

Public Reporting of the Hospital Standardized Mortality Ratio (HSMR): Implications for the Canadian Approach to Safety and Quality in Health Care

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“Things do not get better by being left alone.” – Sir Winston Churchill

The Canadian Institute for Health Information (CIHI) recently published a pan-Canadian report on institutional and health-region level in-hospital mortality rates. Entitled *HSMR: A New Approach for Measuring Hospital Mortality Trends in Canada*, the report utilizes the hospital standardized mortality ratio (HSMR), a “big-dot measure” intended for use in improving patient safety by reducing preventable in-hospital deaths⁽ⁱ⁾. According to CIHI officials, the HSMR is to be used to track improvement in preventing in-hospital mortality over time ^(ii, iii). It is a ratio that compares the actual number of deaths in a hospital or health region to the number of deaths expected given the types of patients. This measure was developed in the United Kingdom and has been used in several countries to measure inpatient deaths, stimulate hospital care improvements and track success in improving care and decreasing inpatient mortality ^(iv, v, vi, vii). Others have used the HSMR in conjunction with other measurements to provide more detailed data regarding hospital performance ^(viii).

The HSMR calculated by CIHI compared the actual number of deaths among 65 diagnoses ^(ix) accounting for 80% of in-patient mortality to the expected mortality based on the sum of the probabilities of in-hospital death. The probabilities of in-hospital death were determined using a logistic regression model that uses age, sex, length-of-stay group, admission category, diagnosis group, co-morbidity group and transfers to predict death. The data were collected from all acute care hospitals in Canada, excluding Quebec, with an annual number of expected deaths greater than or equal to 20, between April 2004 and March 2007 ^(x). CIHI engaged the hospitals in a data validation process in advance of releasing the public report. The report presents the HSMR with and without palliative care patients on a yearly basis by hospital and health region.

Hospitals were provided with a HSMR toolkit that contained more detailed, confidential reports

containing HSMRs calculated for medical and surgical programs and intensive care unit cases. Results were broken down quarterly, and hospitals were also provided with hospital peer group data ranges. The toolkit also contained resources describing starting points for identifying areas of improvement.

The HSMR report captured Canadians' attention, with multiple local, provincial and national media outlets reporting on the results. Although CIHI made repeated assertions that the HSMR should not be used to compare institutions, but rather as an internal monitor of quality of care, two major Canadian newspapers nonetheless published rankings of hospital performance. The Globe and Mail utilized the HSMR that included palliative care patients to rank 85 hospitals whereas the Toronto Star used the HSMR *without* palliative care patients to rank the top five hospitals and the bottom five hospitals. As these rankings used slightly different numbers, there was discordance between the two publicly printed lists of hospitals. Other media sources also pointed out high and low performing hospitals, but did not produce a rank order. This reaction by the media demonstrates the difficulty, at the public level, of interpreting a complex measure such as the HSMR. However, despite this misunderstanding, the media attention was successful in drawing the public's attention to the issue of quality of health care and stimulating local, provincial and national discussion on the subject.

Overall, the HSMR report is a valuable contribution to the improvement of health care quality in Canada. Unlike other countries such as the United States and the United Kingdom, measurement of health care performance is relatively new in Canada. First conducted by Florence Nightingale in the 1800s in the United Kingdom and in British military hospitals, and further practiced by Ernest Codman in New England in the early 1900s, the monitoring of outcomes in hospitals has been proposed as an intervention that may lead to reductions in hospital mortality ^(xi).

Prior to the commencement of CIHI's HSMR project, large-scale comprehensive monitoring of hospital outcomes had not occurred in Canada. Individual hospitals, hospital corporations or health regions may have conducted their own outcomes monitoring, but these were not accompanied by public reporting of the outcomes. Publicly reporting hospital performance in domains of quality is an important aspect of accountability. In the United States, where public reporting of health care performance is common, there are many parties demanding accountability: employers, payers, insurers, patients and the public. Furthermore, accountability is demanded for all levels in the health care continuum: health management organizations, hospitals and the individual provider. Although all Canadians pay into the publicly-funded health care system through taxation, there is much less demand for accountability. However, that does not preclude the fact that Canadians should have access to timely data on health care quality. The HSMR is a new attempt at providing the Canadian public with a measure of health care quality in hospitals that they, by means of their tax dollars, fund.

While the HSMR report should be applauded for its foray into public reporting in Canada, there are several cautions with the HSMR measure itself. First, the measure utilizes administrative data, and relies on the accurate coding of diagnoses and co-morbidities within the CIHI database framework. Hospitals were given the opportunity to 'validate' their data prior to the release of the HSMR report, and as a result of this process, some hospitals declined to have their data appear in the published report. While this suppression of information for certain hospitals may be on the basis of legitimate data quality issues, some observers may be led to suspiciously assume (rightly or wrongly) that problematic coding practices were discovered, and that some or all of the non-participating hospitals may have had poor HSMRs and thus did not want such information in the public domain. In this regard, it is hoped that CIHI continues the HSMR

project, working with these non-reporting institutions to locate and correct data quality problems, allowing the institutions to participate in future public reports.

