still
a minor
problem | <input type="checkbox"/>
still
a major
problem |
| 3. The FPN spends too much of her time as an assistant to the physician (receptionist, gives shots, chapters pelvics, and answers the phone) rather than taking on an expanded nursing or FPN role. | <input type="checkbox"/>
never a
problem | <input type="checkbox"/>
problem
resolved | <input type="checkbox"/>
still
a minor
problem | <input type="checkbox"/>
still
a major
problem |
| 4. There is disagreement that the FPN should be one who assesses and manages and one who comforts, supports, and helps. | <input type="checkbox"/>
never a
problem | <input type="checkbox"/>
problem
resolved | <input type="checkbox"/>
still
a minor
problem | <input type="checkbox"/>
still
a major
problem |
| 5. The physician does not relinquish any portion of his conventional role -- his protocol must be followed for all activities -- his protocol always calls for physician involvement and the FPN is not encouraged to work beyond the protocol. | <input type="checkbox"/>
never a
problem | <input type="checkbox"/>
problem
resolved | <input type="checkbox"/>
still
a minor
problem | <input type="checkbox"/>
still
a major
problem |
| 6. The sharing of analysis and decision-making is viewed as an infringement on the physician-patient relationship and there is <u>not</u> an attitude of commitment to patients without professional possessiveness. | <input type="checkbox"/>
never a
problem | <input type="checkbox"/>
problem
resolved | <input type="checkbox"/>
still
a minor
problem | <input type="checkbox"/>
still
a major
problem |
| 7. In specific situations there tends to be disagreement on who collects patient data. | <input type="checkbox"/>
never a
problem | <input type="checkbox"/>
problem
resolved | <input type="checkbox"/>
still
a minor
problem | <input type="checkbox"/>
still
a major
problem |
| 8. In specific situations there tends to be disagreement on who makes what decisions. | <input type="checkbox"/>
never a
problem | <input type="checkbox"/>
problem
resolved | <input type="checkbox"/>
still
a minor
problem | <input type="checkbox"/>
still
a major
problem |

9. In specific situations there tends to be disagreement on who decides on which management plan.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
10. In specific situations there tends to be disagreement on who is the principal provider for which patients or whether it can be both physician and FPN.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
11. The responsibility of a physician or nurse in the eyes of the law is raised frequently when deciding on who should do what (for example, being on nights or weekends or making decisions without the physician present).
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
12. The physician does not take time to teach the FPN how to become a significant contributor in the management of patients and member of the practice team.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
13. The FPN finds that in her relations with hospital and extra-practice personnel there is confusion as to whether her role should be a conventional medical one or a conventional nursing one.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
14. The practice has a policy of handing over to the FPN all new and unknown "clinic" patients for which the physician has little interest or time.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |
15. The uncertainties of the FPN's future in the practice have prevented her from some activities.
- | | | | |
|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 | 2 | 3 | 4 |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| never a problem | problem resolved | still a minor problem | still a major problem |

13. In relation to question 12 are there any other problems of role change that have been created as the result of the FPN attachment to your practice?

14. In comparison with a registered nurse program please enumerate the new skills and knowledge that were displayed to you by the FPN which you feel were useful and essential for the expanded role nurse.

15. What extra skills and knowledge would you think would be useful to the FPN and could be taught in future educational programs?

16. The introduction of a Family Practice Nurse into a practice can be seen to have advantages and disadvantages. Please check the advantages and disadvantages that have affected your practice.

ADVANTAGES

- | | | |
|--|--------------------------|---|
| shorter working hours | <input type="checkbox"/> | 1 |
| increased patient flow | <input type="checkbox"/> | 2 |
| more efficient practice management | <input type="checkbox"/> | 3 |
| physician less tired after a working day | <input type="checkbox"/> | 4 |
| staff work load lessened | <input type="checkbox"/> | 5 |
| increase in MCP revenue | <input type="checkbox"/> | 6 |
| other, please specify _____ | <input type="checkbox"/> | 7 |
-

16. (continued)

DISADVANTAGES

- decreased patient flow 1
 - less efficient practice management 2
 - lost time because of consultation with FPN on planned courses of action and procedures 3
 - decrease in MCP revenue 4
 - other, please specify _____ 5
-

17. Do you hope to have your Family Practice Nurse continue to work in your practice after the Experimental Period is over?

