

# Evaluation and Hospital Funding

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## ABSTRACT

Increasing hospital costs in both Canada and the United States forces a re-examination of the funding system incentives. The current funding based on standards gives administrators and planners the wrong incentives while a funding system based on cost-outcome or cost-effectiveness analysis would change the incentives towards shorter stays and thus less pressure on capital funding.

## RÉSUMÉ

Les augmentations dans les coûts hospitaliers dans le Canada et les Etats-Unis ont forcées une réexamination des primes dans le système de subventions. Le système actuel, basé sur des normes, donne aux administrateurs et aux planificateurs les mauvais objectifs à atteindre pendant qu'un système de subventions basé sur les principes de coûts—résultats ou bien coûts—efficacité produirait des résultats qui favoriseraient des séjours plus courts et produiraient donc moins de demands de financement capitaux.

## Evaluation and Hospital Reimbursement\*

The costs of hospital care continue to escalate and despite the attempts by governments to force more efficient management by limiting budget increases, there are pressures within the system to force greater government spending on this function and consequently greater taxes will ultimately be needed.

One of the reasons for the spiraling costs in hospitals is the confusion between evaluation of inputs and outputs. Too great an emphasis on evaluating inputs develops from the current funding formula. Greater attention should be given to the measurement of outcome.

Specifically, the current formula rewards a hospital for keeping beds full with demonstrable need being the only way staff or capital can be added. Niskanen, for example, has proposed a theory which suggests that a bureau manager [the CEO, nursing director, finance director, or comptroller] will improve his/her utility [salary, power] if the size of the bureau increases). While administrators tend to suggest that admissions and discharges are the responsibility of the medical staff; the medical staff will find their own

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interests enhanced by keeping the hospital administrators happy as well as in ensuring that budget increases for staff and capital occur.

A new formula as proposed in this paper may take some time to accomplish but could have the effect of changing the incentives to enhancing the quantity and quality of the outcomes rather than the inputs. Suppose it were possible to agree on a standardized measure of outcome and that costs could be allocated on a case or type of case basis so that a cost-outcome ratio could be calculated. A funding formula based on a standard set across hospitals for the cost-outcome expected would enhance the emphasis on performance within the hospital, would reward quick and efficient treatment of cases and in the process relieve the pressure hospitals experience in finding beds to accommodate admissions. Since capital expenditures are significant and always result in continuing operating expenditures, any formula which reduces the need for capital is advantageous.

In exploring this topic, we will first examine the Ontario funding formula as an example of the incentives it establishes and then examine the information system, the methodology, and the benefits of a cost-outcome funding formula.

### **The Ontario Funding Formula**

The Ontario funding formula means that a hospital can expect to receive the previous years global budget with an inflation adjustment. Small hospitals and teaching hospitals deviate from the standard formula.

Originally, the global budget was based on how much the hospital had received in the previous year based on a bed-day basis. Hospitals had been calculating their costs per bed per days occupied and those costs clearly varied depending on whether the hospital was a teaching hospital, the size of the hospital, the types of equipment the hospital used, etc. The incentive under the bed-day system of remuneration was to prolong the stay or delay the discharge of patients. The following examples will serve to demonstrate.

Presumably the government realized the folly of this system so they moved to the global budget system with controls built into the system. In particular, Ontario is measuring inputs to assure quality and also to assure efficiency. The quarterly Hospital Information System published by the Ontario Hospital Association and Statistics Canada publishes for each hospital of a certain size a number of measures. For instance for the pharmacy, the paid hours per total patient day, the non-medical salary cost per total patient day, the supplies and other expenditure costs per total patient day, and total cost per total patient day are published for each hospital along with the mean.

One might question why one hospital uses, for example, an average 0.8 hours more per newborn admission in obstetrics than another or why the non-medical salary cost per total patient day in one hospital is \$2.39 whereas in another it is \$1.68. Are there differences in standards or tasks or more importantly, are the *same outcomes* being achieved at different costs? At this point there is no evidence to suggest that Hospital A provides better outcomes, only that there will be pressure on Hospital A to reduce inputs and/or explain the need for greater inputs.

**Table 1**  
**Hypothetical Actual Costs For Surgery Patient**

	Actual Costs	Funding	(Loss) Gain	Cumulative Loss
Day 1	300	200	(100)	(100)
Day 2	400	200	(200)	(300)
Day 3	250	200	(50)	(350)
Day 4	200	200	0	(350)
Day 5	150	200	50	(300)
Day 6	125	200	75	(225)
Day 7	125	200	75	(150)
Day 8	125	200	75	(75)
Day 9	125	200	75	0
Day 10	125	200	75	75

One way to reduce the inputs is to accept easier cases requiring fewer or less costly inputs. For example, suppose there is a choice in whether to book the operating room for some elective surgery (hip replacement for an arthritic) and there are two potential patients for the same time slot; one with a heart condition and excess weight and one who is in otherwise good health. One could predict the latter case would use fewer resources and consequently be more acceptable to a hospital wanting to limit the number and/or costs of inputs.

