The Fraser Institute

Hospital Report Card

Ontario 2008

by Nadeem Esmail and Maureen Hazel

I Overview and Observations

FRASER INSTITUTE

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1 Overview and Observations

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Overview and Observations

Overview

The Fraser Institute's *Hospital Report Card: Ontario 2008* is constructed to help patients choose the best hospital for their inpatient care by providing them with information on the performance of Ontario acute-care hospitals. All of the information in this report, which is laid out in 12 documents, can be accessed in a convenient and interactive way through our websites, <www.fraserinstitute.org> and <www.hospitalreportcards.org>.

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 CIHI by all Ontario hospitals. Demographic, administrative, and clinical data are extracted from the Discharge Abstract Database for inpatient hospital stays from all acute care hospitals in Ontario, except for the Hospital for Sick Children in Toronto.

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 hospital death rates, adverse events rates, and utilization rates for patients with the same condition but a different health status. The international standard for risk adjustment, 3M™ APR™ DRG Classification System, [1] is employed to risk-adjust the data.

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

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, 30, representing 4.94% 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 previous 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 this year's edition, the *Hospital Report Card: Ontario 2008.* These 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.

The Fraser Institute's *Hospital Report Card: Ontario 2008* consists of 39 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 to 2006, comprising more than 9.5 million patient records. [2] We have also calculated the indicators for all municipalities in Ontario, based on patient location. This constitutes the most comprehensive and detailed publicly available measure of acute-care hospital performance and accountability in Canada at the present time.

[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. Years 2002 to 2004 report 42 main indicators. Due to changes in AHRQ software, three indicators were dropped in 2005 for a total of 39 indicators.

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.

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.

A Hospital Mortality Index (HMI) has been constructed to examine the overall performance of a hospital or municipality across indicators that measure death rates. It consists of up to nine indicators including:

- deaths due to hip replacement surgery
- deaths due to heart attacks
- deaths due to heart failure
- deaths due to acute strokes
- deaths due to bleeding from the esophagus, stomach, small intestine or colon
- deaths due to hip fractures
- deaths due to pneumonia infection
- deaths among patients that are considered unlikely to die in the hospital
- deaths in patients that developed complications of care during hospitalization

The final HMI is an average of the scores of these indicators, where 100 is the best. All institutions and municipalities were ranked based on their HMI score, where 1 is the best. It is important to note that the 39 indicators and the Hospital Mortality Index are applicable only to acute-care conditions and procedures for inpatient care. The results cannot be generalized to assessing the overall performance of any given hospital.

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 to choose a hospital based solely on statistics and descriptions such as those given in this report.

That said, the DAD is a major data source used to produce various CIHI reports including annual reports on the performance of the hospitals and health-care system and for seven of the health indicators adopted by the federal, provincial, and territorial governments. These data have been used extensively in previous reports on health care performance, and form the basis for many journal articles.

A number of publications have addressed data-quality issues that are discussed in our report. Of note are CIHI's reabstraction studies that go back to the original patient charts and recode the information using a different set of expert coders. [3]

Overall, according to CIHI, [4] 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 [5] 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" (p. 11). Further, a recently released report by the Manitoba Center for Health Policy that used the AHRQ Patient Safety Indicators [6] 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.

[3] 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.

[4] Data Quality of the Discharge Abstract Database Following the First-year Implementation of ICD-10-CA/CCI. CIHI, 2004.

[5] Selecting Indicators for Patient Safety at the Health Systems Level in OECD Countries. John Millar, Soeren Mattke and the Members of the OECD Patient Safety Panel. Report available at <http://www.oecd.org/dataoecd/53/26/33878001.pdf>.

[6] Bruce S. et al., Application of Patient Safety Indicators in Manitoba: A First Look. Winnipeg, Manitoba Centre for Health Policy, June 2006.

Observations

A report based on more than 9.5 million patient records, shown across as many as 50 quality and safety indicators for 136 hospitals and 138 municipalities over nine 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 of hospital care across the entire system. It is for that reason that we have rates, scores, and ranks for each separate indicator and that information can be assessed by using this document and our associated interactive web-enabled database found through <www.fraserinstitute.org> or <www.hospitalreportcards.org>.