NO

YES

If YES, will your Family Practice Nurse's role in your practice after the experimental period change or remain the same? (Check one)

(1) FPN's role will change after the experimental period

(2) FPN's role will remain the same after the experimental period

If YES to (1) how will the FPN's role change after the experimental period?

PROFESSIONAL SATISFACTION QUESTIONNAIRE

The following questions are about your job and the effect it has on other parts of your life.

After each of the following items:

Circle the "S" if you are satisfied with that item.

Circle the "D" if you are dissatisfied with that item.

Circle the "?" if you are not sure

Circle the "NA" if the item is not present in or not appropriate to your job.

Please mark each item with your present job in mind.

- | | | | | | |
|-------|--|---|---|---|----|
| 1. | Your earnings | S | ? | D | NA |
| <hr/> | | | | | |
| 2. | Financial security | S | ? | D | NA |
| <hr/> | | | | | |
| 3. | Prospects for a comfortable retirement | S | ? | D | NA |
| <hr/> | | | | | |
| 4. | Prospects for future earnings | S | ? | D | NA |
| <hr/> | | | | | |
| 5. | Time for recreation on evenings or weekends | S | ? | D | NA |
| <hr/> | | | | | |
| 6. | Time for holidays | S | ? | D | NA |
| <hr/> | | | | | |
| 7. | Time for family activities | S | ? | D | NA |
| <hr/> | | | | | |
| 8. | Time and opportunity for professional travel | S | ? | D | NA |
| <hr/> | | | | | |
| 9. | Time and opportunity for recreational travel | S | ? | D | NA |
| <hr/> | | | | | |
| 10. | Community in which you live | S | ? | D | NA |
| <hr/> | | | | | |
| 11. | Your prestige in the community | S | ? | D | NA |
| <hr/> | | | | | |

- | | | | | | |
|-----|---------------------------------------|---|---|---|----|
| 12. | Your prestige on the job | S | ? | D | NA |
| 13. | Opportunities for promotion | S | ? | D | NA |
| 14. | Prestige in your profession | S | ? | D | NA |
| 15. | Administrative details of job | S | ? | D | NA |
| 16. | Committee work required | S | ? | D | NA |
| 17. | Written reports necessary | S | ? | D | NA |
| 18. | Time for study in your field | S | ? | D | NA |
| 19. | Routine activities on the job | S | ? | D | NA |
| 20. | Non-professional aspects of the job | S | ? | D | NA |
| 21. | Opportunity to advance professionally | S | ? | D | NA |
| 22. | Opportunity to talk shop | S | ? | D | NA |
| 23. | Opportunity to direct work of others | S | ? | D | NA |
| 24. | Opportunity to help in policy-making | S | ? | D | NA |
| 25. | Opportunity to be your own boss | S | ? | D | NA |
| 26. | Interesting co-workers | S | ? | D | NA |
| 27. | Intelligent competent co-workers | S | ? | D | NA |

28.	Fun and relaxation with co-workers	S	?	D	NA
29.	Competition	S	?	D	NA
30.	Demands of patients or clients	S	?	D	NA
31.	Demands of supervisors	S	?	D	NA
32.	Intellectual challenge	S	?	D	NA
33.	Variety of activities required	S	?	D	NA
34.	Chance to do research	S	?	D	NA
35.	Chance to improve skills	S	?	D	NA
36.	Experience	S	?	D	NA
37.	Physical fatigue	S	?	D	NA
38.	Pressure on job	S	?	D	NA
39.	Hours (e.g. 9 to 5, 7 to 9) on all professional activities	S	?	D	NA
40.	Scheduling of regular office hours	S	?	D	NA
41.	Scheduling of evening duty	S	?	D	NA
42.	Scheduling of weekend duty	S	?	D	NA
43.	Opportunity to use learned skills	S	?	D	NA