### Education In Health Care

Scales have been developed for Fine Motor, Gross Motor, Auditory-Attention/Memory, and Visual-Attention/Memory for preschoolers so why can't such scales be developed for patients (Amdur)? If such a measure were applied at admission and at discharge, the hospital would then be evaluating the effect (marginal benefit) it had on that particular patient. For instance, if a patient scores 21 on admission (percentile = 0) but on discharge scores 29 (percentile = 35), that patient has received a marginal benefit of 8 units or a 35 percentile unit change. Either way, the outcome of the hospital is measured.

Development of standardized measurements may take some time particularly in a hospital setting where there are many varied programs. Those who have worked with the elderly know that for some the goal may be to reduce or even eliminate deterioration rather than seek improvements in scores. Thus, hospitals with both acute and chronic care facilities may have many additional measures to deal with. Questions arise as to how to measure the nursery for new born babies. In the case of normal infants, the care is to ensure that the child is discharged free of infection and rash, and with as little weight loss as possible. On the other hand, dealing with premature infants and those born with special problems (whether those be drug

addictions, handicaps, or various minor medical problems) may involve a whole different set of outcome measures.

The authors do not wish to minimize the task or the cost of developing measures that effectively measure outcome. Furthermore, such measures (such as objective goal attainment scales) (McCready and Rahn, 1983b) must be validated (Willer and Miller, 1976) and subject to audit, just as the hospital budget is subject to audit. The least accurate measure of outcome is narrative case recording; the next is a daily log on each patient (which hospitals currently do); social indicators; global assessment scales; subjective problem-oriented scales; subject goal attainment scale; development inventory; and objective goal attainment scale which is the most reliable. The information is more useful (as shall be shown) than what is collected now and once the initial scales are developed and validated, the information systems on a computer ought to be relatively inexpensive to maintain (Rahn).

Another complication, although it is true in all cases is that the setting itself can lead to under- or over-estimation of a person's normal performance (Rubenstein et. al.). The problem is seen as minimal in that the bias ought not differ between hospitals.

Finally, another interfering variable is the physician who is not employed by the hospital but contracts with the patient for some of the related services. In the suggested model, there would be some logic in hospitalized patients (personally or through insurance) owing the hospital for all services and the hospital paying the physician for those services provided at the hospital.

The careful reader will note that an argument has been made for a before and after measure of functioning. It is only if there is a measure at admission can an effective change attributable to hospital care be determined. Cases which are admitted with extremely low scores may incur higher costs to achieve a given marginal change *or* alternatively it may be that the highest costs are to achieve the last marginal unit of change. That is an hypothesis that would have to be tested but is subject to reasonably accurate testing once the objective scale measurements are in place.

Sorenson and Grove have made the patient functioning ratings subject to intermediate measurement as well (Sorenson and Grove, 1978). For long-term care such periodic measurements of patient functioning could act as triggers for the funding agent but could also be extremely useful in establishing the care plan for the next period of time.

While there are those who believe that the patient's will or determination can greatly enhance the percentile improvement as can miracles (unexplained or from God), the argument here is that the hospital has a role to play in the medical, psychological, and spiritual realm and it may be as important for health care workers to stimulate the individual's will as it is for them to provide medication or surgical instruments. If that is the case, then the outcome can truly be attributed to the hospital. While it is recognized that most hospitals have social workers and chaplains available, even such things as colour in wards and halls, the quality of the personality of the nursing staff, cleaning, and laboratory staff, and the appearance of meals could have an impact on the percentile improvement in a given patient.

It is also recognized that the patient arrives with the psychological and spiritual baggage of years of conditioning. Family and friends can influence this in the short term as they have in the longer term. Thus, while we have attributed the full percentile change to the hospital and its medical staff, that is somewhat unfair and yet given the mix of people in the community, is it really unfair? Every hospital has the same opportunity to receive the same mix of psychological and spiritual problem cases and it is how they deal with those cases that really tests their program outcomes.

In summation, it is important to develop standardized, objective, auditable, measures of patient functioning and yet keep the information system as inexpensive and unobtrusive as possible in order to move to the next stage in this paper.

Sylvester Berki (1972) in his book *Hospital Economics* suggests that the type of measure of outcome that is proposed here is best for determining the social efficiency of medical resource allocation. He also suggests that the lack of work on end-result measures has to do with imaginative failure. Further, some economists believe that relative prices reflect relative satisfactions and consequently it is not analytically required to measure end results since prices already do this. However, in response to this it is only necessary to detail consumer ignorance, absence of free entry, differential accessibility, and the physician as agent for arguments against hospital prices as measures of consumer satisfaction.

More recently the United States Government has proposed cost containment measures to place a limit on operating revenues as well as capital controls on a nationwide basis along with standards on number of beds and occupancy levels. While it is generally recognized that the cost controls would do little to reward efficiency (Durm and Lefkowitz, 1978) it is expected that hospital administrators might be powerless to do anything except cut back on community services which they control.