However, we have created one summary measure of mortality, based on the most important and reliable data in this study, the Hospital Mortality Index. The nine component indicators of the HMI were arrived at by a process of elimination. Starting with our complete group of indicators (39 in the latest year), we eliminated indicators that had no data for several years or relatively few hospitals with data. The resulting HMI has scores and rankings for 57 hospitals and 93 municipalities in the latest year.

Tables 1 (pages 6–7) and 2 (pages 9–11) show scores and rankings for the Hospital Mortality Index for 2005/06. [7] This is compared to the average score over the latest four years (2002/03–2005/06). The change column shows the improvement or deterioration in score between the two periods. Scores for fiscal years 2002, 2003 and 2004 are also presented. Comparisons of the Hospital Mortality Index for 2005/06 and previous years must be interpreted with caution.

[7] The use of 2002/03 and 2003/04 data possibly introduces a SARS effect to the HMI for some hospitals, as 44 patients died in Ontario from SARS between February and July 2003 and hospital operations were affected. However, we note that the median HMI score rose by 6.6 points in 2003 and dropped by 6.5 points in 2004, leaving the score virtually unchanged between 2002 and 2004 at 71.3.

Indeed, the number of hospitals and municipalities ranked fell from 66 to 57 and 106 to 93 respectively. Moreover, scores for 2005/06 may also be affected by changes in AHRQ's computation of risk-adjusted rates. [8]

[8] Prior to version 3, a linear regression model was used for risk-adjustment where the risk adjusted rate = observed rate - expected rate + population rate. With version 3, logistic regression was used, where the risk adjusted rate = observed rate / expected rate * population rate.

Hospital Mortality Index: Hospitals

Top-Ranked Hospitals

- The top hospital in Ontario is Anonymous Hospital 10, identity unknown, with a high HMI score of 91.2 out of 100. It has performed consistently well, ranking second in both the late 1990s and early 2000s.
- Anonymous hospitals 222 and 204 are ranked second and third respectively in 2005/06. These hospitals did not appear in previous report cards.
- Anonymous Hospital 50 was ranked first in 2002/05 and ranks 13th in 2005/06.
- The top identified hospital is Timmins and District Hospital in 15th place and a score of 88.3, followed closely by Stratford General Hospital (Stratford) in 19th place and a score of 88.2. Stratford ranked among the top five in previous years.
- Calculation of an HMI score was possible for only four of the identified hospitals, none of which are in the top ten. St. Thomas Elgin General Hospital and Orillia Soldiers' Memorial Hospital rank 39th and 49th, respectively. As noted above, Timmins and District ranked 15th and Stratford General, 19th.
- Anonymous Hospital 25, ranked 12th, has had the largest improvement in its HMI score of any hospital (up 20.7 points) since the early 2000s.[9]

[9] Comparisons of the Hospital Mortality Index for 2005/06 and previous years must be interpreted with caution. Indeed, the number of hospitals and municipalities ranked fell from 66 to 57 and 106 to 93, respectively. Moreover, scores for 2005/06 may also be affected by changes in AHRQ's computation of risk-adjusted rates and scores for 2002/03 and 2003/04 may be biased by a SARS effect.

Bottom-Ranked Hospitals

- Nine of the 10 bottom-ranked hospitals did not participate in the study. Of these, Anonymous Hospital 18, with a score of 72.8, is the lowest-ranked hospital. It also ranked in the bottom 10 in 2002/05.
- Anonymous Hospital 40 is the second lowest-ranked hospital, with a score of 73.8. Anonymous Hospital 55 is third lowest, with a score of 79.0; this hospital also experienced the smallest improvement in its HMI from the early 2000s among hospitals for whom an HMI could be calculated in 2005/06.
- Orillia Soldiers' Memorial Hospital is the lowest-ranked participating hospital and is ranked 49th. A score for previous years is unavailable.

Consistency

- There is some consistency of performance in the top and bottom hospitals.
- All of the bottom ten hospitals, except for Anonymous Hospitals 55 and 59, were either low ranked in the late 1990s and early 2000s or had inadequate data during that period to be ranked.

