Overview and Observations

Overview

The Fraser Institute's *Hospital Report Card: Ontario 2009* is constructed to help patients choose the best hospital for their inpatient care by providing them with information on the performance of acute-care hospitals in Ontario. All of the information in this report is available at our interactive web site, <www.hospitalreportcards.ca>.

We set out to create a hospital report card that is easy to understand and accessible by the public, where individuals are able to look up a given condition or procedure and compare death rates, volumes of procedures, rates of adverse events, and utilization rates for their hospital to those of other hospitals in Ontario. This is accomplished by using state-of-the-art indicators developed by the US Agency for Healthcare Research and Quality (AHRQ) in conjunction with Stanford University that have been shown to reflect quality of care inside hospitals. These indicators are presently in use in more than a dozen US states, including several of the more populous ones, New York, Texas, Florida, and California.

We are using the Canadian Institute for Health Information's (CIHI) Discharge Abstract Database (DAD) as our primary information source. This information is derived from patient records provided to the CIHI by all hospitals in Ontario. Demographic, administrative, and clinical data are extracted from the Discharge Abstract Database for inpatient hospital stays from all acute-care hospitals in Ontario. Since more specialized hospitals may treat more high-risk patients and some patients arrive at hospitals sicker than others, it is important to risk-adjust the indicators for patients with the same condition but a different health status. The international standard for risk adjustment, the 3M™ APR™ DRG Classification System,[1] is employed to risk-adjust the data. The Fraser Institute spent two years developing the methods, databases, and computer programs required to adapt the measures to Canadian circumstances. This work has been internally and externally peer-reviewed (Mullins, Menaker, and Esmail, 2006) and is supported by an extensive body of research based on the AHRQ approach.

Of Ontario's 136 acute-care hospitals, 17, representing 5% of inpatient records in Ontario in the latest year, granted us authorization to identify them by name in this report. This represents a significant drop from the first report, in which we were authorized to identify 43 hospitals, representing 41% of inpatient records in Ontario in 2004/05. We applaud those hospitals who voluntarily agreed to be identified in the *Hospital Report Card: Ontario 2009*. These

1 3M and APR are trademarks of 3M, used under license in Canada.

hospitals should be commended for their efforts to empower patients with information regarding the health care they receive and for their ongoing commitment to quality improvement through accountability and transparency.

What indicators are used?

The Fraser Institute's *Hospital Report Card: Ontario 2009* consists of 50 of AHRQ's indicators of quality (such as death due to a stroke) and patient safety (such as a foreign body left inside a patient during a procedure). The indicators are shown for all acute-care hospitals in Ontario from 1997/98 to 2006/07, comprising more than 10.5 million patient records.[2] We have also calculated the indicators for all municipalities in Ontario, based on patient residence postal codes. This constitutes the most comprehensive and detailed publicly available measure of acute-care hospital performance and accountability in Canada at the present time.

The indicators are expressed as observed rates (such as death due to hip replacement surgery) and risk-adjusted rates (the same rate adjusted for patient health status). Each institution was given a score from 0 to 100 for each indicator based on its risk-adjusted rate, where 100 is the best. The institutions were then ranked based on their scores, where 1 is the best.[3] The indicators are classified into three groups: those related to medical conditions, hospital procedures, and child birth. The indicators are further classified by type: death rates, volumes of procedures, utilization rates, and adverse events.

Hospital Mortality Index

The Hospital Mortality Index (HMI) shows the overall performance of a hospital (table 1, pages 8–9) or municipality (table 2, pages 11–14) across indicators that measure death rates. It consists of eight or nine indicators, depending upon the year:

1. deaths due to hip replacement surgery
2. deaths due to heart attacks (2002/03 onwards)

2 There are a total of 50 indicators in this report. Due to changes in diagnostic and procedural classifications, the availability of indicators varies from year to year. Forty-two indicators are reported for the period from 2002/03 to 2003/04. Due to changes in the AHRQ software, three indicators were dropped from 2005/06 onwards for a total of 39 indicators.

3 Some adverse events tend to be rare and smaller municipalities and hospitals will not always see these consequences of patient care. It cannot be imputed that a high score on these types of indicators is necessarily due to fewer adverse events for those places with relatively low numbers of cases as their volume of activity may be inadequate to produce the inevitable adverse event. Therefore, results for some indicators must be interpreted with caution in the case of smaller institutions and municipalities.

3 deaths due to heart failure

4 deaths due to acute strokes

5 deaths due to bleeding from the esophagus, stomach, small intestine or colon

6 deaths due to hip fractures

7 deaths due to pneumonia infection

8 deaths among patients that are considered unlikely to die in the hospital

9 deaths in patients that developed complications of care during hospitalization

The final score in the HMI for each hospital and municipality is an average of the scores of these indicators (100 is the best). All institutions and municipalities were ranked based on their HMI score (1 is the top rank). It is important to note that the 50 indicators and the Hospital Mortality Index are applicable only to acute-care conditions and procedures for inpatient care. The results cannot be generalized to assess the overall performance of any given hospital.

Limitations and caveats

Since this report is based on administrative data, the results have limitations related to coding variations and other factors. Hospital deaths or complications will occur even when all standards of care are followed. Deciding on treatment options and choosing a hospital are decisions that should be made in consultation with a physician. It is not recommended that anyone choose a hospital based solely on statistics and descriptions such as those given in this report.

That said, the Discharge Abstract Database (DAD) is a major data source used to produce various reports published by the Canadian Institute for Health Information (CIHI), including annual reports on the performance of hospitals and the health care system. It is also a major data source for seven of the health indicators adopted by the federal, provincial, and territorial governments. These data have also been used extensively in previous reports on health care performance and form the basis for many journal articles. As is noted in the *Ontario Hospital Report*, which uses the same DAD data set underlying this report card, "the data are collected under consistent guidelines, by trained abstractors, in all acute-care hospitals in Ontario. The data undergo extensive edit checks to improve accuracy, but all errors cannot be eliminated" (Ontario Hospital Association and the Government of Ontario, 2006: 6).

There are a number of publications that have addressed the data-quality issues that are discussed in our report. Of note are the CIHI's reabstraction studies that go back to the original patient charts and recode the information

using a different set of expert coders.[4] Overall, according to the CIHI (2004), findings from their three-year DAD re-abstraction studies have confirmed the strengths of the database, while identifying limitations in certain areas resulting from inconsistencies in the coding of some data elements. In addition, the findings from the inter-rater data (that is, comparison between reabstractors) were generally similar to the findings from the main study data (that is, comparison between original coder and reabstractor). This suggests that the database is coded as well as can be expected using existing approaches in the hospital system.

In addition to the aforementioned reabstraction studies, the OECD published a report that supports the AHRQ patient-safety indicator approach, noting that "this set of measures represents an exciting development and their use should be tested in a variety of countries" (Millar, Mattke, et al., 2004: 12). Further, a recently released report by the Manitoba Center for Health Policy that used the AHRQ Patient Safety Indicators (Bruce et al., 2006) noted two important advantages to using the AHRQ approach. The first advantage is the breadth of coverage offered by the indicators in studying in-hospital patient safety. The second is that the AHRQ patient safety indicators were developed to measure complications of hospital-based care among a group of patients for whom the complications seemed preventable or highly unlikely.

Observations

A report based on over 10.5 million patient records, shown across 50 quality and safety indicators, for 136 hospitals and 138 municipalities, over 10 years, is not something that can be summarized in a few words. In fact, the primary purpose of this research is to provide patients with access to information on specific medical procedures and conditions, and understand the variation in hospital care across the entire system. It is for that reason that we have rates, scores, and ranks for each separate indicator. All documents are available at <www.hospitalreportcards.ca> and <www.fraserinstitute.org/reportcards/hospitalperformance/>.

However, we have created one summary measure of mortality, based on the most important and reliable data in this study, the Hospital Mortality Index (HMI). The component indicators of the HMI were arrived at by a process of

4 Reabstractors participating in the study were required to have several years of coding experience, experience coding in ICD-10-CA and CCI in particular, experience coding at a tertiary care centre, and attendance at specific CIHI educational workshops. They were also required to attend a one-week training session and to receive a passing score on the inter-rater test.

elimination. Starting with our complete group of indicators, we eliminated indicators that had no data for several years or for which there were relatively few hospitals with data. The resulting HMI has scores and rankings for 54 hospitals and 94 municipalities in the latest year since not all hospitals and municipalities had data for all nine indicators in 2006/07.

Tables 1 (pages 8–9) and 2 (pages 11–14) show scores and rankings for the Hospital Mortality Index for 2006/07. This is compared to the score in 2005/06. The change column shows the improvement or deterioration in score between the two periods. Due to changes in the underlying methodology, comparisons of the Hospital Mortality Index for 2005/06 onwards with previous years must be interpreted with caution.[5]

Hospital Mortality Index: Hospitals

Top-Ranked Hospitals

- The top hospital in Ontario is Anonymous Hospital 211 with a high HMI score of 91.1 out of 100 in 2006/07. It was not among the top 10 in the previous period.
- Anonymous Hospital 220 is the second-ranked hospital. Unlike Anonymous Hospital 211, it was among the top ten performers in the previous period, where it ranked seventh with a score of 90.1 as compared to 90.4 in 2006/07.
- Anonymous Hospital 10 was ranked first in 2005/06 and ranks seventh in 2006/07.
- Among the hospitals ranked in the top 10 in 2006/07, three saw a deterioration in their scores between 2005/06 and 2006/07. All but two hospitals in the top 10 in 2006/07 were also in the top 15 in 2005/06.
- Calculation of an HMI score was possible for only five of the identified hospitals, none of which are in the top 10. Rouge Valley Health System—Ajax and Pickering Site was the top identified hospital in 32nd place and a score of 86.7. Hanover and District Hospital ranked 36th; Rouge Valley Health System—Centenary Health Centre Site, 42nd; Timmins and District General Hospital, 51st; and Bluewater Health-Sarnia General Site, 58th.

5 In the previous version of the AHRQ software used for the *Hospital Report Card: Ontario*, a linear regression model was used for risk adjustment where the risk-adjusted rate = observed rate – expected rate + population rate. In the new version of the software implemented for data from 2005/06 onwards, logistic regression was used, where the risk-adjusted rate = observed rate / expected rate * population rate. In addition, the application of risk adjustment was revised for some indicators.