44.	Opportunity to use aptitudes and abilities	S	?	D	NA
45.	Opportunity to use education	S	?	D	NA
46.	Feeling of achievement	S	?	D	NA
47.	Feeling of being needed	S	?	D	NA
48.	Feeling of accomplishment	S	?	D	NA
49.	Full credit for work done	S	?	D	NA
50.	Personal satisfaction of job well done	S	?	D	NA
51.	Chance to see results of work	S	?	D	NA
52.	Chance to follow job through to its conclusion	S	?	D	NA
53.	Recognition from your supervisors	S	?	D	NA
54.	Recognition from your peers	S	?	D	NA
55.	Thanks from those you benefit	S	?	D	NA
56.	Chance to evaluate own work	S	?	D	NA
57.	Evaluation of work by others	S	?	D	NA
58.	Opportunity to use initiative	S	?	D	NA
59.	Freedom to make decisions	S	?	D	NA

Personal autonomy	S	?	D	NA
<hr/>				
Freedom to use own judgement	S	?	D	NA
<hr/>				
Opportunity to do socially significant tasks through work	S	?	D	NA
<hr/>				
Opportunity to fulfill political civic responsibilities	S	?	D	NA
<hr/>				
Opportunity to fulfill educational civic responsibilities	S	?	D	NA
<hr/>				
Opportunity to fulfill recreational civic responsibilities	S	?	D	NA
<hr/>				
Opportunity to maintain desired religious activities	S	?	D	NA
<hr/>				
Amount of time free for charitable and/or moneyraising activities	S	?	D	NA
<hr/>				

Appendix E
Detailed Tables

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Table 1 Total Services Per Year, Pre and Post-Family Practice Nurse (FPN)

Practice	<u>Pre-Family Practice Nurse</u>		<u>Post-Family Practice Nurse</u>		<u>Percent Change</u> 1974 to 1975	<u>Percent Change</u> 1975 to 1976	
	1974	1975	Excluding FPN Solo Services	1975 Including FPN Solo Services		Excluding FPN Solo Services	Including FPN Solo Services
A	6,758	7,540	8,477	8,718	12%	12%	16%
B	10,375	11,082	14,786	15,268	7	33	38
C	11,636	12,589	12,490	12,708	8	- 1	1
D	11,957	13,781	11,682	11,851	15	-15	-14
E	8,841	8,923	9,775	10,370	1	10	16
F	6,185	9,955	12,959	13,693	61	30	38
Mean	9,292.00	10,645.00	11,694.83	12,101.33	15%	10%	14%
Province- wide Mean	8,609.80	8,680.81	9,491.19		1%	9%	
Province- wide SD	3,063.16 (n=106)	3,340.56 (n=98)	3,525.25 (n=133)				
±1 SD	5,547- 11,673	5,332- 12,029	5,966- 13,016				
±2 SD	2,483- 14,736	1,984- 15,378	2,441- 16,542				

Source: Medical Care Plan and Family Practice Nurse Daybook

TABLE 2. Number of Patients and Services Per Patient By Year in the Six Study Practices

	A	B	C	D	E	F	Mean
<u>PATIENTS</u>							
1974	1997	3875	3395	4415	3654	2864	3366.67
1975	2160	3770	3227	4612	3795	3473	3506.17
1976 (Total Practice)	2188	4496	2964	3590	4015	3743	3499.33
% Change 1974-75	8.16%	-2.71%	-4.95%	4.46%	3.86%	21.26%	4.14%
% Change 1975-76	1.30%	19.26%	-8.15%	-22.16%	5.80%	7.77%	-0.20%
<u>SERVICES PER PATIENT</u>							
1974	3.4	2.7	3.4	2.7	2.4	2.2	2.8
1975	3.5	2.9	3.9	3.0	2.4	2.9	3.0
1976 (Total Practice)	4.0	3.4	4.3	3.3	2.6	3.7	3.5
% Change 1974-75	2.9%	7.4%	14.7%	11.1%	0	31.8%	10.1%
% Change 1975-76	14.3%	17.2%	10.3%	10.0%	8.3%	27.6%	13.8%