Secondly, the HSMR as a measurement has several shortcomings. It focuses entirely on mortality as an outcome, which is acknowledged by an early user of outcomes measurement, Florence Nightingale, to be a non-comprehensive measure of quality of care ^(xii). In terms of the Donabedian approach of a balanced set of system-level measures, that is, structures, processes and outcomes ^(xiii), mortality represents only one type of outcome of receiving health care, which is only one component of system-level quality measurement. Indeed, the Institute for Healthcare Improvement has recognized the importance of balanced measures of performance and has developed the “Whole System Measures”, a set of 13 measures that address structure, process and outcomes measures, including the HSMR (Error: Reference source not found). These are supplied to health care leaders and other stakeholders with data that enable them to evaluate their health system’s overall performance and provide input to strategic quality improvement planning. The multifaceted information from these measures provides context to hospital leaders, allowing them to conduct more focused quality improvement programs. The HSMR as reported by CIHI does not provide this context, nor does the accompanying report suggest that other measures of hospital structure and processes of care should be used in conjunction with the HSMR.

The HSMR measure also overlooks complexities of care within and supporting a hospital. As pointed out by Sir Brian Jarman, the creator of the HSMR, there are several factors beyond patient characteristics and health status that can influence the HSMR (Error: Reference source not found). In the inaugural publication of the measure, Jarman and colleagues demonstrated that hospitals with greater doctor-to-bed ratios had lower HSMRs, as did teaching facilities, although this latter influence was corrected when the doctor-to-bed ratio was factored into the multivariable regression. Moreover, the group discovered that a greater number of discharges to

patient homes was associated with higher HSMRs, whereas the presence of a greater number of health facilities in the area surrounding a hospital predicted lower HSMRs, reflecting a hospital's ability to move patients out of the acute care setting into more suitable long-term care or hospice care. These predictors point to issues of staffing within a hospital and auxiliary health care services in a hospital's community, rather than direct measures of quality of care within the hospital. Although hospital staffing is something a hospital's administration can adjust to improve quality of care, hospital administrators are less able to change a hospital's auxiliary services. Oftentimes transferring patients to long-term care is not feasible due to lack of space or resources in the destination facility, something that acute care hospitals cannot control. Therefore, the HSMR is impacted by these complex care factors that may not be obvious to administrators or may be outside of their realm of control.

Most importantly, however, is the “macro-level” nature of the HSMR. Although CIHI provides hospitals with supplementary analyses (e.g. HSMR for ICU-related cases, excluding transfers), the HSMR remains a composite measure, reflecting an institution's overall mortality rate based on 65 diagnoses (ranging from various cardiovascular diseases to cancer to infections such as pneumonia, and to trauma such as hip fracture) that constitute 80% of in-hospital deaths (Error: Reference source not found). With such a broad range of diagnoses that would be cared for under different departments and care units in a hospital, it is difficult to pinpoint where problems with quality of care reside. CIHI does provide working examples of hospitals that have used the HSMR to reduce avoidable deaths ^(xiv) and a one page resource ^(xv) to participating hospitals outlining how to understand and interpret the HSMR. The resource also suggests consulting *Safer Healthcare Now!*, a national campaign to improve patient safety in Canada ^(xvi) for intervention tools and strategies to improve the HSMR. The *Safer Healthcare Now!* website provides detailed programs for six patient safety interventions ^(xvii): improved care for acute

myocardial infarction, prevention of intravenous bloodstream infections, prevention of adverse drug events, rapid response to failing patients outside of intensive care units, prevention of surgical site infections, and prevention of ventilator-associated pneumonia. However, hospitals are not provided with condition-specific data in the CIHI HSMR report, and are therefore unable to take a targeted approach to adopting the *Safer Healthcare Now!* interventions. Provision of condition-specific data in addition to the HSMR would greatly enhance the value of the HSMR and would be more likely to stimulate effective and targeted quality of care improvements.

In order to provide more detailed reports with condition-specific and process and structure information, data outside of that available to CIHI are required. Reports produced by CIHI are based on macro-level data, and in particular, the HSMR report is based on the Discharge Abstract Database, which consists of administrative data on discharges and day surgeries from hospitals across Canada. Indeed, other federal organizations within Canada have similar difficulties producing detailed reports on quality of care. As with CIHI, Statistics Canada and Health Canada have produced several national condition-specific and comparable health indicator reports, but these report to the level of province and/or health region. In contrast, provincial ministries of health and health quality councils have access to ‘meso’- and ‘micro-level’ data such as medication use and physician claims, whereas health authorities and hospitals have access to micro-level data such as chart reviews and electronic health records, as conceptually shown in Figure 1. Combining the data from these three levels of administration (i.e. federal, provincial and local/regional) could permit the preparation of more detailed, and thus more valuable reports on quality of health care with condition-specific information that includes data on processes, structures and outcomes in addition to mortality; such reporting, however, will require cooperation among the levels of health system administration (local, provincial, and federal) and a willingness within each level to form data sharing partnerships.

In asserting that “things do not get better if left alone”, Sir Winston Churchill articulated a sentiment that undoubtedly underlies the HSMR report produced by CIHI. This report is an important step in the right direction toward improvement of patient safety and quality of health care services in Canada. Over the short term, the CIHI HSMR report as it stands has been successful in stimulating discussion regarding the measurement of quality of health care in Canada. It will have further short-term impact if it aligns all hospitals with national coding practices, and/or improves the uptake of *Safer Healthcare Now!* practices in hospitals. However, over the longer term, this report is not likely to catalyze improvement of quality of care practices in acute care hospitals in Canada if it is an isolated event and does not provide meso- and micro-level data that give depth and meaning to the macro HSMR measurement. This latter point will be an important challenge, as it will require CIHI and other organizations to overcome the barriers relating to decades-old federal-provincial health care structure based on an overriding federal body that distributes resources to provincial bodies that ultimately control the distribution of these resources to the regional level. As residents of a region, province and country (who pay taxes to every level of administration), Canadians deserve comprehensive reporting on health care quality at many levels so that meaningful change and improvements in health care quality can be achieved.

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