Bottom-Ranked Hospitals

- Anonymous Hospital 31 is the lowest-ranked hospital with a score of 78.3. It saw a deterioration in its score between 2005/06 and 2006/07 and was ranked 52nd out of 57 in 2005/06.
- Anonymous Hospital 40 experienced the biggest improvement in its HMI from 2005/06 among hospitals for which an HMI could be calculated in both years. It went from 56th of 57 in 2005/06 to 47th of 59 in 2006/07.
- Bluewater Health-Sarnia General Site is the lowest-ranked participating hospital and is ranked 58th with a score of 79.9.

Consistency

- There is a fair amount of consistency in the performance of both top-ranked and bottom-ranked hospitals.
- Of the seven hospitals among the bottom 10 for whom scores are available in both years, only only two were not among the bottom 15 performers in 2005/06.
- Similarly, only two of the top 10 hospitals in 2006/07 did not rank among the top 15 in 2005/06.

Table 1: Hospital Mortality Index—Hospitals

	2006/07		2005/06		Change 2005/06–2006/07	
	Score	Rank	Score	Rank	Score	Rank
Hospital 211	91.1	1	87.4	27	3.7	7
Hospital 220	90.4	2	90.1	7	0.4	22
Hospital 227	90.2	3	90.1	6	0.1	25
Hospital 202	90.2	4	90.0	8	0.2	23
Hospital 50	90.2	5	89.2	13	0.9	17
Hospital 178	90.0	6	88.3	17	1.7	14
Hospital 10	90.0	7	91.2	1	–1.2	37
Hospital 235	89.7	8	89.5	10	0.1	24
Hospital 29	89.6	9	90.3	5	–0.8	33
Hospital 223	89.4	10	89.6	9	–0.2	30
Hospital 204	88.9	11	90.4	3	–1.6	40
Hospital 217	88.7	12	88.0	22	0.7	20
Hospital 243	88.6	13	—	—	—	—
Hospital 219	88.5	14	91.0	2	–2.4	45
Hospital 179	88.4	15	88.0	23	0.4	21
Hospital 25	88.2	16	89.4	12	–1.2	39
Hospital 200	88.2	17	88.2	20	–0.0	28
Hospital 16	88.1	18	85.1	37	2.9	9
Hospital 70	88.0	19	88.0	24	–0.0	27
Hospital 67	88.0	20	90.4	4	–2.5	46
Hospital 97	87.9	21	88.3	16	–0.4	32
Hospital 22	87.8	22	82.4	50	5.4	4
Hospital 76	87.5	23	87.8	26	–0.3	31
Hospital 225	87.4	24	89.4	11	–2.1	42
Hospital 104	87.3	25	85.3	35	2.1	12
Hospital 109	87.3	26	85.0	38	2.3	11
Hospital 77	87.3	27	87.2	29	0.1	26
Hospital 36	87.2	28	86.2	33	1.0	15
Hospital 15	87.2	29	87.2	28	–0.0	29
Hospital 79	87.0	30	89.2	14	–2.2	43
Hospital 44	86.7	31	83.0	47	3.7	6

Table 1, continued: Hospital Mortality Index—Hospitals

	2006/07		2005/06		Change 2005/06–2006/07	
	Score	Rank	Score	Rank	Score	Rank
Rouge Valley Health System—Ajax and Pickering Site	86.7	32	88.0	25	–1.2	38
Hospital 38	86.6	33	83.1	46	3.5	8
Hospital 96	86.1	34	82.2	51	3.8	5
Hospital 80	86.0	35	84.2	43	1.9	13
Hanover and District Hosp.	86.0	36	—	—	—	—
Hospital 8	85.9	37	84.9	40	1.0	16
Hospital 43	85.8	38	79.3	54	6.6	3
Hospital 72	85.5	39	84.6	41	0.9	18
Hospital 62	85.4	40	86.6	30	–1.2	36
Hospital 7	85.0	41	88.3	18	–3.3	48
Rouge Valley Health System—Centenary Health Centre Site	84.9	42	86.0	34	–1.1	35
Hospital 233	84.9	43	88.1	21	–3.2	47
Hospital 37	84.0	44	—	—	—	—
Hospital 106	84.0	45	86.3	32	–2.3	44
Hospital 210	83.9	46	83.2	45	0.8	19
Hospital 40	83.5	47	73.8	56	9.7	1
Hospital 71	83.1	48	86.5	31	–3.4	49
Hospital 208	83.1	49	—	—	—	—
Hospital 248	82.7	50	—	—	—	—
Timmins & District General Hosp.	82.6	51	88.3	15	–5.7	52
Hospital 108	82.4	52	84.4	42	–2.0	41
Hospital 63	81.8	53	—	—	—	—
Hospital 55	81.8	54	79.0	55	2.8	10
Hospital 203	81.1	55	82.2	53	–1.0	34
Hospital 215	81.1	56	85.2	36	–4.2	51
Hospital 18	80.7	57	72.8	57	8.0	2
Bluewater Health—Sarnia Gen. Site	79.9	58	—	—	—	—
Hospital 31	78.3	59	82.2	52	–3.9	50

Note: Scores are calculated to exact values and are rounded for inclusion in the table.

Hospital Mortality Index: Municipalities[6]

Top-Ranked Municipalities

- The top municipality is Caledon with an HMI score of 93.1 out of 100; data is inadequate to show Caledon's score in 2005/06.
- The second-ranked municipality, Innisfil, scored 90.0 in 2006/07, but ranked 1st for its improvement from the previous period, moving up from 85th position with an improvement of 15.5.
- Municipal scores at the high end showed little consistency between the two years. Only one municipaly among the top 10 in 2006/07 was among the top 10 in 2005/06, while only two were among the top 15 (HMI scores could not be calculated for 2005/06 for two). Conversely, 7 of the 10 lowest-ranked municipalities in 2006/07 for which scores were available for 2005/06 ranked among the bottom 15 in 2005/06.

Bottom-Ranked Municipalities

- The lowest-ranked municipality in Ontario is Kirkland Lake, with an HMI score of 58.6. The lowest-ranked municipality for which data is available for both 2005/06 and 2006/07 is Napanee, with a score of 66.6 for 2006/07, which comes after a decline of approximately 9.5 points from its score in 2005/06.

Five Largest Municipalities

- The five largest municipalities in Ontario by number of inpatient stays are: Toronto, ranked 28th on the Hospital Mortality Index; Ottawa, ranked 22nd; Mississauga, ranked 36th; Scarborough, ranked 40th; and Hamilton, ranked 12th.

6 The Hospital Mortality Index (HMI) is calculated for municipalities using the residence of patients treated in Ontario's acute-care hospitals. Due to patient mobility, municipal scores cannot be reliably used to infer the performance of hospitals.

Table 2: Hospital Mortality Index—Municipalities

	2006/07		2005/06		Change 2005/06–2006/07	
	Score	Rank	Score	Rank	Score	Rank
Caledon	93.1	1	—	—	—	—
Innisfil	90.0	2	74.5	85	15.5	1
Essex	89.5	3	—	—	—	—
Thunder Bay	88.9	4	81.4	48	7.5	6
Georgetown	88.6	5	84.9	28	3.7	22
Brampton	88.6	6	86.4	15	2.2	30
Pickering	88.3	7	81.0	51	7.3	8
Guelph	88.1	8	77.0	78	11.1	4
Orangeville	88.0	9	90.6	3	–2.7	63
Bowmanville	87.4	10	86.4	16	1.0	38
Amherstburg	87.1	11	88.0	5	–0.9	56
Hamilton	86.8	12	84.3	37	2.5	27
Oshawa	86.6	13	85.5	24	1.2	37
Richmond Hill	86.5	14	86.5	14	–0.0	47
Ingersoll	86.4	15	—	—	—	—
Willowdale	86.3	16	83.9	39	2.4	28
Other	86.3	17	84.8	29	1.5	33
Thornhill	86.2	18	86.3	18	–0.2	49
Cornwall	85.7	19	87.1	11	–1.4	58
Maple	85.7	20	91.4	1	–5.7	73
Whitby	85.4	21	87.2	10	–1.8	60
Ottawa	85.2	22	86.0	20	–0.8	54
Chatham	85.2	23	78.4	69	6.8	10
Acton	85.1	24	—	—	—	—
Brantford	85.0	25	77.5	74	7.5	7
Oakville	84.8	26	84.3	38	0.5	42
Aurora	84.8	27	79.7	56	5.0	15
Toronto	84.7	28	83.7	40	1.0	39
Aylmer West	84.7	29	79.7	57	5.0	16

Table 2, continued: Hospital Mortality Index—Municipalities

	2006/07		2005/06		Change 2005/06–2006/07	
	Score	Rank	Score	Rank	Score	Rank
London	84.6	30	82.9	45	1.7	31
Midland	84.5	31	79.3	61	5.2	14
North York	84.5	32	79.6	58	4.9	17
Elmira	84.4	33	—	—	—	—
Brockville	84.4	34	71.7	89	12.7	2
Sault Ste. Marie	84.2	35	78.3	72	5.8	11
Mississauga	84.1	36	83.7	42	0.4	44
Pembroke	84.1	37	80.3	54	3.8	21
Wallaceburg	84.0	38	86.1	19	–2.1	61
Caledonia	83.9	39	—	—	—	—
Scarborough	83.8	40	81.2	49	2.6	25
Orillia	83.8	41	78.4	70	5.5	13
Markham	83.8	42	78.0	73	5.8	12
Smiths Falls	83.6	43	—	—	—	—
Keswick	83.6	44	75.2	84	8.3	5
Sudbury	83.1	45	76.2	80	7.0	9
Stratford	83.0	46	88.9	4	–5.9	75
Weston	83.0	47	80.8	52	2.2	29
Woodbridge	82.9	48	85.6	23	–2.6	62
Windsor	82.8	49	83.1	44	–0.3	50
Etobicoke	82.8	50	83.5	43	–0.8	53
Kingsville	82.6	51	86.3	17	–3.8	67
Cambridge	82.4	52	85.3	27	–2.8	64
Ajax	82.1	53	87.8	7	–5.8	74
Bolton	82.1	54	79.5	59	2.6	26
Welland	81.9	55	85.4	25	–3.4	65
Bradford	81.8	56	77.5	75	4.3	20
St. Catharines	81.7	57	79.0	64	2.6	24
Leamington	81.5	58	87.3	9	–5.7	72

