

Health Care Evaluation in a Government Agency: Goals, Organization, and Software

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RÉSUMÉ

La Commission des Services de Santé du Manitoba doit faire face à une demande croissante de données ponctuelles de la part du Gouvernement, des commissions de santé et autres organismes planificateurs ou fournisseurs de services. Ces utilisateurs peuvent maintenant accéder à un système de données suffisamment maniable, compte tenu de la diversité des applications recherchées (contrôle des coûts sans compromettre la qualité des soins, évaluation des programmes . . .). Toutes les provinces ont à résoudre des problèmes similaires à partir de données semblables: demandes d'indemnité des médecins, feuilles de renvoi des malades, états des soins à domicile, etc. . .). Un Centre d'Information met à la disposition des utilisateurs potentiels tous renseignements concernant les données disponibles, restrictions d'accès, software . . . Le traitement des données, qui s'effectue grâce à l'utilisation conjointe du Health Applications System (HAS) et du Statistical Analysis System (SAS), ouvre la voie à l'analyse des questions désignées comme prioritaires par Statistique Canada, à savoir, utilisation des soins cliniques, morbidité et mortalité dans les hôpitaux. Un aspect essentiel du projet est d'exploiter les outils analytiques disponibles de façon à guider le système de santé sur une voie constructive; les résultats analysés seront donc donnés en retour aux hôpitaux et autres centres de soins dans la mesure du possible..

ABSTRACT

The demands on the Manitoba Health Services Commission to provide timely data to assist government, health boards, planners and service providers have been increasing. Users have wanted a system to provide easy manipulation of data to address questions of cost containment without compromising quality of care, of differences in utilization across areas, and of program evaluation. Such problems are similar across provinces, as are the data sets available to address them—hospital admissions/separations, physician claims, personal care home records, and so forth.

The Manitoba Health Services Commission is setting up an Information Centre to instruct potential end users on data base availability, restrictions on access, software, and so on. Users will be running the Health Applications System (HAS) in combination with the well-known Statistical Analysis System (SAS) to do their own data analysis. Analysts will be able to address issues singled out by Statistics Canada as top priority information needs: health care utilization, hospital morbidity, and mortality. An effort will be made to feed back information to hospitals and providers; the critical task is to use available analytic tools to help provide constructive direction to the health care system.

Introduction

Health care planners need easy access to system-wide data on health care usage to permit monitoring of utilization patterns, to aid strategic planning, and to permit program evaluation. Wennberg (1986) has noted that routinely-collected administrative data can be used to address questions of great concern:

- 1) Can the low cost practice patterns seen in some communities be safely adopted in high cost communities?
- 2) Can health care costs be contained without compromising patient outcomes?
- 3) What is the meaning of hospital-specific differences in outcomes and what can be done about them?
- 4) What are the costs and risks of commonly used medical care?

Administrative data generated as a part of Canada's universal health insurance system can aid in answering such questions. As one example, the Manitoba Health Services Commission (MHSC) collects uniform, province-wide information on hospital admissions/separations and on doctor/patient interactions. These two computer-readable files contain unique patient, physician, and hospital identifiers. These data, along with the file on those registered for health care coverage in Manitoba, have the potential for serving planners well.

The Canadian Medical Association's recent publication *Health: A Need for Redirection* (Task Force on the Allocation of Health Care Resources, 1985) cites Evans (1984), highlighting the relevance of such information:

The descriptive data generated by the present insurance systems represents an enormous, and virtually untapped, resource. It would be possible to go through this data, identifying on the basis of current evidence the effective and ineffective practices, encouraging the former, and weeding out the latter. An energetic reimbursement agency would investigate the wide and persistent variations in surgical rates across regions, or the large differences in lengths of stay.

Hospital File

The hospital file is built on the basis of each hospital separation and contains dates of admission and discharge, limited information on services rendered, up to sixteen diagnoses and twelve surgical procedures, as well as identification numbers of the surgeon or attending physician, consultants, and anesthetist. Surveillance artifacts are minimal, since all hospitals are legally required to submit information on all hospital stays (Webb et al., 1981). Unique physician and hospital codes permit determining the number of procedures of a given type performed by any physician (regardless of where the surgery was done) and the number performed in each hospital. Diagnoses reported on hospital claims have been compared with those on hospital records and those on physician claims with satisfactory results (Roos et al., 1979; Roos et al., 1982; Roos et al., 1985).

The following data seem to be commonly available on hospital claims collected in almost all Canadian provinces and in many American settings. Sufficient information to "identify" patients for research purposes is necessary for studies counting the number of individuals receiving services, the number readmitted after a diagnostic or therapeutic procedure, and so forth.