Source: Medical Care Plan and Family Practice Nurse Daybooks

TABLE 3 Office Visit Patients by Sex and Age: 1974, 1975 and 1976

	1974						Mean
	A	B	C	D	E	F	
Sex							
Male	41%	36%	41%	36%	38%	30%	37.33%
Female	59	62	59	64	62	70	62.67
Age							
0-4	15%	19%	15%	15%	14%	19%	16.17
5-14	17	13	13	12	12	12	13.17
15-24	13	23	18	28	27	18	21.17
25-44	30	28	31	29	27	35	30.00
45-64	18	13	16	12	15	12	14.33
65+	7	4	7	4	5	4	5.17
TOTAL	1580	2895	3038	3827	2310	1653	15,303
	1975						
Sex							
Male	39%	36%	40%	37%	36%	32%	36.67%
Female	61	64	60	63	64	68	63.33
Age							
0-4	13%	18%	14%	15%	13%	20%	15.50%
5-14	18	11	13	12	12	13	13.17
15-24	15	23	15	25	29	19	21.00
25-44	30	29	32	31	27	34	30.50
45-64	17	14	19	13	14	10	14.50
65+	7	5	7	4	5	4	5.33
TOTAL	1692	3067	2896	3524	2400	2241	15,820
	1976 (Total Practice Patients)						
Sex							
Male	40%	38%	42%	38%	41%	36%	39.17%
Female	60	62	58	62	59	64	60.83
Age							
0-4	13%	18%	14%	14%	14%	20%	15.50%
5-14	17	14	16	11	13	11	13.67
15-24	15	21	14	24	29	23	21.00
25-44	30	29	30	33	26	32	30.00
45-64	18	13	18	13	14	10	14.33
65+	7	5	8	5	4	4	5.50
TOTAL	1810	4509	2861	3326	2955	3237	18,768

Source: Medical Care Plan and Family Practice Nurse Daybooks.

Table 4. Age and Sex Distribution of Office Visit Patients Seen by Physician and by Family Practice Nurse (FPN) (Solo or Shared) in The Six Practices in 1976

	A		B		C		D		E		F		All Patients Seen By M.D. (197)		All Patients Seen By FPN (94)	
	Total MD	Total FPN	Total MD	Total FPN	Total MD	Total FPN	Total MD	Total FPN	Total MD	Total FPN	Total MD	Total FPN	Total MD	Total FPN	Total MD	Total FPN
TOTAL PATIENTS	1,795	1,002	4,102	2,332	2,477	1,162	3,240	1,372	2,514	1,126	2,723	1,632	16,971	9,425		
SEX																
Males (%)	678 (40)	409 (41)	1,481 (36)	917 (39)	1,286 (42)	469 (40)	1,195 (37)	473 (24)	913 (36)	644 (54)	761 (29)	584 (36)	6,124 (36)	3,435 (39)		
Females (%)	1,027 (69)	593 (59)	2,621 (64)	1,415 (61)	1,191 (59)	693 (60)	2,055 (63)	899 (66)	1,601 (64)	742 (65)	2,052 (71)	1,048 (64)	30,847 (64)	5,991 (61)		
AGE																
0-4 (%)	220 (12)	182 (18)	719 (18)	543 (23)	373 (14)	209 (18)	466 (14)	222 (16)	372 (15)	225 (20)	507 (21)	347 (21)	3,717 (16)	1,721 (20)		
5-14 (%)	300 (18)	209 (21)	553 (13)	309 (13)	423 (16)	182 (16)	259 (8)	249 (18)	329 (13)	267 (23)	337 (13)	140 (8)	2,372 (13)	1,156 (13)		
15-24 (%)	256 (15)	142 (14)	888 (22)	431 (18)	377 (14)	165 (14)	722 (22)	329 (24)	717 (28)	328 (28)	627 (23)	420 (26)	3,637 (21)	1,407 (16)		
25-44 (%)	569 (32)	197 (20)	2,204 (54)	594 (25)	820 (31)	285 (25)	1,682 (51)	371 (27)	652 (26)	310 (27)	864 (32)	534 (33)	5,142 (30)	2,311 (26)		
45-64 (%)	312 (18)	178 (18)	536 (13)	309 (13)	471 (18)	215 (18)	415 (13)	208 (15)	342 (14)	203 (18)	276 (10)	129 (8)	2,152 (12)	1,122 (13)		
65+ (%)	108 (6)	93 (9)	202 (5)	166 (7)	203 (8)	115 (10)	146 (5)	162 (12)	202 (8)	73 (6)	92 (3)	60 (4)	853 (5)	369 (4)		