	2006/07		2005/06		Change 2005/06–2006/07	
	Score	Rank	Score	Rank	Score	Rank
Rural	81.5	59	81.1	50	0.5	43
Collingwood	81.4	60	77.1	77	4.3	19
Strathroy	81.2	61	—	—	—	—
Elliot Lake	81.2	62	—	—	—	—
Gravenhurst	81.0	63	—	—	—	—
Hanover	80.9	64	—	—	—	—
Peterborough	80.9	65	81.8	47	–0.9	55
Kingston	80.9	66	80.1	55	0.9	40
Timmins	80.8	67	84.7	30	–3.9	68
Listowel	80.8	68	—	—	—	—
Bracebridge	80.6	69	79.4	60	1.2	36
St. Thomas	80.5	70	76.9	79	3.7	23
Kitchener	80.4	71	84.4	34	–4.0	69
Milton	80.2	72	78.7	67	1.5	34
Burlington	80.2	73	85.3	26	–5.1	71
Trenton	80.1	74	—	—	—	—
Downsview	80.0	75	80.7	53	–0.7	52
Perth	79.8	76	—	—	—	—
Newmarket	79.8	77	86.0	21	–6.2	77
Cobourg	79.3	78	79.1	63	0.2	45
Woodstock	79.0	79	78.8	65	0.2	46
Barrie	78.5	80	82.2	46	–3.7	66
Owen Sound	78.3	81	78.7	66	–0.4	51
Belleville	78.0	82	79.1	62	–1.2	57
New Hamburg	78.0	83	—	—	—	—
Renfrew	77.8	84	—	—	—	—
Parry Sound	77.7	85	83.7	41	–6.0	76
Carleton Place	77.4	86	84.5	32	–7.1	80
Port Hope	76.7	87	86.8	12	–10.2	83

Table 2, continued: Hospital Mortality Index—Municipalities

	2006/07		2005/06		Change 2005/06–2006/07	
	Score	Rank	Score	Rank	Score	Rank
North Bay	75.9	88	75.4	83	0.6	41
Goderich	75.8	89	—	—	—	—
Uxbridge	75.6	90	71.1	91	4.5	18
Wasaga Beach	75.5	91	87.9	6	–12.4	84
Sarnia	75.5	92	84.3	36	–8.8	81
Fort Erie	74.8	93	62.2	93	12.5	3
Tillsonburg	74.4	94	73.1	88	1.4	35
Lindsay	73.9	95	73.9	86	–0.0	48
Grimsby	73.7	96	78.3	71	–4.7	70
Alliston	73.2	97	87.5	8	–14.3	85
Port Colborne	72.0	98	73.6	87	–1.6	59
Niagara Falls	70.7	99	77.4	76	–6.7	79
Gananoque	69.1	100	75.4	82	–6.3	78
Simcoe	68.4	101	—	—	—	—
Huntsville	68.3	102	66.6	92	1.7	32
Napanee	66.6	103	76.1	81	–9.5	82
Meaford	62.0	104	—	—	—	—
Kirkland Lake	58.6	105	—	—	—	—

* Municipal patient populations are constructed from the Forward Sortation Areas (FSAs) of patient postal codes. All FSAs containing a "0" as their second character were grouped into a "Rural" category (as described by Canada Post). All FSAs not described by Canada Post were placed in the residual group "Other." For more information, see Appendix H.

Note: Scores are calculated to exact values and are rounded for inclusion in the table.

Conclusion

The Fraser Institute's *Hospital Report Card: Ontario 2009* provides a comprehensive measure of inpatient acute-care conditions in Ontario's hospitals. This is the third edition of an annual report card for patients in Ontario. One report for British Columbia is already available and future editions of the Fraser Institute's *Hospital Report Card* will include performance measurement of acute-care hospitals in other provinces. We welcome comments on the content and format of this report via <comments@hospitalreportcards.ca>.

Introduction and background

The goal of the Fraser Institute's *Hospital Report Card: Ontario 2009* is to contribute to the improvement of inpatient care in Ontario by providing hospital-specific information about quality of service directly to patients and to the general public. This series was the first in Canada to empower patients to make informed choices about their health care delivery options by providing comparable, hospital-specific, performance measurements on clearly identified indicators. The Fraser Institute's *Hospital Report Card: Ontario 2009* has been published to promote accountability within hospitals, thereby stimulating improved performance through an independent and objective measurement of performance.

In Canada, individuals have access to data identifying problem areas in an automobile from information willingly supplied by consumers, the vehicle's manufacturer, and industry experts. They can find which CD player is the best on the market for their needs. They can compare restaurants before heading out for an evening meal. Yet when it comes to health care, which many will consider more important for an individual's well being, consumers are left with remarkably little information about where the best services are available. They cannot even tell which hospitals offer the worst care or have the highest mortality rates (Esmail, 2003).

What Are Hospital Report Cards?

Hospital report cards provide a set of consistent performance measurements to rank the services in question and give consumers the information they need to make a more informed choice.[1] In some cases, these indicators may be subjective, based on the opinions of survey respondents. In other cases, the indicators will be objective measures of performance or outcomes.

Hospital report cards are used to measure specific practices in hospitals such as the application of a specific drug or technology to certain events; or performance with respect to access to care or consumer satisfaction; or to measure the likelihood of a positive or negative outcome provided by health facilities in a specific jurisdiction.

1 See Kessler, 2003 for a helpful delineation of the field.

The Four Primary Types of Hospital Report Cards

1 ***Process Report Cards***

This type of report card describes the inputs used by hospitals, health plans, or individual physicians in the course of treating their patients. An example of these types of report cards can be found in those commissioned by The Leapfrog Group <http://www.leapfroggroup.org/>. The primary strength of a process report card is that it can be developed from existing medical administrative databases with relative ease. The process report card, however, does not necessarily measure the appropriateness, the quality, or the importance of the inputs employed in ensuring good health, although these factors can be captured to some extent by the inclusion or exclusion of specific inputs.

2 ***Survey Report Cards***

This type of report card is composed of patients' evaluations of their quality of care and/or customer service. An example of this type of report card is found in the California HealthCare Foundation's ratings <http://www.calhospitalcompare.org/>. Although survey-based report cards do provide valuable information on subjective areas of patient care, they cannot measure how treatment decisions by a doctor or hospital lead to objective improvements in patient care.

3 ***Outcomes Report Cards***

These report cards present average levels of adverse health outcomes based on mortality or complication rates experienced by patients as part of a health plan, as treated by a specific doctor, or in a specific hospital. An example of this type of report card can be found in the Pennsylvania CABG surgery reports <http://www.phc4.org/reports/cabg/>. These report cards provide objective measures of differences in the quality of care but are susceptible to being "gamed" by either doctors or hospitals. For example, the doctor or hospital may avoid exceptionally sick patients (that is, patients who are qualitatively more ill with a listed condition and who will consequently drag average results down) in favor of healthier patients (to skew results upward). This unintended effect can, however, be mitigated through the appropriate application of risk-adjustment in the measures. Outcomes report cards (including the Fraser Institute's *Hospital Report Cards*) provide the most empirically sound basis for analyzing the quality of care.

4 ***Balanced Scorecards***

The balanced scorecard was developed in the early 1990s by Robert Kaplan and David Norton to examine a business above and beyond the financial bottom line. Translated into the healthcare field, this results in four quadrants. In the case of the *Ontario Hospital Reports* series, a prime example of the

use of a balanced scorecard, these are [a] financial performance and conditions; [b] patient/client satisfaction; [c] clinical utilization and outcomes; and, [d] system integration and change. While this variant of report card is useful in determining the broadest view of a hospital's operations and functions, specific and relevant indicators regarding hospital performance may be overlooked.

Why Are Hospital Report Cards Published?

Hospital report cards are published to provide outcomes data that can both improve the quality of care in hospitals and inform patients' healthcare decision-making. Armed with more information based on a set of repeatable measurements about the relative performance of caregivers, both patients and physicians are able to make a more informed choice about which facility or provider to select for a given condition. This allows for a rational discussion of relative levels of quality and eliminates measurement based on anecdotal information, which can be misleading and ultimately harmful.

Where Are Hospital Report Cards Published?

The United States of America

The United States was one of the first nations to begin measuring, comparing, and publishing measurements of hospital performance. Hospital report card initiatives were first undertaken by the federal government, with state governments following its lead. Private-sector information providers offering several competing reports on the quality of health care providers have refined the reporting of information. In 1987, the first US hospital report cards were published by the Health Care Financing Administration (HCFA), the federal agency that administers Medicare and Medicaid. These reports gave detailed annual mortality rates that were measured from the records of hospitalized Medicare patients. However, because of extensive criticism of the accuracy, usefulness, and interpretability of the HCFA's mortality data, this initiative was withdrawn in 1993 (Berwick and Wald, 1990).

In the late 1980s, the state of New York began the Cardiac Surgery Reporting System (CSRS), which collected data from patients' medical histories and recorded whether they died in hospital following surgery. From these data, New York was able to report detailed physician-specific statistics. While the information contained in the CSRS was not originally intended to provide the public with information about the performance of their provider, the news media understood the public's desire for such data and saw the benefit in publishing the information. In December of 1990, the *New York Times*

used this information to publish a list of local hospitals, which ranked facilities according to their mortality rates for Coronary Artery Bypass Surgery (CABG). Invoking the *Freedom of Information Act*, the *New York Newsday* sued the New York State Department of Health to obtain access to its database on bypass surgery and on cardiac surgeons. The goal was to publish physician-specific death rates for patients. The Supreme Court of New York ruled that it was in the public's best interests to have access to these mortality data in order to make informed decisions about their health care (Zinman, 1991). As a result, *Newsday* was able to publish the information on physicians' performance for citizens to assess where the best care was available. Driven by this development, the New York State Department of Health began publishing annual editions of the *Coronary Artery Bypass Surgery Report* in 1996 (New York State, Department of Health, 2005).

Following the precedent set by this pioneering case, a wide variety of hospital performance reports began to be produced in the 1990s by a disparate group that includes the news media, coalitions of large employers, consumer advocacy organizations, and state governments (Marshall et al., 2003). More recently, the US Centers for Medicare and Medicaid Services released mortality-rate estimates for heart attack, heart failure, and pneumonia for every US hospital over two years alongside other measures of hospital performance (Sternberg and DeBarros, 2008). Development of reports in the United States has taken many different paths so there is currently no "standardized" hospital report card or agreement on the indicators to measure. Furthermore, reports range widely in terms of both quality and comprehensiveness. Indeed, as Marshall and colleagues cheekily note: "Public reporting in the United States is now much like healthcare delivery in that country: It is diverse, is primarily market-based, and lacks an overarching organizational structure or strategic plan. Public reporting systems vary in what they measure, how they measure it and how (and to whom) it is reported" (2003: 136). Of course, for patients who are the beneficiaries of such competition between information providers, each of whom strives to deliver a product in some way superior to his competitors, this is no bad thing.