Table 1: Hospital Mortality Index—Hospitals

	2005/06		2002/05		Change 02/05–05/06		2002/03	2003/04	2004/05
	Score	Rank	Score	Rank	Score	Rank	Score	Score	Score
Hospital 10	91.2	1	79.6	2	11.6	20	73.0	86.0	79.9
Hospital 222	91.0	2	—	—	—	—	—	—	—
Hospital 204	90.4	3	—	—	—	—	—	—	—
Hospital 67	90.4	4	74.3	30	16.1	5	77.6	80.3	64.9
Hospital 29	90.3	5	75.5	24	14.8	11	71.9	80.8	73.8
Hospital 230	90.1	6	—	—	—	—	—	—	—
Hospital 223	90.1	7	—	—	—	—	—	—	—
Hospital 202	90.0	8	—	—	—	—	—	—	—
Hospital 226	89.6	9	—	—	—	—	—	—	—
Hospital 238	89.5	10	—	—	—	—	—	—	—
Hospital 228	89.4	11	—	—	—	—	—	—	—
Hospital 25	89.4	12	68.7	54	20.7	1	65.2	71.9	69.0
Hospital 50	89.2	13	80.9	1	8.3	31	78.5	86.0	78.1
Hospital 79	89.2	14	74.8	28	14.4	13	75.9	76.5	72.0
Timmins and District Hospital	88.3	15	—	—	—	—	—	—	—
Hospital 97	88.3	16	77	6	11.3	22	77.6	79.8	73.6
Hospital 178	88.3	17	—	—	—	—	—	—	—
Hospital 7	88.3	18	72.9	37	15.4	8	70.0	76.5	72.1
Stratford General Hospital	88.2	19	77.3	5	10.9	24	80.2	72.4	79.2
Hospital 200	88.2	20	—	—	—	—	—	—	—
Hospital 236	88.1	21	—	—	—	—	—	—	—
Hospital 220	88.0	22	—	—	—	—	—	—	—
Hospital 179	88.0	23	—	—	—	—	—	—	—
Hospital 70	88.0	24	68.2	57	19.8	2	57.3	78.8	68.4
Hospital 214	88.0	25	—	—	—	—	—	—	—
Hospital 76	87.8	26	71.9	43	15.9	7	68.5	75.8	71.4
Hospital 212	87.4	27	—	—	—	—	—	—	—
Hospital 15	87.2	28	70.7	47	16.5	4	69.9	76.5	65.9
Hospital 77	87.2	29	75.8	19	11.4	21	74.5	79.1	73.8
Hospital 62	86.6	30	76.4	12	10.2	26	78.5	83.1	67.5
Hospital 71	86.5	31	74.2	31	12.3	16	73.4	77.9	71.4
Hospital 106	86.3	32	70.3	48	16.0	6	74.1	73.2	63.6
Hospital 36	86.2	33	71.1	46	15.1	9	69.4	79.3	64.5
Hospital 211	86.0	34	—	—	—	—	—	—	—
Hospital 104	85.3	35	74.1	32	11.2	23	71.2	79.0	72.1
Hospital 218	85.2	36	—	—	—	—	—	—	—
Hospital 16	85.1	37	70.1	50	15.0	10	62.8	74.6	72.8
Hospital 109	85.0	38	74.9	26	10.1	27	75.3	79.6	70.0
St. Thomas-Elgin General Hospital	84.9	39	75.9	18	9.0	30	72.3	79.9	75.4
Hospital 8	84.9	40	70.3	49	14.6	12	64.7	74.1	72.2

Table 1: Hospital Mortality Index—Hospitals (continued)