Source: Medical Care Plan and Family Practice Nurse Daybooks.

Table 5 Patient Services During the Last Six Months of Family Practice
Nurse Attachment by Practice, Location of Service,
and Responsibility

	(80)	(81)	(82)	(85)	(86)	
	FPH Solo	Shared Major	Shared Minor	MD Solo	Total	
OFFICE SERVICES	A	126	718	643	2673	4160
	B	204	815	1729	5487	8235
	C	146	560	542	5436	6684
	D	91	105	1291	4792	6279
	E	301	365	692	2640	3998
	F	375	295	1109	2659	4438
	Total:	1243 (4%)	2858 (8%)	6006 (18%)	23687 (70%)	33794
HOME SERVICES	A	45	6	-	412	463
	B	1	1	-	162	164
	C	1	-	1	76	78
	D	1	-	-	28	29
	E	63	2	8	113	186
	F	54	2	1	86	143
	Total:	165 (16%)	11 (1%)	10 (1%)	877 (82%)	1063
HOSPITAL SERVICES	A	2	5	-	457	464
	B	4	-	17	338	359
	C	-	-	-	202	202
	D	-	-	2	142	144
	E	1	1	15	1842	1859
	F	-	1	1	2781	2783
	Total:	7 (0%)	7 (0%)	35 (1%)	5762 (99%)	5811
OTHER SERVICES	A	-	2	5	50	57
	B	-	6	36	422	464
	C	-	6	26	346	378
	D	-	-	102	537	639
	E	-	12	11	469	492
	F	-	3	13	855	871
	Total:	- (0%)	29 (1%)	193 (7%)	2679 (92%)	2901

Source: Medical Care Plan and Family Practice Nurse Daybooks.

Table 6

Comparison of Proportions of Patient Services Involving
Physician Alone, Physician and Family Practice
Nurse, and Family Practice Nurse Alone

	A	B	C	D	E	F	Totals
Total Services							
1974	6,756	10,374	11,636	11,952	8,834	6,184	55,736
1975	7,540	11,082	12,569	13,781	8,923	9,955	63,870
1976	8,718	15,268	12,708	11,851	10,370	13,693	72,608
In 1976:	n %	n %	n %	n %	n %	n %	n %
All Services Involving Physician	8,477 97	14,786 97	12,490 98	11,682 99	9,775 94	12,959 95	70,159 97
All Services Involving FPN	2,410 28	4,169 27	2,296 18	2,617 22	2,252 22	2,800 20	16,534 23
Services Involving Physician Alone	n %	n %	n %	n %	n %	n %	n %
Services Shared by Physician and FPN	6,308 72	11,099 73	10,422 82	9,234 78	8,118 78	10,893 80	55,074 77
Services Involving FPN Alone	2,169 25	3,687 24	2,068 16	2,448 21	1,657 16	2,066 15	14,095 20
Services Involving FPN Alone	241 3	482 3	218 2	169 1	595 6	734 5	2,439 3

Source: Medical Care Plan and Family Practice Nurse Daybooks.