Examples of American Private and Public Information Providers

- Hospital Compare <hospitalcompare.hhs.gov>
- America's Best Hospitals—*USNEWS & World Report* <http://www.usnews.com>
- Healthgrades <http://www.healthgrades.com>
- The Leapfrog Group <http://www.leapfroggroup.org>
- National Committee for Quality Assurance (NCQA) <http://www.ncqa.org>
- National Quality Forum <http://www.qualityforum.org>

- Quality Check <http://www.jointcommission.org/PerformanceMeasurement/PerformanceMeasurement/>
- *Cardiac Surgery in New Jersey* <http://www.state.nj.us/health/reportcards.htm>
- *Cardiac Surgery Reports* <http://www.health.state.ny.us/nysdoh/healthinfo/index.htm>
- *Pennsylvania Hospital Performance Reports* <http://www.phc4.org>
- *Indicators of Inpatient Care in New York Hospitals* <http://www.myhealthfinder.com/newyork>
- *Indicators of Inpatient Care in Texas Hospitals* <http://www.dshs.state.tx.us/thcic/>
- *Maryland Hospital Performance Evaluation Guide* <http://mhcc.maryland.gov/consumerinfo/hospitalguide/index.htm>
- *California HealthCare Foundation* <http://www.calhospitalcompare.org/>.

United Kingdom

The hospital reporting universe in the United Kingdom is a fraction of the US market's size. League tables[2] of death rates for English hospitals were available from 1992 to 1996 (Leyland and Boddy, 1998) and mortality statistics for English hospitals were published by the national government in 1998. Although publicly released, these were intended for managerial use and had little discernible impact (Street, 2002). The first initiative designed for public consumption was the Patient's Charter (National Health Service, 1991), which focused on waiting times as opposed to clinical quality.

In 1998, the National Health Service (NHS, Britain's tax-funded, universal medical-insurance program) adopted a new Performance Assessment Framework (PAF) to report clinical outcomes at the hospital level (London Department of Health, 1998). It focused on health gain, fair access, effective delivery of services, efficient delivery of services, health outcomes, and patient/career experience. This initiative received prominence in 2001 as the NHS became the first government plan in the developed world to deal explicitly with report cards. Beginning in September 2001, the UK Department of Health began to publish a new rating system for all NHS non-specialist hospitals in England. The performance of hospitals included in this survey was classified into one of four categories, ranging from zero to three stars based on the hospital's performance on a range of indicators and the outcome of their clinical governance review by the Commission for Health Improvement (CHI). As an additional incentive for improvement, beyond that assumed to come with public reporting of performance, the Department of Health mandated that hospitals scoring at the high end of the scale would receive greater

2 A league table ranks the performance of a range of institutions.

funding and autonomy, while those at the bottom of the scale would be subject to greater government oversight and intervention. For example, those receiving zero stars were subject to investigations and underwent changes in management where necessary.

Although the lion's share of reporting in Britain has been by and at the direction of government, an independent initiative entered the arena in the latter half of 2000 when Tim Kelsey and Jake Arnold-Forster, a pair of Sunday Times journalists, founded Dr. Foster to generate authoritative independent information about local health services on the web at <http://www.drfosterintelligence.co.uk/>. The partnership is in the form of a 50/50 joint venture involving the new Health and Social Care Information Centre (a special health authority of the NHS) and Dr. Foster, a commercial provider of healthcare information. Numerous publications have emerged from this initiative including the Good Birth Guide and the annual Good Hospital Guide, which was first published in 2001 and continues to be published annually. These guides contain information about hospital-specific mortality rates; the total number of staff; wait times; numbers of complaints; as well as, uniquely, private hospitals' prices for services.

Canada

In Canada, as in the United States and the United Kingdom, hospital reporting initiatives have emerged only recently. In 1998, the Ontario Hospital Association produced a report card comparing the hospitals covered by its organization. Undertaken by a research group at the University of Toronto, the publication focused upon inpatient acute care and reported results at both peer group and regional levels of aggregation, but not for individual facilities. *Hospital Report '99*, published the following year, saw the first reporting of hospital-specific acute-care hospital performance indicators in Canada. In 2000, the Government of Ontario joined as a partner in the enterprise and the scope of the report was expanded to include such areas as complex continuing care, mental health, rehabilitation, and emergency department care. In addition, specific reports dealing with women's health, the health of the population as a whole, and nursing care were also produced. These publications have since appeared annually. The *Hospital Report Series* (see, e.g., Ontario Hospital Association and the Government of Ontario: 2006, 2007) appears in a "balanced scorecard" format and assesses the performance of hospitals in four quadrants including (as noted above): [a] financial performance and conditions; [b] patient/client satisfaction; [c] clinical utilization and outcomes; and [d] system integration and change.

Other notable reporting initiatives in Canada include CIHI's *Hospital Standardized Mortality Ratio* (HSMR) (discussed below), *Healthcare Performance Measurement in Canada: Who's Doing What?* (Baker et al., 1998), *Quality of Cardiac Care in Ontario* (CCORT, 2004) and *The State of Hospital*

Care in the GTA/905 (GTA/905 Healthcare Alliance, 2005). Additionally, two publications that have reported on patient safety and adverse events are the *Ottawa Hospital Patient Safety Study* (Forster et al., 2004) and *The Canadian Adverse Events Study* (Baker et al., 2004), though neither reported institution-specific measures. Similarly, the Manitoba Center for Health Policy released an in-hospital patient safety report using the AHRQ Patient Safety Indicators (Bruce et al., 2006). Additionally, for the last 17 years, the Fraser Institute has published *Waiting Your Turn: Hospital Waiting lists in Canada*, a report that provides Canada's only national, comparable, and comprehensive measurement of waiting times for medically necessary treatment (Esmail and Hazel with Walker, 2008). Another initiative of the Fraser Institute is *How Good is Canadian Health Care? An International Comparison of Health Care Systems* (Esmail and Walker, 2008), which compares Canada's health policies and healthcare performance with other nations that guarantee their citizens access to healthcare insurance.

Other avenues for reporting and monitoring hospital performance in Canada have largely been in the form of private assessments of hospital performance by a contracted third party using a proprietary methodology. A prime example of this is the work done by the Hay Group in rating the performance of participating Ontario hospitals for a fixed fee per facility (Hay Group, 2005).

Hospital Standardized Mortality Ratio (HSMR)

The Canadian Institute for Health Information (CIHI) has published its own measure of hospital and regional performances, the *Hospital Standardized Mortality Ratio* (HSMR), since 2007. While both the CIHI's measure and the *Hospital Report Card: Ontario 2009* use data from the CIHI's Discharge Abstract Database, there are several significant differences between the measure published by the CIHI and those published by the Fraser Institute. These differences make comparisons between the two reports difficult and lead to the conclusion that the CIHI and the *Hospital Report Card: Ontario 2009* are measuring mortality in two very different ways.

The most significant difference between the measures published by the Fraser Institute and those published by the CIHI is the level of detail available. According to the CIHI's report, the *Hospital Standardized Mortality Ratio* (HSMR) is a "big dot summary" measure (CIHI, 2007: 4), or a measure that "tracks progress on broad outcomes at a system level" (2007: vii). More specifically, the HSMR is a composite measure of mortality in diagnosis groups that comprise 80% of all deaths in acute-care facilities (see table 3).

By comparison, the measures published in the *Hospital Report Card: Ontario 2009* allow for the examination of hospital performance in specific and detailed areas, thus providing patients with a greater level of information about their particular interest or diagnosis and allowing providers greater insight into

Table 3: Diagnosis groups used in the CIHI's *Hospital Standardized Mortality Ratio* (HSMR)

- Acute pancreatitis
- Acute renal failure
- Adult respiratory distress syndrome
- Alcoholic liver disease
- Alzheimer's disease
- Acute myocardial infarction
- Angina pectoris
- Aortic aneurism and dissection
- Atrial fibrillation and flutter
- Cardiac arrest
- Cerebral infarction
- Chronic ischemic heart disease
- Other chronic obstructive pulmonary disease
- Chronic renal failure
- Complications of procedures, not elsewhere classified
- Convalescence
- Diabetes mellitus type 2
- Diffuse non-Hodgkin's lymphoma
- Diverticular disease of intestine
- Fibrosis and cirrhosis of liver
- Heart failure
- Hepatic failure
- Fracture of femur
- Intracerebral hemorrhage
- Intracranial injury
- Lymphoid leukemia
- Malignant neoplasm of bladder
- Malignant neoplasm of brain
- Malignant neoplasm of breast
- Malignant neoplasm of bronchus and lung
- Malignant neoplasm of colon
- Malignant neoplasm of liver and intrahepatic bile ducts
- Malignant neoplasm of pancreas
- Malignant neoplasm of prostate
- Malignant neoplasm of stomach
- Malignant neoplasm without specification of site
- Multiple myeloma and malignant plasma cell neoplasms
- Myeloid leukemia
- Other and unspecified types of non-Hodgkin's lymphoma
- Other bacterial intestinal infections
- Other diseases of digestive system
- Other diseases of intestine
- Other disorders of brain
- Other disorders of fluid, electrolyte and acid-base balance
- Other disorders of urinary system
- Other interstitial pulmonary diseases
- Other non-traumatic intracranial hemorrhage
- Paralytic ileus and intestinal obstruction without hernia
- Peritonitis
- Pleural effusion, not elsewhere classified
- Pneumonia, organism unspecified
- Pneumonitis due to solids and liquids
- Post-procedural respiratory disorders, not elsewhere classified
- Pulmonary embolism
- Respiratory failure, not elsewhere classified
- Secondary malignant neoplasm of other sites
- Secondary malignant neoplasm of respiratory & digestive organs
- Other septicemia
- Shock, not elsewhere classified
- Stroke, not specified as hemorrhage or infarction
- Subarachnoid hemorrhage
- Unspecified dementia
- Unspecified renal failure
- Vascular disorders of intestine
- Volume depletion

Source: CIHI, 2008.

the areas of care that are of particular concern in their facilities. In all, 39 specific and well-defined indicators of quality of care are examined in latest year of the Fraser Institute's report. The composite measure published in the *Hospital Report Card: Ontario 2009*, the Hospital Mortality Index (HMI), is also a more specific measure of mortality in acute-care hospitals than the CIHI's composite measure and includes only the nine measures shown in table 4.