	2005/06		2002/05		Change 02/05–05/06		2002/03	2003/04	2004/05
	Score	Rank	Score	Rank	Score	Rank	Score	Score	Score
Hospital 72	84.6	41	72.7	38	11.9	19	72.7	78.9	66.5
Hospital 108	84.4	42	72.3	42	12.1	17	69.8	75.8	71.2
Hospital 80	84.2	43	74.9	27	9.3	28	—	79.6	70.2
Hospital 180	83.7	44	—	—	—	—	—	—	—
Hospital 210	83.2	45	—	—	—	—	—	—	—
Hospital 38	83.1	46	72.3	41	10.8	25	70.4	75.1	71.3
Hospital 44	83.0	47	—	—	—	—	—	—	—
Hospital 59	82.9	48	75.6	23	7.3	32	—	80.0	71.1
Orillia Soldiers' Memorial Hospital	82.8	49	—	—	—	—	—	—	—
Hospital 22	82.4	50	69.3	53	13.1	15	70.0	71.0	67.0
Hospital 96	82.2	51	63	64	19.2	3	63.0	65.9	60.2
Hospital 31	82.2	52	68.2	56	14.0	14	73.1	74.9	56.7
Hospital 203	82.2	53	—	—	—	—	—	—	—
Hospital 43	79.3	54	67.3	59	12.0	18	63.2	71.9	66.8
Hospital 55	79.0	55	74.7	29	4.3	34	68.2	81.4	74.6
Hospital 40	73.8	56	64.6	62	9.2	29	59.8	69.5	—
Hospital 18	72.8	57	67.2	60	5.6	33	60.2	71.7	69.6

Hospital Mortality Index: Municipalities

Note: The Hospital Mortality Index (HMI) is calculated for municipalities using the residence of patients treated in Ontario's acute-care hospitals.

Top-Ranked Municipalities

- The top municipality is Maple with a high HMI score of 91.4 out of 100. This municipality ranked high at second place in 2002/05 but had inadequate data to show a score in the late 1990s.
- The second ranked municipality is Port Perry, with an HMI score of 90.9. Interestingly, Port Perry ranked a relatively low 61st over the period from 2002 to 2005. Data were not available to show a score in the late 1990s.
- The fourth-ranked municipality is Stratford, which also ranked consistently high at second place in the late 1990s and at third place in the early 2000s. Stratford General Hospital scored in the top 20 in 2005/06 and ranked consistently highly (fifth and first) over the previous two time periods, which is not surprising, given that more than 80% of Stratford inpatient stays occurred at that hospital.
- Larger population municipalities with high rankings are: Richmond Hill, ranked 14th; Brampton, ranked 15th; and Ottawa, ranked 20th.

Bottom-Ranked Municipalities

- The lowest-ranked municipality in Ontario is Fort Erie, with a low HMI score of 62.2 for the most recent period but inadequate data from the late 1990s.
- Most of the bottom-ranked municipalities are small and consistently low ranked over the two time periods. Examples are Brockville, Fort Erie, Collingwood, and Gananoque.
- Aylmer West, ranked 57th, sees almost 70% of its inpatients go to St. Thomas-Elgin General Hospital, which has an 39th-place ranking.
- Larger municipalities with low rankings are: Sault Ste. Marie, ranked 72nd; Markham, ranked 73rd; Brantford, ranked 74th; and Sudbury, ranked 80th.

Five Largest Municipalities

- The five largest municipalities in Ontario by number of inpatient stays are: Toronto, ranked 40th on the Hospital Mortality Index with a score of 83.7; Ottawa, ranked 20th with a score of 86.0; Scarborough, ranked 49th with a score of 81.2; Mississauga, ranked 42nd with a score of 83.7; and Hamilton, ranked 37th with a score of 84.3.