Such items include:

- Date of birth
- Sex
- Place of Residence
- Identifying Number (Individual or Family)

Other items for analysis include:

- Discharge Diagnoses (several)
- Procedures Performed in Hospital (several)
- Hospital
- Date of Admission
- Date of Discharge
- Discharge Code (Death, Another Hospital, Home, etc.)

Secondary items:

- Admitting Physician Identifying Number
- Physician Performing Each Procedure (Identifying Number)

Medical Claims File

The medical claims file is the vehicle for paying physicians. Claims are submitted by physicians for services rendered to patients. These claims are filed on a temporal basis and contain physician's identification number, patient's identifying information, patient's residence (checked against the population registry), tariff (nature of services such as a consultation, complete physical examination, regional examination, follow-up visit, and the like), and diagnosis (ICD-9-CM code). As described elsewhere, the claims appear to provide valid data on total patient-physician contact (Roos et al., 1979; 1982). In a fee-for-service system, claims should not underestimate the volume of physician contact, and since physician practice profiles are routinely audited with detailed analyses of outlier practice patterns, a significant amount of overbilling appears unlikely (Roos, 1980).

Developing End-user Computing Capabilities

Tabular information has been produced by the Commission for many years. However, recently increasing demands for multidimensional and more timely data to assist government, health boards, planners and service providers in making difficult decisions have indicated the need for more sophistication in analysis and display. The inflexibility of the tabular format severely limits planners' ability to organize and reduce the numbers into more easily understandable formats, to refine problems with additional data, and to

encourage provider input. The easy manipulation of data so necessary for program planning has not been possible within the existing system. In order to improve the Commission's ability to access administrative data for health planning and evaluation, and to provide support to the end users, the Manitoba Health Services Commission is creating an Information Centre.

Potential users of the Manitoba data deal with essentially the same problems faced by other provinces as Manitoba's data base organization of hospital admission/separation abstracts and physician claims is very similar to that of most other provinces. Data from hospital admission/separation abstracts are particularly amenable to analysis elsewhere in Canada. Recently, users of Health Division data at Statistics Canada singled out data on mortality, health care utilization, and hospital morbidity—along with person-based statistics—as top-priority information needs. This work is oriented toward making it possible for governments to organize and address these data.

HAS (Health Applications System) provides a fast, low-cost management information system for analyzing data available on existing hospital admission/separation abstracts, medical claims, or cancer registries. This system is designed to allow health analysts and managers to make timely computer runs under their own control with minimal help from programming staff. The Health Applications System is based on SAS, a fourth generation computer language (SAS User's Guide: Basics, 1985). HAS's modular structure, built using SAS macros, permits users to do their own data analysis at their own level of sophistication.

HAS is extremely flexible as the user can select appropriate options and link predesigned modules into a single program stream. An analysis module, the RATES procedure, computes hospitalization rates, length of stay, and mortality statistics. Several modules are available for facilitating information retrieval by flexibly combining and summarizing data to produce files based on one record per case. Most directly applicable is the COMBINE procedure, which pairs abstracts after any medical or surgical event. This procedure can be used to identify hospital readmissions for quality control purposes.

Planned Activities

The project is designed to help planners with:

- a) The ongoing monitoring of hospital utilization. Recent intervention strategies to address escalating costs and demands for more acute care beds have focused on the lengths of stay and rates of admission for certain diagnostic and procedural categories. The RATES module within HAS can be used to compare utilization across physicians, facilities, and areas. This information would then be shared with the individuals concerned and serve as a focal point for discussions and the development of consensus surrounding reductions in rates of admission and average lengths of stay for certain problems. This is a top-priority application.
- b) Strategic planning. Analysis should help delineate existing service deliv-

ery patterns, project usage patterns as the population ages, and identify high-risk populations.

- c) Program evaluation. Monitoring mortality and readmission rates can flag areas of concern which can then be referred to the appropriate agencies. A detailed study of readmission within 30 days of discharge (using the COMBINE module within HAS) may help a hospital in improving its discharge criteria; such analysis can facilitate monitoring the effect of interventions designed to reduce length of stay or subsequent morbidity and mortality.
- d) The manipulation of smaller data systems based at the Commission. Planning for Community Health Centres focuses on the provision of primary health care to a defined catchment area. In a future application the RATES module could analyze activity in these defined areas and compare patterns before and after Centres opened. The COMBINE module could be used in auditing tracer conditions to assure that appropriate follow-up care has occurred.