While we would be the first to agree that the first attempts to control costs involve the development of standards and the measurement of services, these usually prove to be inadequate. In the U.S. there have been recent decisions to develop "severity indexes" indicating the inadequacy of previous cost containment measures.

In the 1980s, the Department of Health and Human Services (DHHS) has been introducing hospital reimbursement prospectively based on classes of patients. The new system is based on Diagnostic Related Groups (DRGs) originally developed at Yale University to divide patients into 23 major diagnostic categories, further subdivided into 356 DRGs subdivided according to age and the presence or absence of complications (Curtin, 1983). The change essentially mandates a change from a per bed day basis to a cost per discharge system. At John Hopkins Hospital, work has been going on to relate costs to the severity of the illness at admission (Horn et. al., 1982). This sounds like an interim step in the direction being advocated in the next sections of this paper.

## Proposed Schema For Hospital Funding

It is proposed that once a change (improvement) in patient functioning [which may be a decline or halt in the deterioration of patient functioning] can be established and a standard cost per unit improvement can be set, the hospital ought to be funded for the number of units of improvement times the standardized cost (the latter varying for each type of presenting problem and also varying according to the severity of the case [recall the discussion on how marginal units may cost different amounts depending on how large or small the deficit from normality]).

The hospital that cannot achieve the outcome at the standardized cost would have three options. First, it could opt to become more efficient in the provision of the particular program or service. Second, it could opt to be more efficient in the provision of some other program in which it can achieve economies of scale *or* specialization (in economic terminology, a comparative advantage) and cross-subsidize the program in which it is less efficient. The third alternative would be to drop the program in its entirety in order to reduce its losses.

There would be little incentive to fill beds with patients who had already achieved the requisite level of functioning and consequently there would be less pressure on the taxpayer to construct new hospital beds with the attendant capital costs and subsequent operating expenditures. If we return to Table 1, it should become evident why the pressure on beds would be reduced.

In Table 1, if the patient has achieved his maximum level of functioning (or we could have moved to achieve some desired level of functioning) at day 7, the funding available to the hospital for a standard case of this nature was \$1550, the hospital would have broken even. Suppose, because this hospital was more efficient at this type of case and could achieve the same level of functioning at day 5, the hospital costs would have been \$1300 and the hospital would have had a \$250 profit. Furthermore, the incentive is to discharge the patient at day 7 instead of day 9 (to break even) or earlier (to make a profit) and thus the bed could be used at least two days on another case. If every bed in the hospital is used more intensely, there will be little pressure to build additional beds.

Let's take another peek at the difference in the measure being proposed from current evaluation measures.

In Table 2 on a per bed day basis, Hospital C would be favoured. On the average cost per admission Hospital B would be favoured but on the basis of some measure of outcome, Hospital A is favoured. The generic term success has been used here whereas it has been argued in this paper that some more specific objective scale of success ought to be used. The argument is, nevertheless, identical.

There will undoubtedly be those who argue that objective scales of outcome miss something important in our health care system. Specifically, some people need a rest and consequently ought to use the hospital as a result. Why should tax dollars pay when others pay for their rest at resorts in vacation communities or by hiring homemakers at home? Indeed, this fund-

ing system encourages a more rational allocation of resources and if someone needs homecare that will cost the taxpayer less than the same amount of care in a hospital setting.

**Table 2**

**Hypothetical Example of Cost-Effectiveness**

	Unit Cost Per Bed Day	Average Number of Bed Days Per Admission	Average Cost Per Admission	Success Rate	Average Cost Per Success (100 cases)
Hospital A	250	8	2000	50%	4000
Hospital B	380	5	1900	40%	4750
Hospital C	200	16	3200	70%	4571.4

Source: A similar table appeared in McCready and Rahn *The Social Service System in Ontario: Options for Accountability*, 1983 p. 42.

The schema suggested here is not one which would yield either a fixed utility (outcome) or a fixed budget (McCready and Rahn, 1986). It ought to yield greater utility per dollar of spending but at this point we would not be prepared to prescribe the amount of outcome or the amount of budget society "ought" to be willing to achieve. Rather, the purpose here is to make rational moves towards achieving greater health status per dollar spent.

### Conclusion

Starting with the current system in which the evaluation is of input standards, it was shown that the wrong incentives emerged for health care providers. To switch to a new system, however, would require two steps; first, standardized measures of outcome; and second, a funding formula based on outcome.

There is no suggestion that the new system is easy to implement nor cost less but the benefit/cost ratio is likely to be greater than one and consequently the proposed funding based on hospital outcomes ought to be a goal to which we aspire. An interim measure might be to take the DRG route with a severity of case component as is being done in the U.S. Another alternative would be to move directly to outcome measure in a few specific types of cases and expand over time with quality checks and interdisciplinary research leading to ultimate implementation.

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