Table 2: Hospital Mortality Index—Municipalities

	2005/06		2002/05		Change 02/05–05/06		2002/03	2003/04	2004/05
	Score	Rank	Score	Rank	Score	Rank	Score	Score	Score
Maple	91.4	1	79.2	2	12.2	32	83.7	76.2	77.7
Port Perry	90.9	2	69.4	61	21.5	3	—	74.0	64.8
Orangeville	90.6	3	77.6	6	13.0	26	85.1	68.9	78.9
Stratford	88.9	4	79.1	3	9.8	55	81.9	74.1	81.3
Amherstburg	88.0	5	73.1	29	14.9	13	78.8	77.1	63.6
Wasaga Beach	87.9	6	—	—	—	—	—	—	—
Ajax	87.8	7	76.5	8	11.3	41	80.9	76.5	72.1
Alliston	87.5	8	63.8	92	23.7	2	59.0	58.6	73.9
Leamington	87.3	9	77.9	5	9.4	61	71.0	79.8	82.8
Whitby	87.2	10	74.9	15	12.3	31	74.8	73.1	76.8
Cornwall	87.1	11	70.2	54	16.9	7	71.0	69.5	70.0
Port Hope	86.8	12	66.5	81	20.3	4	72.8	72.1	54.5
Lively	86.7	13	61.2	100	25.5	1	66.0	55.1	62.5
Richmond Hill	86.5	14	72.3	35	14.2	19	78.3	64.7	73.9
Brampton	86.4	15	75.9	11	10.5	49	80.9	72.4	74.3
Bowmanville	86.4	16	74.4	18	12.0	33	69.0	75.7	78.5
Kingsville	86.3	17	70.7	53	15.6	10	—	66.8	74.6
Thornhill	86.3	18	76.7	7	9.6	58	82.2	72.5	75.5
Wallaceburg	86.1	19	68	72	18.1	6	70.3	64.3	69.4
Ottawa	86.0	20	72.8	33	13.2	24	77.2	68.8	72.5
Newmarket	86.0	21	70.7	52	15.3	12	75.8	70.6	65.7
Fergus	85.9	22	72.1	38	13.8	22	—	76.5	67.7
Woodbridge	85.6	23	73	31	12.6	30	72.8	71.9	74.2
Oshawa	85.5	24	73.5	26	12.0	34	76.4	71.1	72.9
Welland	85.4	25	71.2	44	14.2	20	75.6	64.8	73.2
Burlington	85.3	26	70.9	50	14.4	18	74.1	67.6	70.9
Cambridge	85.3	27	73.7	24	11.6	38	75.3	68.3	77.5
Georgetown	84.9	28	70	55	14.9	14	77.5	65.7	66.8
Other	84.8	29	74.4	17	10.4	52	76.4	73.9	73.0
Timmins	84.7	30	73.9	21	10.8	45	75.6	72.2	73.9
Arnprior	84.6	31	79.8	1	4.8	80	79.9	—	79.8
Carleton Place	84.5	32	—	—	—	—	—	—	—
Penetanguishene	84.5	33	78.2	4	6.3	76	—	77.7	78.7
Kitchener	84.4	34	69.5	60	14.9	15	73.9	65.2	69.4
Hawkesbury	84.3	35	—	—	—	—	—	—	—
Sarnia	84.3	36	73.7	23	10.6	47	76.7	71.3	73.1
Hamilton	84.3	37	73.7	22	10.6	48	76.3	69.5	75.5
Oakville	84.3	38	75.6	12	8.7	65	77.0	72.7	77.1
Willowdale	83.9	39	72.3	36	11.6	37	76.3	68.0	72.4
Toronto	83.7	40	72.1	39	11.6	36	74.5	69.8	71.9

Table 2: Hospital Mortality Index—Municipalities (continued)