Table 7
Location of Patient Services Involving Physicians
and Family Practice Nurses

	A		B		C		D		E		F		TOTALS	
	MD (97)	FPN (94)	MD (94)	FPN (94)	MD (94)	FPN (94)	MD (94)	FPN (94)	MD (94)	FPN (94)	MD (94)	FPN (94)	MD (94)	FPN (94)
Total Services 1976 (Overlaps)	8,477	2,410	14,786	4,169	12,490	2,266	11,692	2,617	2,775	2,252	12,959	2,800	70,169	16,524
In 1976:														
Office Consul- tations and Assessments	300 (4%)	43 (2%)	575 (4%)	138 (3%)	431 (3%)	68 (3%)	341 (3%)	90 (3%)	410 (4%)	112 (5%)	331 (2%)	50 (2%)	2,303 (3%)	501 (3%)
Office Visits	6,715 (79%)	2,231 (93%)	12,530 (85%)	3,920 (94%)	10,917 (87%)	2,139 (94%)	9,819 (84%)	2,372 (91%)	5,555 (57%)	1,019 (85%)	6,440 (50%)	2,616 (93%)	51,077 (74%)	15,197 (92%)
Home Consul- tations and Assessments	--	--	--	--	--	--	--	--	0 (0)	2 (0)	6 (0)	--	15 (0)	2 (0)
Home Visits	616 (7%)	85 (3%)	243 (2%)	3 (0)	145 (1%)	3 (0)	47 (1%)	3 (0)	155 (2%)	110 (5%)	127 (1%)	101 (4%)	1,364 (2%)	305 (2%)
Hospital Con- sultations	--	--	--	--	--	--	--	--	1 (0)	--	07 (1%)	1 (0)	28 (0)	1 (0)
Hospital Out- patient Visits	362 (4%)	22 (1%)	577 (4%)	42 (1%)	81 (1%)	--	139 (1%)	3 (0)	1,370 (14%)	10 (0)	445 (3)	3 (0)	2,584 (4%)	61 (0)
Hospital In- patient Visits	366 (4%)	7 (0)	514 (3%)	14 (0)	263 (2%)	1 (0)	231 (2%)	2 (0)	1,445 (15%)	25 (1%)	4,112 (32%)	1 (0)	6,931 (10%)	50 (0)
Diagnostic and Therapeutic Services	6 (0)	1 (0)	163 (1%)	21 (1%)	352 (3%)	40 (2%)	678 (6%)	119 (5%)	176 (2%)	62 (3%)	155 (1%)	10 (0)	1,450 (2%)	253 (2%)
Obstetrics and Gynecology	53 (1%)	2 (0)	231 (2%)	13 (0)	98 (1%)	3 (0)	153 (1%)	2 (0)	89 (1%)	1 (0)	625 (5%)	2 (0)	1,249 (2%)	23 (0)
Other Hospital Inpatient Services	39 (0)	18 (1%)	343 (2%)	18 (1%)	203 (2%)	32 (1%)	274 (2%)	26 (1%)	533 (5%)	11 (1%)	631 (5%)	16 (1%)	2,023 (3%)	121 (1%)

Source: Medical Care Plan and Family Practice Nurse Daybooks.

Table 3. Presenting Complaints of Patients for Whom the Family Practice Nurse Took Major Responsibility

Nature of Complaint:*	Practice						Percent of all Complaints
	A (n=221)	B (n=178)	C (n=152)	D (n=63)	E (n=68)	F (n=131)	
General Symptoms	** %	3.9%	3.3%	2.3%	** %	3.0%	2.8%
Nervous System	**	**	**	**	**	**	0.8
Skin, Nails, Hair	**	3.9	3.3	2.3	4.4	**	2.5
Cardiovascular & Lymphatic Systems	**	**	**	2.3	**	2.3	0.6
Respiratory System	7.7	13.5	14.5	7.0	2.9	2.3	9.0
Musculoskeletal System	**	**	3.3	**	8.8	**	2.0
Digestive System	7.2	5.6	14.5	4.7	4.4	3.1	7.2
Urinary System	**	**	**	**	**	**	0.6
Male Reproductive System	**	**	**	**	**	**	0
Female Reproductive System incl. Breast	**	3.9	**	2.3	2.9	**	1.5
Eyes & Ears	2.3	2.2	5.3	4.7	2.9	2.3	3.0
Mental Health	**	**	**	**	**	**	0.3
Nonsymptomatic Visits:							
Routine Pregnancy	17.6	16.9	7.2	32.6	23.5	39.7	20.4
Well Baby	**	7.3	2.6	**	**	10.7	4.4
Other Examination	5.0	**	5.9	7.0	7.4	6.1	4.8
Followup Care	35.7	15.7	19.7	16.3	13.2	9.2	20.8
Other	18.1	22.5	16.4	18.6	25.0	17.6	19.3

*From the National Ambulatory Medical Care Survey

**Accounts for <2.0% of total complaints

Source: Family Practice Nurse Detailed Daybooks.