Table 4: Inpatient Quality and Patient Safety Indicators used in the Hospital Mortality Index

- Hip replacement mortality (IQI 14)
- Acute myocardial infarction mortality (IQI 15) *
- Congestive heart failure mortality (IQI 16)
- Acute stroke mortality (IQI 17)
- Gastrointestinal hemorrhage mortality (IQI 18)
- Hip fracture mortality (IQI 19)
- Pneumonia mortality (IQI 20)
- Death in low mortality Diagnosis Related Groups (PSI 2)
- Failure to rescue rates (PSI 4)

* 2002/03 onwards

Further, the *Hospital Standardized Mortality Ratio* (HSMR) is a relative measure, giving a measure of a hospital's or region's performance relative to Canada's performance as a whole in 2004/05. The indicator measures the ratio of the actual number of deaths for a hospital or region given its case mix (age, sex, length of stay, diagnosis group, etc. of its patients) to the number of deaths that would be expected according to national estimates in 2004.[3] Conversely, the indicators published in the *Hospital Report Card* give an absolute measure of patient safety or inpatient quality of care.

These significant differences in the approaches used by the CIHI and the *Hospital Report Card: Ontario 2009* lead to the conclusion that the two measures cannot be compared with one another directly. Further, the relative rankings of hospitals are not necessarily comparable because of differences in what is being measured in the HSMR and the various indicators of the *Hospital Report Card: Ontario 2009* or the HMI composite measure, and because of the differences between an absolute and relative measure (that is, for a given indicator, a hospital or region performing better than the Canadian average will not necessarily score highly if the Canadian average is low). In addition to these significant differences in approach is a difference in risk-adjustment methodologies: the indicators in the *Hospital Report Card: Ontario 2009* are risk-adjusted using the publicly available 3M/AHRQ methodology/software and are not risk-adjusted in the manner developed and employed by the CIHI for the HSMR.

However, while the two sets of measures cannot be directly compared, it is nevertheless true that the HSMR provides a measure of hospital mortality that can be used in conjunction with the HMI and the other measures produced in the *Hospital Report Card: Ontario 2009*.[4] Both sets of measures are based on an internationally validated and commonly applied methodology, and both sets of measures can provide patients and providers with insight

3 The number of deaths is computed for the 65 diagnosis groups listed above, accounting for 80% of in-patient mortality.

4 Note that the regional results published by CIHI are based on where patients were treated, while municipal measures published in the *Hospital Report Card: Ontario 2009* are based on where patients lived.

into where mortality rates are unacceptably high or exceptionally low.[5] In this sense, the authors of this report welcome the CIHI's measure and hope that greater reporting of, and attention to, provider performances on mortality leads to improved outcomes from care for Canadians.

What Are the Measurable Impacts of Patient Safety and Hospital Report Cards?

In the United States, hospital report cards have had a number of measurable impacts on performance and the quality of patient care. The first and most notable example came from the *New York State Cardiac Surgery Report*. Hannen et al. (1994) reported an associated 41% decline in the risk-adjusted mortality rate of Coronary Artery Bypass Graft patients with the publication of these outcomes statistics and data. A similar overall trend was experienced in Pennsylvania and New Jersey following the publication of their report cards.[6]

These findings have also created controversy about the Cardiac Surgery Reporting System, the database used to create the *New York State Surgery Report*. Critics have raised pertinent questions regarding "up-coding"[7] and the possibility that hospitals have decided not to operate on some complex and critically ill patients and have referred such complex cases to out-of-state jurisdictions (McKee and Healy, 2000). In contrast, using data from the *Cardiac Surgery Reporting System Report* (CSRS) for the period from 1991 to 1999, researchers at the National Bureau of Economic Research found that the reporting program had an impact on the volume of cases and the future quality at hospitals identified as poor performers. Those identified as weaker hospitals lost some relatively healthy patients to competing facilities with better records. Subsequently, these "weaker"

5 It is worth noting that CIHI began working with the HSMR measure for Canada in 2005 while the Fraser Institute's research program on the *Hospital Report Card* began in 2004. Further, the Fraser Institute's *Hospital Report Card: Ontario 2006* was the first publicly available report in Canada that allowed the comparison of mortality rates in Canadian hospitals based on a standardized measure. A significant advantage of the CIHI's report over the *Hospital Report Card* is that it names all hospitals for which data is published while many hospitals in Ontario elected to remain unnamed in the reports produced by the Fraser Institute.

6 For Pennsylvania data, see PHC4, Pennsylvania Health Care Cost Containment Council, 1998. For New Jersey data, see New Jersey, Department of Health and Senior Services, 2001. For the northern New England initiative, see O'Connor et al., 1996.

7 "Up-coding" is a term used to describe when financial incentives cause a physician or hospital to exaggerate or falsely represent patients' medical conditions and services provided in order to increase payment received from the government.

hospitals experienced a decline of 10% in the number of patients during the first 12 months after an initial report and this decrease remained in place for three years. Consequently, patients choosing these hospitals demonstrated a decrease in their risk-adjusted mortality rate by approximately 1.2 percentage points (Cutler et al., 2004).

Though subject to a number of caveats regarding their design and structure, report cards have had a beneficial impact on the quality of health care delivery in those regions where they are published.

The Fraser Institute's *Hospital Report Cards*

The Fraser Institute's *Hospital Report Cards* aim to provide a patient-friendly measurement of hospital care that is focused on clinical outcomes. This report includes information about all health facilities treating patients through the Ontario Health Insurance Program, 17 of which (out of a total of 136) are identified in the report.[8] The report is built on a recognized methodology for constructing hospital report cards from the Agency for Healthcare Research & Quality (AHRQ), an agency of the US federal government's Department of Health and Human Services.

1 What Are the AHRQ Inpatient Quality and Patient Safety Indicators?

The first stage of the research in producing this report was to acquire or create a methodology that was reliable, easily understood by the public and participants, and that produced an accurate measurement of provider performance. An initial period of examining performance-indicator frameworks from earlier literature on hospital report cards provided a number of different examples of accepted and proven methodologies that were not otherwise proprietary information and thus could be employed by the Fraser Institute[9] The search also turned up methodologies that, though available, would be less effective in providing a patient-friendly hospital report card focused on clinical outcomes.

Further examination of the methodologies available led to the selection of the performance-indicator framework developed by the Agency for Healthcare Research & Quality (AHRQ). AHRQ's indicator modules

8 These facilities voluntarily participated in this project. Other facilities in Ontario either declined or offered no response to our requests for participation/identification. Readers should note that the participation rate declined from 43 facilities in FY2004 to 30 facilities in FY2005 and 17 facilities in FY2006.

9 For an example of how some report-card methodologies are proprietary, please refer to the Healthgrades user agreement at <http://www.healthgrades.com/aboutus/index.cfm?fuseaction=modnw&modtype=content&modact=UserAgreement>.

were chosen because they represent a comprehensive set of indictors that are widely used, highly regarded, and applicable to any hospital inpatient administrative data. They are readily available and relatively inexpensive to use. Importantly, they comprise an ideal set of indicators to allow a patient-friendly, clinical outcomes-focused, hospital-specific patient care report card.

The AHRQ indicators date from the mid-1990s when AHRQ developed a set of quality measures, or indicators, that required only the information found in routine hospital administrative data: diagnoses and procedures codes, patient age, sex, other basic demographic and personal information, source of admission, and discharge status. These indicators, 33 in all, made up the Healthcare Cost and Utilization Project (HCUP) Quality Indicators, designed to be used by hospitals to assess their inpatient quality of care as well as by the State and community to assess access to primary care.[10] Although they could not be used to provide definitive measures of the quality of health care directly, they are used to provide indicators of healthcare quality. They serve as the basis for subsequent in-depth investigation of issues of quality and patient safety at the facility level.

In the years following the release of the HCUP, both the knowledge base about quality indicators increased and newer risk-adjustment methods developed. Following input from then-current users, as well as advances in the specific indicators themselves, AHRQ underwrote a project to develop and refine the original Quality Indicators. This project was undertaken by the University of California San Francisco-Stanford Evidence-based Practice Centre. The results of this research were the AHRQ Quality Indicators, which are currently used to measure hospital performance in more than 12 US States including New York, Texas, Colorado, California, Florida, Kentucky, Maryland, Minnesota, New Jersey, Oregon, Utah, Vermont and parts of Wisconsin.

AHRQ indicators Are Organized in Four Modules[11]

1 *Prevention Quality Indicators (PQIs)* Consisting of ambulatory care-sensitive conditions, these indicators pertain to hospital admissions that could have been prevented via high-quality outpatient care.[12]

10 Further information about HCUP Quality Indicators can be found at <http://www.qualityindicators.ahrq.gov/hcup_archive.htm>.

11 The Fraser Institute's *Hospital Report Card: Ontario 2009* is composed of 50 indicators from the inpatient quality and patient safety modules of the AHRQ system (see Appendix E for a list of all indicators used in this report). Not all indicators are available for all years.

12 PQIs identify the quality of care for ambulatory care-sensitive conditions and are measures of the overall health care system. Since the *Hospital Report Card* was designed to analyze the care inside acute-care hospitals, PQIs were omitted from this report.

2 *Inpatient Quality Indicators (IQIs)* These indicators reflect the quality of care inside hospitals and include such items as inpatient mortality; misuse, overuse, or underuse of procedures; and volume of procedures for which evidence shows that a higher volume of procedures is associated with a lower rate of mortality.

3 *Patient Safety Indicators (PSIs)* These indicators focus upon preventable instances of harm to patients such as complications arising from surgery and other iatrogenic events.[13]

4 *Pediatric Quality Indicators (PDIs)* These indicators examine the quality of pediatric inpatient care, as well as the quality of outpatient care that can be inferred from inpatient data, such as potentially preventable hospitalizations.[14]

The Fraser Institute's *Hospital Report Card* uses the IQI and PSI modules; it is made up of 50 of the 63 indicators available in these categories.[15] These two modules were chosen because they are well respected and have seen widespread use.