	2005/06		2002/05		Change 02/05–05/06		2002/03	2003/04	2004/05
	Score	Rank	Score	Rank	Score	Rank	Score	Score	Score
Parry Sound	83.7	41	71	47	12.7	28	71.4	69.1	72.6
Mississauga	83.7	42	70.9	49	12.8	27	73.8	68.5	70.4
Etobicoke	83.5	43	68.8	69	14.7	16	71.2	67.7	67.4
Windsor	83.1	44	72.4	34	10.7	46	76.1	68.1	73.0
London	82.9	45	73	30	9.9	53	77.2	70.6	71.3
Barrie	82.2	46	75.1	14	7.1	73	78.7	75.7	71.0
Peterborough	81.8	47	65.4	86	16.4	8	75.4	57.8	62.9
Thunder Bay	81.4	48	73.9	20	7.5	69	77.9	70.3	73.6
Scarborough	81.2	49	69.7	57	11.5	39	75.1	64.3	69.6
Rural	81.1	50	71.3	43	9.8	56	74.9	68.4	70.8
Pickering	81.0	51	73.6	25	7.4	70	82.3	67.4	71.2
Weston	80.8	52	69.4	62	11.4	40	74.9	64.6	68.6
Downsview	80.7	53	65.2	88	15.5	11	71.4	62.3	62.0
Pembroke	80.3	54	64.1	90	16.2	9	64.1	63.8	64.6
Kingston	80.1	55	68.4	70	11.7	35	68.0	65.0	72.4
Aurora	79.7	56	72.2	37	7.5	68	75.2	69.7	71.7
Aylmer West	79.7	57	76.1	10	3.6	82	78.8	71.8	77.7
North York	79.6	58	67	78	12.6	29	73.5	54.5	73.0
Bolton	79.5	59	73.3	28	6.2	77	77.1	72.2	70.4
Bracebridge	79.4	60	69.6	59	9.8	54	77.5	67.8	63.5
Midland	79.3	61	66.3	84	13.0	25	78.7	59.8	60.5
Belleville	79.1	62	68	73	11.1	42	69.0	62.5	72.4
Cobourg	79.1	63	60.9	102	18.2	5	72.2	58.0	52.4
St. Catharine	79.0	64	67.9	74	11.1	43	73.9	63.3	66.4
Woodstock	78.8	65	69.1	64	9.7	57	72.1	70.2	64.8
Owen Sound	78.7	66	74.1	19	4.6	81	69.1	75.2	78.0
Milton	78.7	67	69.6	58	9.1	63	75.3	65.3	68.3
Stouffville	78.5	68	71.2	45	7.3	71	77.5	72.5	63.5
Chatham	78.4	69	69	66	9.4	60	72.7	63.9	70.3
Orillia	78.4	70	68.9	68	9.5	59	68.8	68.2	69.6
Grimsby	78.3	71	67.5	76	10.8	44	67.4	63.7	71.4
Sault Ste. Marie	78.3	72	74.9	16	3.4	83	81.3	72.2	71.1
Markham	78.0	73	64.2	89	13.8	21	69.9	60.4	62.2
Brantford	77.5	74	71.2	46	6.3	75	75.3	69.6	68.6
Bradford	77.5	75	72	40	5.5	78	67.8	76.3	—
Niagara Falls	77.4	76	66.9	79	10.5	50	73.1	63.1	64.6
Collingwood	77.1	77	62.5	96	14.6	17	72.8	59.3	55.3
Guelph	77.0	78	69.1	63	7.9	67	69.2	67.4	70.8
St. Thomas	76.9	79	66.4	83	10.5	51	69.1	60.7	69.4
Sudbury	76.2	80	70.7	51	5.5	79	71.2	70.5	70.5

Table 2: Hospital Mortality Index—Municipalities (continued)

	2005/06		2002/05		Change 02/05–05/06		2002/03	2003/04	2004/05
	Score	Rank	Score	Rank	Score	Rank	Score	Score	Score
Napanee	76.1	81	69	65	7.1	72	71.6	71.8	63.7
Gananoque	75.4	82	61.8	98	13.6	23	61.1	—	62.4
North Bay	75.4	83	66.1	85	9.3	62	68.6	59.3	70.5
Keswick	75.2	84	73	32	2.2	85	71.0	68.6	79.4
Innisfil	74.5	85	75.2	13	-0.7	86	83.7	67.3	74.6
Lindsay	73.9	86	71.5	41	2.4	84	70.6	73.3	70.6
Port Colborne	73.6	87	65.3	87	8.3	66	73.8	64.0	58.2
Tillsonburg	73.1	88	66.5	80	6.6	74	68.9	69.0	61.7
Brockville	71.7	89	62.6	95	9.1	64	—	63.8	61.4
Paris	71.3	90	—	—	—	—	—	65.1	—
Uxbridge	71.1	91	—	—	—	—	—	67.4	—
Huntsville	66.6	92	71.4	42	-4.8	88	—	62.6	80.2
Fort Erie	62.2	93	64	91	-1.8	87	71.0	58.2	62.8

Conclusion

The Fraser Institute's *Hospital Report Card: Ontario 2008* provides a comprehensive measure of inpatient acute-care conditions in Ontario hospitals. This is the second edition of an annual report card for patients in Ontario, and its publication follows the introduction of a similar report for patients in British Columbia (*Hospital Report Card: British Columbia 2008*). 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 2008* 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 is 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 2008* has been published to promote accountability within hospitals, thereby stimulating improved performance through an independent and objective measurement of performance.

Introduction

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? [1]

[1] Daniel P. Kessler of Stanford University, Hoover Institution provides a helpful delineation of the field in a PowerPoint® slideshow entitled "Health Care Quality Report Cards."

Hospital report cards provide a set of consistent performance measurements to rank the products in question and help inform consumer choice. In some cases, these indicators may be subjective, or 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 friendliness; or to measure the likelihood of a positive outcome provided by health facilities in a specific jurisdiction.