Specific Questions

Examples of specific questions that can be answered using HAS are:

- 1) Has Hospital A succeeded in reducing the average length of stay for cholecystectomies since last year? Has there been an increase in the number of procedures performed? How does this compare to Hospitals B, C, and D? What has been the impact of the attempt to reduce average length of stay in this hospital on the readmissions for known complications of this procedure?
- 2) How many individuals in each region of the province were hospitalized with a diagnosis of heart disease this year? How does this compare with last year? What age and sex groups were primarily affected? What was their average length of stay, rate of admission, and total days used per thousand population according to small area or region? How does this compare to the amount of coronary artery bypass graft surgery performed for residents of each region of the province?

Analyses of the Manitoba data have been conducted by government personnel and academics with extensive programming input (Roch et al., 1985; Roos et al., 1986). Custom programming is expensive and impractical for planners and evaluators to use regularly. Because these individuals could better perform their jobs with improved access to the data base, the information centre is designed to facilitate such access and analysis.

As noted from the questions posed above, the issues may involve identifying individual hospitals with particular problems. Governments may legitimately feel that such politically sensitive material should be restricted. Academic investigators' access to MHSC data has been with the understanding that individual hospitals not be identified in the publications. Improving the government's inhouse analytical capability is most worthwhile in facilitating its ability to deal with problem situations.

Feedback

Finally, an effort will be made to feed back information to hospitals and providers (Wennberg, 1984; Schroeder, 1984). Some users will be analyzing the data for planning within government departments: feedback issues will be less important for them. Preliminary plans are to feed back results to each hospital, comparing their data with provincial, Winnipeg, and rural means. Hospitals will not see specific data from other hospitals and areas unless this is agreed to by all the parties concerned.

Although feedback is key to the successful communication of information and will hopefully lead to the desired behavioural changes, this process is fraught with problems. Many hospital boards, administrators and physicians are not familiar with the hospital utilization literature and may have difficulty in grasping the essential concepts. Physicians worry that a reduction in rates of admission will interfere with their ability to provide quality care. Area residents may be concerned that, when they need hospital services, they will be denied access to them.

Recent work in Maine (American Medical Association, 1986) has suggested grounds for optimism in managing change and alleviating physician concerns. The Maine study involved analyzing rates of a number of common surgical procedures and feeding back information to physicians in each area. The Maine experience has suggested that outlier patterns of practice can be brought closer to consensus and that economic savings can be achieved without damaging quality of care. At the same time, increased management monitoring of the health care system will undoubtedly result in both controversy and change (Berki, 1985). The task for Manitoba and other Canadian provinces is to use available analytic tools to help provide constructive direction to the health care system.

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References

- American Medical Association: *Confronting Regional Variations: The Maine Approach*. Chicago: American Medical Association, 1986.
- Berki SE: *Commentary: DRGs, incentives, hospitals, and physicians*. *Health Affairs* 1985; 4(4):70-76.
- Evans RG: *Strained Mercy: The Economics of Canadian Health Care*. Toronto: Butterworths, 1984.

- Roch DJ, Evans RG, Pascoe DW: Manitoba and Medicare—1971 to the Present. Department of Research, Manitoba Health, 1985.
- Roos LL, Cageorge SM, Austen E, Lohr KN: Using computers to identify complications after surgery. *Am J Public Health* 1985; 75:1288-1295.
- Roos LL, Nicol JP, Johnson C, Roos NP: Using administrative data banks for research and evaluation: a case study. *Eval Q* 1979; 3:236-255.
- Roos LL, Roos NP, Cageorge SM, Nicol JP: How good are the data? Reliability of one health care data bank. *Med Care* 1982; 20:266-276.
- Roos LL, Cageorge SM, Roos NP, Danzinger RG: Centralization, certification, and monitoring: readmissions and complications after surgery. *Med Care* 1986; 24:1044-1066.
- Roos NP: Impact of the organization of practice on quality of care and physician productivity. *Med Care* 1980; 18:347-359.
- SAS Institute: SAS User's Guide: Basics, Version 5 Edition. Cary, North Carolina: SAS Institute, 1985.
- Schroeder SA: ReViews: a medical educator. *Health Affairs* 1984; 3(2):55-62.
- Task Force on the Allocation of Health Care Resources: Health: A Need for Redirection. Canadian Medical Association, Ottawa, Ontario, 1985.
- Webb EJ, Campbell DT, Schwartz RD, Sechrest L, Grove JB: *Nonreactive Measures in the Social Sciences*. Boston: Houghton Mifflin, 1981.
- Wennberg JE: Dealing with medical practice variations: a proposal for action. *Health Affairs* 1984; 3(2):6-32.
- Wennberg JE: Testimony to House Committee on Energy and Commerce, Subcommittee on Health and the Environment, Washington, DC: July 16, 1986.