The AHRQ indicator modules are designed to be used with data from administrative databases in the United States, which themselves are primarily used by hospitals for billing purposes. This type of record, referred to as "administrative data" consists of diagnoses and procedures codes along with information about a patient's age, sex, and discharge status. The Canadian counterpart is the Canadian Institute for Health Information's Discharge Abstract Database (DAD), which contains demographic, personal, administrative, and clinical data for hospital discharges (inpatient acute, chronic, rehabilitation) and day surgeries.

The indicators in the Fraser Institute's *Hospital Report Card: Ontario 2009* analyze more than 10.5 million patient records extracted from the DAD for the years 1997/98 to 2006/07. The data are risk-adjusted using the 3M™ All Patient Refined™ DRG (APR™-DRG) software, commonly recognized to

13 An iatrogenic event is one that is inadvertently caused by a physician, a medical/surgical treatment, or a diagnostic procedure.

14 The PDI module became available in February 2006 and is not used in the *Hospital Report Card*. For details on the PDI module, see <http://www.qualityindicators.ahrq.gov/pdi_download.htm>.

15 Intrinsic differences between ICD-9/CCP and ICD-10-CA/CCI resulted in several indicators being reported in either data coded in ICD-9/CCP (DAD data from FY1997 to FY2001) or data coded in ICD-10-CA/CCI (DAD data from FY2002 onwards), but not both (see Appendix G for details). Moreover, three indicators were dropped from 2005/06 onwards due to changes in the AHRQ software.

be the gold-standard system for risk-adjusting hospital data.[16] The AHRQ QIs were designed to be used in conjunction with 3M™ All Patient Refined™ Diagnosis Related Groups (APR™-DRG) software, which risk adjusts the QIs for patients' clinical conditions and severity of illness or risk of mortality. Indeed, the version of the APR-DRG software built into the AHRQ software was used for this report.

Since this report is based on administrative data, the results have limitations. Coding varies from hospital to hospital and codes do not always provide specific details about a patient's condition at the time of admission or capture all that occurs during hospitalization. For these reasons, individual judgment often is required while reviewing the results from this report.

When reviewing mortality or other measures of quality and patient safety, remember that medicine is not an exact science and death or complications will occur even when all standards of care are followed. Deciding on treatment options and choosing a hospital are decisions that should be made in consultation with a physician. It is not recommended that anyone choose a hospital based solely on statistics and descriptions such as those given in this report.

2 Data Quality

CIHI's Discharge Abstract Database (DAD) contains information on hospital stays in Canada. Various CIHI publications note that the DAD is used extensively by a variety of stakeholder groups to monitor the use of acute-care health services, conduct analyses of health conditions and injuries, and increasingly to track patient outcomes. The DAD is a major data source used to produce various CIHI reports, including annual reports on the performance of hospitals and the health care system and for seven of the health indicators adopted by the federal, provincial, and territorial governments (CIHI, 2002). These data have been used extensively in previous reports on health care performance and form the basis for many journal articles (see, e.g., Ontario Hospital Association and the Government of Ontario, 2007; Aubrey-Bassler et al., 2007).

As the *Hospital Report 2006: Acute Care* notes, using the same DAD data set underlying this report card, "the data are collected under consistent guidelines, by trained abstractors, in all acute care hospitals in Ontario. The data undergo extensive edit checks to improve accuracy, but all errors cannot be eliminated" (Ontario Hospital Association and the Government of Ontario, 2006: 6). However, in order to produce good information about data quality, CIHI established a comprehensive and systematic data-quality program, whose framework involves 24 characteristics relating to the five

16 For further details, please refer to Appendix B and <http://www.3m.com/us/healthcare/his/products/coding/refined_drg.jhtml>.

data-quality dimensions of accuracy, timeliness, relevance, comparability, and usability. (CIHI, 2005)

There are a number of publications that have addressed data-quality issues, which are discussed in our report. Of note are CIHI's reabstraction studies (2002, 2004b) that go back to the original patient charts and recode the information using a different set of expert coders.[17] The reabstraction studies note the following rates of agreement between what was initially coded and what was coded on reabstraction:

a non-medical data: 96%–100%

b selection of intervention codes (procedure codes): 90%–95%

c selection of diagnosis codes: 83%–94%

d selection of most responsible diagnosis: 89%–92%

e typing of co-morbidities: pre-admit: 47%–69%; post-admit: 51%–69%

f diagnosis typing (which indicates the relationship of the diagnosis to the patient's stay in hospital) continues to present a problem; discrepancy rates have not diminished with adoption of ICD-10-CA.

The coding issues in points (e) and (f) do not affect our results since the most responsible diagnosis is coded with a high degree of agreement and the AHRQ indicators do not discriminate among diagnosis types. Overall, when the rates of agreement in the third year of this reabstraction study (performed on data coded in ICD-10-CA) were compared to the rates of agreement of the previous years' data (coded in ICD-9/CCP), the rates were as good as, or better than, previous rates.

However, with regard to the coding of pneumonia, a potential issue with data quality exists because some coders selected pneumonia instead of chronic obstructive pulmonary disease (COPD) as the most responsible diagnosis (CIHI, 2004b). This could potentially create false positive results for Pneumonia mortality rate (IQI 20) since this indicator counts deaths due to pneumonia in situations where the primary diagnosis is a pneumonia diagnosis code.

17 Reabstractors participating in the study were required to have several years of coding experience, experience coding in ICD-10-CA and CCI in particular, experience coding at a tertiary care centre, and attendance at specific CIHI educational workshops. They were also required to attend a one-week training session and to receive a passing score on the inter-rater test.

With respect to specific conditions related to the health indicators examined, those that are procedure-driven (i.e. Cesarean section, coronary artery bypass graft, and total knee replacement) were coded well with low discrepancy rates. The following had less than a 5% rate of discrepancy: Cesarean section, coronary artery bypass graft, hysterectomy, total knee replacement, vaginal birth after Cesarean, and total hip replacement. The following had greater than a 5% discrepancy: AMI (8.9%), hip fracture (6.0%), hospitalization due to pneumonia and influenza (6.9%), and injury hospitalization (5.3%) (CIHI, 2002).

Discrepancy rates were noted in conditions that are diagnosis driven: acute myocardial infarction (AMI) (CIHI, 2002: 8), stroke, pneumonia, and COPD (CIHI, 2004b) (as described above). Only the pneumonia codes are potentially affected in our report.

Overall, according to CIHI, findings from their three-year DAD reabstraction studies "have confirmed the strengths of the database, while identifying limitations in certain areas resulting from inconsistencies in the coding of some data elements" (CIHI, 2004b: 41). In addition, the findings from the inter-rater data (that is, comparison between reabstractors) were generally similar to the findings from the main study data (that is, comparison between original coder and reabstractor). This suggests that the database is coded as well as can be expected using existing approaches in the hospital system.

In addition to the aforementioned reabstraction studies, the OECD published a report in support of the AHRQ patient-safety indicator modules noting that "this set of measures represents an exciting development and their use should be tested in a variety of countries" (Millar, Mattke, et al., 2004: 12). Further, a recently released report by the Manitoba Center for Health Policy that used the AHRQ Patient Safety Indicators (Bruce et al., 2006) noted two important advantages to using the AHRQ module: The first advantage is the breadth of coverage offered by the indicators in studying in-hospital patient safety. The second is that the AHRQ patient-safety indicators were developed to measure complications of hospital-based care among a group of patients for whom the complications seemed preventable or highly unlikely.

3 Participation and identification of hospitals

Participation in the report-card project was not mandatory for hospitals in Ontario. In the end, 17 out of 136 acute-care facilities (representing 5% of inpatient records) agreed to have their institution identified. The unidentified hospitals were assigned an arbitrary hospital number.

Overview of methodology used

All hospital data used in the Fraser Institute's *Hospital Report Card: Ontario 2009* are from the Discharge Abstract Database (DAD) that was purchased from the Canadian Institute for Health Information (CIHI). The DAD is an administrative database containing demographic, administrative, and clinical data for hospital discharges (inpatient acute, chronic, rehabilitation) and day surgeries. Only inpatient acute records were used in this report (see Appendix A for details on which DAD data fields were used).

CIHI is unable to release the identity of specific institutions whose data is included in the DAD unless those institutions have explicitly granted permission to the researchers requesting the data. For 2006/07, only 17 acute-care hospitals (representing 54,867 inpatient records or 5% of records in Ontario in 2006/07) granted their authorization (see Appendix D for a list of participating institutions).[1]

The inpatient acute records were grouped into diagnosis-related groups (DRGs) using the Centers for Medicare and Medicaid Services (CMS) Grouper with Medicare Code Editor software. The program sorts patients' records into groups of patients who are expected to make similar use of a hospital's resources. The groupings are based on information extracted from diagnosis and procedure codes as well as the patients' age, sex, and the presence of complications or co-morbidities (see Appendix B for details).[2]

Since more specialized hospitals may treat more high-risk patients and some patients arrive at hospitals sicker than others, it is difficult to compare hospital mortality rates for patients with the same condition but a different health status. In order to compensate for this possible difference in the mix of hospital cases, the international standard for risk adjustment,

1 For the years from 1997/98 to 2004/05, 43 of Ontario's 136 acute-care hospitals (representing 457,409 inpatient records or 41% of inpatient records in Ontario in 2004/05) voluntarily granted the Fraser Institute authorization to identify their institution-specific discharge data in the DAD. The total number of patient records for the province during these years was 8,588,784. For 2005/06, only 30 acute-care hospitals (representing 54,316 inpatient records or 4.94% of records in Ontario in 2005/06) granted their authorization.

2 In order to use the Centers for Medicare and Medicaid Services (CMS) Grouper with Medicare Code Editor as well as the Agency for Healthcare Research and Quality (AHRQ) Inpatient Quality Indicators (IQI) and Patient Safety Indicators (PSI) modules, the diagnosis and procedure codes had to be translated from ICD-10-CA/CCI (ICD-10-CA is an enhanced version of ICD-10 developed by CIHI for morbidity classification in Canada; the companion classification to ICD-10-CA for coding procedures in Canada is CCI) to ICD-9-CM. See Appendix J for details.

developed by 3M Corporation, was employed to risk-adjust the data. This was done to ensure that a hospital's final score reflected the performance grading that the hospital would have received if it had provided services to patients with the average mix of medical complications.[3]

The final step in our methodology was to produce separate indicators for hospital performance based on the methodology developed by the Agency for Healthcare Research and Quality's (AHRQ) Evidence-Based Practice Center (EPC) at the University of California San Francisco-Stanford.[4] AHRQ's indicator modules use readily available discharge data and were chosen because they have been demonstrated to be a concise and effective tool by which to inform patients' decision-making about their health care. They are currently used to measure hospital performance in more than 12 US states including New York, Texas, Colorado, California, Florida, Kentucky, Maryland, Massachusetts, Minnesota, New Jersey, Oregon, Utah, Vermont and parts of Wisconsin.