TABLE 9
Types of Medication "Prescribed" by Family Practice Nurses

	Practice						Percent of all Medications
	A (n=134)**	B (n=0)	C (n=107)	D (n=111)	E (n=38)	F (n=66)	
Antibiotics	46.3%	-	49.5%	36.0%	21.1%	36.4%	41.0%
Cardiovascular agents	9.0	-	12.1	8.1	2.6	4.5	8.3
Cold remedies	6.0	-	8.4	7.2	10.5	18.2	9.0
ASA & pain relievers	4.5	-	3.7	8.1	5.3	1.5	4.8
Sedating & tranquilizers	6.7	-	6.5	5.4	7.9	3.0	5.9
Oral contraceptives	1.5	-	3.7	7.2	13.2	10.6	5.7
Laxatives & stomach medicines	1.5	-	1.9	4.5	2.6	4.5	2.9
Replacement therapy	0.7	-	-	0.9	-	-	0.4
Vitamins & tonics	3.0	-	1.9	2.7	7.9	6.1	3.5
Misc.	20.9	-	12.1	19.8	28.9	15.2	18.4

* See text for a discussion of FPN responsibility in these "prescriptions".

** "n" refers to the number of medications recorded on the family practice nurse daybook

Source: Family Practice Nurse Detailed Daybooks.

Table 10 Situations in Which Family Practice Nurses
Routinely Provided Total Care*

Wellbaby and child exams	5 practices (out of 6)
Prenatal	3 practices
School physicals	3 practices
Well female exams	2 practices
Geriatric maintenance	3 practices
Hypertension (followup)	4 practices
Obesity (followup)	5 practices
Contraception	4 practices
Behavioral problems in children (followup)	1 practice

Source: Family Practice Nurse Function Transfer Questionnaire.

* Assessment, diagnosis, and management (physician may have been marginally involved).

Table 11 Actions Taken by the Family Practice Nurse

	Performed only With MD Involved	Sometimes Performed Without MD Involved
Medications prescribed	4 practices	1 practice
Advice or explanation	--	6 practices
History and physicals	2 practices	4 practices
Lab investigation	3 practices	3 practices
Minor medical and surgical procedures	4 practices	1 practice
Prenatal examinations	3 practices	3 practices
Pap and pelvic	1 practice	4 practices
Admissions and discharges	1 practice	--
Blood pressure check	1 practice	5 practices
Newborn examination	3 practices	2 practices
Referrals and consultations	4 practices	--
Immunizations	--	6 practices
Electrocardiogram	--	1 practice
Injections	--	6 practices
Term pregnancy	1 practice	--
Emergency care	2 practices	1 practice
Postpartum examination	3 practices	2 practices
Suturing	2 practices	--
Removing sutures	--	6 practices

Source: Family Practice Nurse Function Delegation Questionnaire.

Table 12 Physician and Family Practice Nurse
Apportionment of Time to Clinical and
Non-clinical Activities during the Last Six
Months of Attachment

	<u>Physician</u> (n=5)	<u>Family Practice Nurse</u> (n=5)
Greatest No. of Days Observed	24	25
Smallest No. of Days Observed	13	22
Total No. of Hours Observed	976.97	861.79
Percent of time in:		
Diagnosis and Management		
Office	62	64
Housecalls	4	6
Hospital	22	2
Telephone	3	5
Case Study and Professional Reading	2	2
Clerical and Housekeeping	1	9
Other	6	11

Source: Time Study Sheets

