

# Executive Summary

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The primary objective of this project is the development of methodologies to estimate the marginal costs of hospitalizations for different types of patients, both for day surgery and acute inpatient. In this project's report, "marginal cost" refers to the change in total hospital expenditures associated with treating one additional patient.

This analysis is motivated by the informational needs of provincial Ministries of health. The analysis and interpretation assumes that the primary users of the findings will be provincial Ministries of health and other significant purchasers of health care services, such as the B.C. Health Services Purchasing Organization (HSPO).

Estimating marginal costs of hospitalized patients is complex; hospitals purchase a broad array of equipment and services to provide care to patients. This includes nursing care and sophisticated diagnostic and therapeutic equipment. Accordingly, a range of data sources is required in order to derive estimates of patients' marginal cost. These complementary datasets include statistical and financial data from hospitals' chart of accounts, activity-based costing data, workforce data and lastly, clinical, demographic and administrative data abstracted from the patient's chart and submitted to the Canadian Institute for Health Information (CIHI). British Columbia (B.C.) and Ontario have consented to have their anonymous data included in this analysis. Ethics approval was provided by the University of British Columbia.

The report will first describe the methodology used to estimate marginal costs of patients' hospitalizations. Since the concept of marginal cost is based on the assumptions of the availability of labour and equipment to treat additional patients, deriving estimates of marginal costs are subject to important hospital-specific issues of constraints. Consequently, estimates of marginal cost will be presented for an array of different assumptions which emulate operating conditions within hospitals, each of which has critical operational and policy implications.

The first scenario assumes that there is currently excess capacity of most, if not all, hospital resources (e.g., beds, OR time, nurses, imaging technologists, therapists) required to accommodate one additional case. Is this assumption reasonable considering the wide-spread existence of extensive hospital wait lists? In other words, is it logical to assume that hospitals currently have already-paid-for resources that remain idle and are not being used? Without passing judgment on the validity of this assumption, estimates of marginal costs are derived.

In the second scenario, estimates of marginal cost are based on differing assumptions regarding the availability and costs of additional labour resources and equipment. While these assumptions

may be operationally realistic for a single incremental case, those same assumptions become progressively more unrealistic as the number of incremental cases increases (e.g., to 10 or 100 additional cases).

Under the different scenarios, the analyses will present estimates of marginal cost as a percentage of average cost. The rationale for presenting the results in this format is based on how provincial Ministries of health examine hospitals' costs. Currently, hospitals' costs are compared to the national average cost of patients with the same clinical profile (CIHI routinely provides the average cost information to Ministries of health and hospitals).

The concept of marginal funding has considerable appeal to both funders and academics alike since the method is seen as a way to motivate hospitals to improve efficiencies without actually having to identify, or establish, that remediable inefficiencies or excess capacity actually exists.

However, if the assumptions about marginal costs change the determination of which scenarios are more accurate, there is room for subjective opinions regarding which scenarios reflect the hospitals' ability to conduct additional cases. If this is the case, and if the assumptions about how much excess capacity is readily available are wrong and funding proceeds on the basis of marginal cost, serious service disruptions, substitutions between care types and/or budget deficits may be an inevitable result.

In summary, while it has been demonstrated that it is possible to calculate hospital marginal costs with some considerable degree of accuracy using available data and based on various scenarios about which additional or excess resources are available, the application of marginal cost information for hospital funding should be considered as a "handle with care" situation.