Figure 1 shows a graphical representation of the methodology. The Fraser Institute's *Hospital Report Card: Ontario 2009* comprises 39 indicators of the quality of inpatient care and patient safety in 2006/07 (for a list of all indicators used in the report, see Appendix E).[5] Inpatient Quality Indicators (IQIs) reflect the quality of care inside hospitals and include mortality rates, the utilization of procedures (where there are questions of misuse, overuse, or underuse), and volume of procedures (for which evidence shows that a higher volume of procedures is associated with a lower rate of mortality). Patient Safety Indicators (PSIs) focus on preventable complications acquired while in hospital, as well as adverse events following surgeries, procedures, and childbirth.

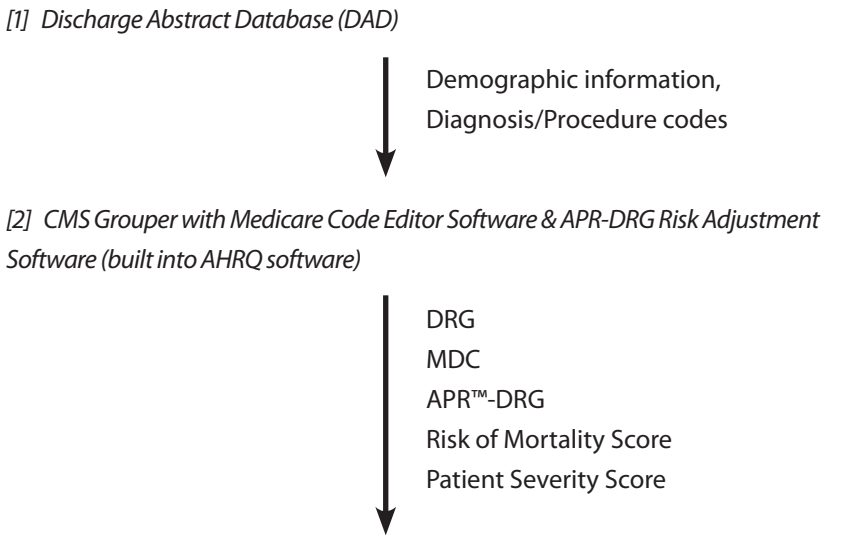
The indicators are expressed as observed rates (which are raw measures) and risk-adjusted rates (incorporating patient severity and risk of mortality scores from the 3M™ software described above). IQI rates are expressed as rates per 100 patients while PSI rates are expressed per 1,000. Each institution was also given a score from 0 to 100 for each indicator based on its

3 For information about 3M's standard for risk adjustment, see <http://www.3m.com/us/healthcare/his/products/coding/refined_drg.jhtml>. See Appendix B for details of its use in this report.

4 The AHRQ Quality Indicators were developed in response to the need for both multidimensional and accessible quality indicators. They include a family of measures that patients, providers, policy makers, and researchers can use with easily accessible inpatient data to identify apparent variations in the quality of inpatient care. For more information, see <http://www.qualityindicators.ahrq.gov/>.

5 There are a total of 50 indicators in this report. Due to changes in diagnostic and procedural classifications, the availability of indicators varies across years. Forty-two indicators are reported for the period from 2002/03 to 2003/04. Due to changes in the AHRQ software, three indicators were dropped from 2005/06 onwards for a total of 39 indicators.

Figure 1: Overview of methodology used to construct the Fraser Institute's *Hospital Report Cards*



risk-adjusted rate and was then ranked based on their scores (see Appendix F for details on calculating scores and ranks).[6]

A Hospital Mortality Index (HMI) was constructed to examine the overall performance of a hospital or municipality across mortality indicators. It consists of eight mortality indicators from 1997/98 to 2001/02 and nine mortality indicators from 2002/03 to 2006/07:[7] *hip replacement mortality* (IQI 14), *acute myocardial infarction mortality* (only included from 2002/03 onwards) (IQI 15), *congestive heart failure mortality* (IQI 16), *acute stroke mortality* (IQI 17), *gastrointestinal hemorrhage mortality* (IQI 18), *hip fracture mortality* (IQI 19), *pneumonia mortality* (IQI 20), *death in low mortality DRGs* (PSI 2) and *failure to rescue rates* (PSI 4). The final HMI index score is based on an equal-weight construct of the separate indicators. For an indicator to be included in the HMI, hospitals representing at least 75% of the patient sample for that year had to have measured data in order to ensure an adequate number of hospitals for comparison. For example, in 2006/07 an

6 Ranks are not used for comparisons of hospitals across indicators as they are based on a varying number of hospitals. It is advisable to rely on the scores (as in the HMI) to examine the overall performance of a hospital across indicators. The HMI also has a fairly large number of hospitals so any bias is insignificant.

7 Intrinsic differences between the ICD-9/CCP and ICD-10-CA/CCI resulted in several indicators being reported on in either data coded in ICD-9/CCP (DAD data from FY1997 to FY2001) or data coded in ICD-10-CA/CCI (DAD data from FY2002 onwards), but not both (see Appendix G for details).

indicator had to contain at least 806,412 records in order to be included in the HMI.[8] All institutions were ranked based on their HMI score, where the highest rank (1) corresponds to the highest score out of 100 (for details on calculating scores, ranks, the HMI, and rank of the HMI, please see Appendix F).

Throughout the *Hospital Report Card*, several measures were taken in order to protect patients' confidentiality. First, patient identifiers such as patients' names and addresses were removed before the Fraser Institute had access to the dataset. Also, postal codes were truncated to Forward Sortation Areas (FSAs) and grouped into municipalities in order to assess and compare care received by patients from those jurisdictions (please see Appendix H for details). Furthermore, results were omitted from publication if the patient population in any given indicator was less than, or equal to, five in any institution and/or municipality.

8 The total number of patient records in 2006/07 was 1,075,216.

Legend for sample table

Use the sample table (page 36) and the explanations below to help you understand how each indicator is displayed in the data tables of the *Hospital Report Card*.

A The name of the Inpatient Quality Indicator (IQI) or Patient Safety Indicator (PSI) from the Agency for Healthcare Research and Quality (AHRQ). See Appendix E for a complete list of the indicators used in the *Hospital Report Card*.

B All indicators were expressed as:

1. an Observed Rate (which is a raw measure);
2. a Risk Adjusted Rate (incorporating patient severity and risk of mortality scores from 3M™ All Patient Refined™ Diagnosis Related Groups [APR™-DRG] Software; see Appendix B for details);
3. a Score (see Appendix F for details on calculating scores, ranks, HMI, and rank of the HMI);
4. a Rank.

Two additional measures were calculated to examine the overall performance of a hospital or municipality across mortality indicators: a Hospital Mortality Index (HMI) and a Rank of the Hospital Mortality Index.

C Indicators are stratified by Institution and by Municipality. Postal Codes were truncated to Forward Sortation Areas (FSAs) before the Fraser Institute had access to the dataset. All patient FSAs were grouped into corresponding municipalities as described by Canada Post. Please see Appendix H for details and Appendix D for a list of participating institutions.

D All IQIs are expressed as percent. PSIs are expressed per thousand.

E All data used in the *Hospital Report Card* were extracted from the Discharge Abstract Database (DAD), which was purchased from CIHI for the period from FY1997 (April 1, 1997 to March 31, 1998) to FY2006 (April 1, 2006 to March 31, 2007).

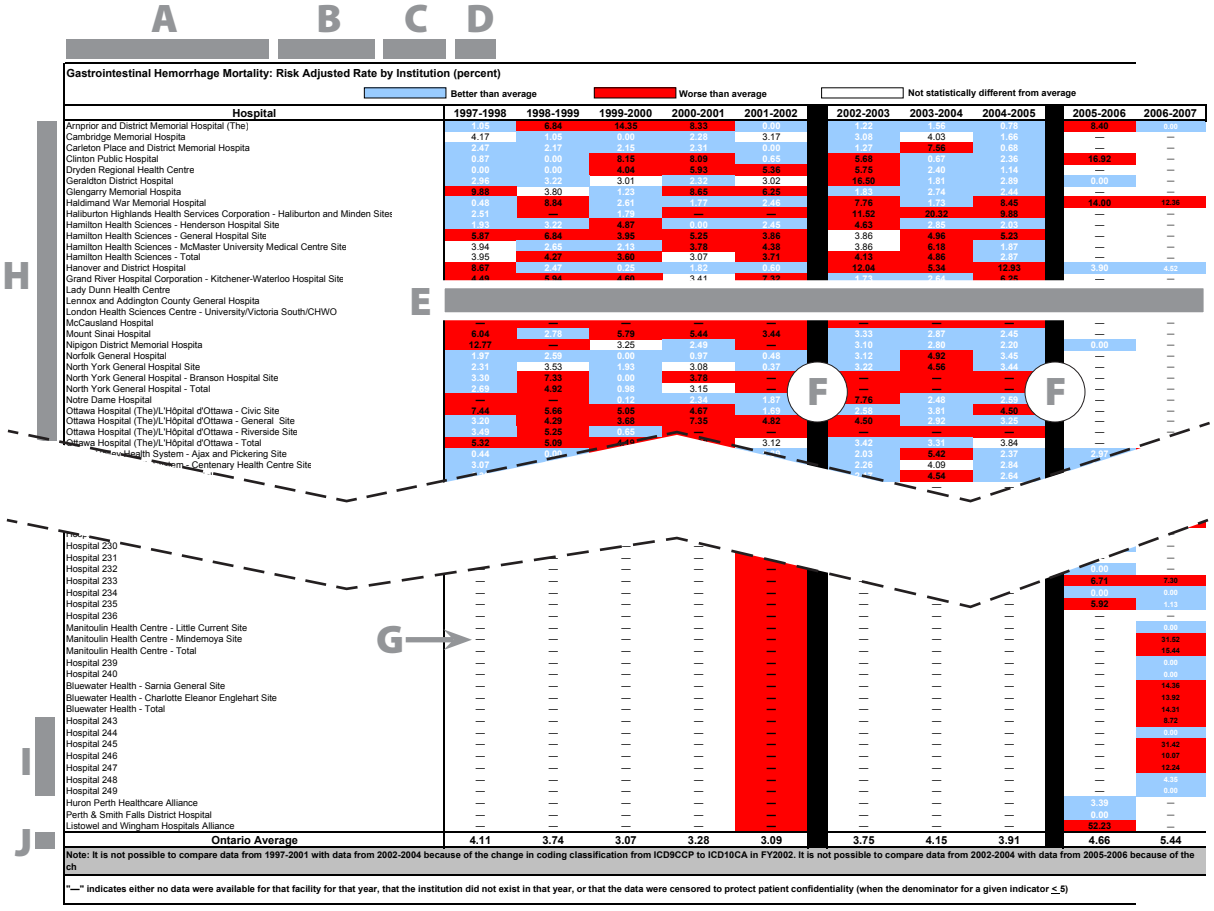
F These lines indicate that it is not possible to compare data from 1997/98–2001/02 and 2002/03–2004/05 because of the change in coding classification from ICD-9/CCP to ICD-10-CA/CCI in 2002/03; and that it is not possible to compare data from 2002/03–2004/05 and 2005/06–2006/07 because of changes in the AHRQ indicators for 2005/06.

G "—" indicates that either no data were available for that hospital for that year, that the institution did not exist in that year, or that the data were censored to protect patient confidentiality (when the denominator for a given indicator is 5 or less).

H Indicators were calculated for all of Ontario's 136 acute-care hospitals. Seventeen hospitals agreed to participate in The Fraser Institute's *Hospital Report Card: Ontario 2009* (representing 5% of inpatient records in Ontario in 2006/07). Please see Appendix D for a list of participating institutions.

I The institution numbers from all acute-care hospitals that did not consent to be identified in the *Hospital Report Card* were encrypted by the Canadian Institute for Health Information (CIHI) prior to delivery. We assigned these institutions an arbitrary number.

J The average rate (Observed or Risk Adjusted) for all the acute-care hospitals in the province.



Gastrointestinal Hemorrhage Mortality: Risk Adjusted Rate by Institution (percent)

Better than average | Worse than average | Not statistically different from average

Hospital	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005	2005-2006	2006-2007
Arnprior and District Memorial Hospital (The)	[illegible]	6.84	14.25	6.33	[illegible]	[illegible]	[illegible]	[illegible]	8.40	[illegible]
Cambridge Memorial Hospita	4.17	1.05	0.00	2.28	3.17	3.08	4.03	1.66	—	—
Carleton Place and District Memorial Hospita	2.47	2.17	2.15	2.31	0.00	1.27	7.56	0.68	—	—
Clinton Public Hospital	0.87	0.00	8.15	8.09	[illegible]	5.68	0.67	2.36	16.92	—
Dryden Regional Health Centre	0.00	0.00	4.04	5.93	5.38	5.75	2.40	1.14	—	—
Geraldton District Hospital	2.96	3.22	3.01	[illegible]	3.02	16.50	1.81	2.89	0.00	—
Glengarry Memorial Hospita	9.88	3.80	1.23	8.65	6.25	1.83	2.74	2.44	—	—
Haldimand War Memorial Hospital	0.48	8.84	2.61	[illegible]	[illegible]	7.76	[illegible]	8.45	14.00	12.36
Haliburton Highlands Health Services Corporation - Haliburton and Minden Sites	2.51	—	4.79	—	—	11.52	20.32	9.88	—	—
Hamilton Health Sciences - Henderson Hospital Site	1.93	[illegible]	4.87	0.00	2.45	4.63	[illegible]	[illegible]	—	—
Hamilton Health Sciences - General Hospital Site	5.87	6.84	3.95	5.25	3.86	3.86	4.96	5.23	—	—
Hamilton Health Sciences - McMaster University Medical Centre Site	3.94	2.65	2.13	3.78	4.38	3.86	6.18	1.87	—	—
Hamilton Health Sciences - Total	3.95	4.27	3.60	3.07	3.71	4.13	4.86	[illegible]	—	—
Hanover and District Hospital	6.67	[illegible]	[illegible]	[illegible]	[illegible]	12.04	5.34	12.93	[illegible]	[illegible]
Grand River Hospital Corporation - Kitchener-Waterloo Hospital Site	[illegible]	[illegible]	[illegible]	3.41	[illegible]	[illegible]	[illegible]	[illegible]	—	—
Lady Dunn Health Centre	—	—	—	—	—	—	—	—	—	—
Lennox and Addington County General Hospita	—	—	—	—	—	—	—	—	—	—
London Health Sciences Centre - University/Victoria South/CHWO	6.04	2.78	5.79	5.44	3.44	3.33	2.87	2.46	—	—
McCausland Hospital	12.77	—	3.25	2.49	—	3.10	2.86	2.20	0.00	—
Mount Sinai Hospital	1.97	2.53	0.00	[illegible]	0.48	3.12	4.92	3.45	—	—
Nipigon District Memorial Hospita	2.31	3.53	1.93	3.08	[illegible]	[illegible]	4.56	[illegible]	—	—
Norfolk General Hospital	3.30	7.33	0.00	[illegible]	—	—	—	—	—	—
North York General Hospital - Branson Hospital Site	2.69	4.92	0.98	3.15	—	—	—	—	—	—
North York General Hospital - Total	—	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	—
Notre Dame Hospital	7.44	5.66	5.05	4.67	1.87	7.76	2.48	[illegible]	—	—
Ottawa Hospital (The)/L'Hôpital d'Ottawa - Civic Site	[illegible]	4.29	3.68	7.35	4.82	[illegible]	3.81	4.50	—	—
Ottawa Hospital (The)/L'Hôpital d'Ottawa - General Site	3.49	5.25	0.65	—	—	4.50	2.92	[illegible]	—	—
Ottawa Hospital (The)/L'Hôpital d'Ottawa - Riverside Site	5.32	5.09	[illegible]	—	3.12	—	—	—	—	—
Ottawa Hospital (The)/L'Hôpital d'Ottawa - Total	0.44	[illegible]	[illegible]	[illegible]	[illegible]	3.42	3.31	3.84	—	—
[illegible]Health System - Ajax and Pickering Site	3.07	[illegible]	[illegible]	[illegible]	[illegible]	2.03	5.42	2.37	[illegible]	[illegible]
[illegible]m - Centenary Health Centre Site	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.26	4.09	2.84	—	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	4.54	2.64	—	—
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	—
Hospital 230	—	—	—	—	—	—	—	—	—	—
Hospital 231	—	—	—	—	—	—	—	—	—	—
Hospital 232	—	—	—	—	—	—	—	—	0.00	—
Hospital 233	—	—	—	—	—	—	—	—	6.71	7.35
Hospital 234	—	—	—	—	—	—	—	—	0.00	0.00
Hospital 235	—	—	—	—	—	—	—	—	5.92	1.13
Hospital 236	—	—	—	—	—	—	—	—	—	—
Manitoulin Health Centre - Little Current Site	—	—	—	—	—	—	—	—	—	0.00
Manitoulin Health Centre - Mindemoya Site	—	—	—	—	—	—	—	—	—	31.52
Manitoulin Health Centre - Total	—	—	—	—	—	—	—	—	—	18.44
Hospital 239	—	—	—	—	—	—	—	—	—	0.00
Hospital 240	—	—	—	—	—	—	—	—	—	0.00
Bluewater Health - Sarnia General Site	—	—	—	—	—	—	—	—	—	14.36
Bluewater Health - Charlotte Eleanor Englehart Site	—	—	—	—	—	—	—	—	—	13.92
Bluewater Health - Total	—	—	—	—	—	—	—	—	—	14.31
Hospital 243	—	—	—	—	—	—	—	—	—	8.72
Hospital 244	—	—	—	—	—	—	—	—	—	[illegible]
Hospital 245	—	—	—	—	—	—	—	—	—	31.42
Hospital 246	—	—	—	—	—	—	—	—	—	10.07
Hospital 247	—	—	—	—	—	—	—	—	—	12.24
Hospital 248	—	—	—	—	—	—	—	—	—	4.35
Hospital 249	—	—	—	—	—	—	—	—	—	0.00
Huron Perth Healthcare Alliance	—	—	—	—	—	—	—	—	3.39	—
Perth & Smith Falls District Hospital	—	—	—	—	—	—	—	—	0.00	—
Listowel and Wingham Hospitals Alliance	—	—	—	—	—	—	—	—	52.23	—
Ontario Average	**4.11**	**3.74**	**3.07**	**3.28**	**3.09**	**3.75**	**4.15**	**3.91**	**4.66**	**5.44**

Note: It is not possible to compare data from 1997-2001 with data from 2002-2004 because of the change in coding classification from ICD9CCP to ICD10CA in FY2002. It is not possible to compare data from 2002-2004 with data from 2005-2006 because of the ch

"—" indicates either no data were available for that facility for that year, that the institution did not exist in that year, or that the data were censored to protect patient confidentiality (when the denominator for a given indicator ≤ 5)

Hospital responses

During the validation phase of the Fraser Institute's *Hospital Report Card*, hospitals that agreed to be identified in the report were sent the results of their performance across both Inpatient Quality Indicators and Patient Safety Indicators. The hospitals had the opportunity to review their results and provide comments about their data and their quality efforts.

Response from Bluewater Health

Unfortunately it is not possible to validate the Bluewater Health results that you have provided. The AHRQ documentation does not provide sufficient detail that would allow us to accurately replicate the indicators used in this study. However, based on the descriptions contained the AHRQ documentation, we were able to estimate numerators and denominators for some indicators that roughly approximate those contained in the validation file.

Further, we do not have access to the risk-adjustment tool used in this study and are therefore unable to validate these findings. We are concerned that the risk adjustment methodology changes Bluewater Health's results significantly for many indicators. In nine instances, the risk-adjusted value is greater than the observed value by over 70%. Conversely, there are eight indicators in which the risk-adjusted value was less than the observed value; however, the average change for these indicators is only –2.7%. We urge the Fraser Institute to review these findings and carefully consider how these results are communicated.

For future studies, we urge you to use methods and tools that are more applicable to datasets used in Canadian hospitals.

Julie Moffat, Director, Health Information Services, Chief Privacy Officer