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 (Leapfrog Group, 2005). [2] The primary strength of a Process Report Card is that it can be developed from existing medi-

[2] Further information available at <http://www.leapfroggroup.org/>.

cal 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 These types of report cards are 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 Pacific Business Group on Health's (PBGH) *Healthscope* reports. 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 (Pennsylvania Health Care Cost Containment Council, 2006). [3] 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 favour of healthy 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 Card*) provide the most empirically sound basis for analyzing the quality of care.

[3] Further information available at <http://www.phc4.org/reports/cabg/>.

4 Balanced Scorecards The balanced scorecard was developed in the early 1990s by Drs. 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?

The publication of hospital report cards is based on the concept that publishing outcomes data 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 of service provision 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 provider quality have refined the reporting of information.

In 1987, the first US hospital report cards were published by the Health Care Financing Administration (HCFA). These reports detailed annual mortality rates that were measured from the records of hospitalized Medicare patients. However, due to extensive criticism regarding 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, *New York Newsday* was able to publish the information on physician 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). [4]

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 of authors that ranged from the news media, coalitions of large employers, consumer advocacy organizations, and state governments (Marshall et al., 2003). Many different development paths have been taken so that there is currently no "standardized" hospital report card or agreement on the indicators to measure.

[4] Links to the entire series of reports can be found at <http://www.health.state.ny.us/nysdoh/heart/heart_disease.htm>.

Furthermore, these different 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." [5] 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.

[5] Document available at <www.medscope.com/viewarticle/452953_3>.

Examples of American Private and Public Information Providers

[1] America's Best Hospitals—USNEWS & World Report <http://www.usnews.com>.

[2] Healthgrades <http://www.healthgrades.com>

[3] Leapfrog Group <http://www.leapfroggroup.org>

[4] National Committee for Quality Assurance (NCQA) <http://www.ncqa.org>

[5] National Quality Forum <http://www.qualityforum.org>

[6] Quality Check <http://www.jointcommission.org/PerformanceMeasurement/PerformanceMeasurement/>

[7] Cardiac Surgery in New Jersey <http://www.state.nj.us/health/reportcards.htm>

[8] Cardiac Surgery Reports <http://www.health.state.ny.us/nysdoh/healthinfo/index.htm>

[9] Pennsylvania Hospital Performance Reports <http://www.phc4.org>

[10] Indicators of Inpatient Care in New York Hospitals <http://www.myhealthfinder.com>

[11] Indicators of Inpatient Care in Texas Hospitals <http://www.dshs.state.tx.us/THCIC/>

[12] Maryland Hospital Performance Evaluation Guide <http://www.hospitalguide.mhcc.metro-data.com>

The United Kingdom

The hospital reporting universe in the United Kingdom is a fraction of the US market's size. League tables [6] 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 Labour 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), [7] which focused on waiting times as opposed to clinical quality.

[6] A league table ranks the performance of a range of institutions.

[7] Further information can be found at <http://www.pfc.org.uk/medical/pchrt-e1.htm#foreword>.

In 1998, the National Health Service (NHS, Britain's tax-funded and 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 Plan 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 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.drfoster.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 hospital prices for services.

Canada

Hospital reporting initiatives, like those in both the United States and the United Kingdom, have emerged in Canada 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 appears in a "balanced scorecard" format and assesses the performance of hospitals in four quadrants including: [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 Canadian Institute for Health Information's *Hospital Standardized Mortality Ratio* (discussed below), *Healthcare Performance Measurement in Canada: Who's Doing What?* (Baker et al., 1998), *Quality of Cardiac Care in Ontario* (ICES, 2004) [8] and *The State of Hospital Care in the GTA/905* (GTA/905 Healthcare Alliance, 2005). [9] Additionally, two publications that have reported on patient safety and adverse events are *The Ottawa Hospital Patient Safety Study* (Forster et al., 2004) [10] and *The Canadian Adverse Events Study* (Baker et al., 2004), though neither reported institution-specific measures. [11] 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 Walker with Bank, 2007). [12] Another Fraser Institute initiative is *How Good is Canadian Health Care? An International Comparison of Health Care Systems* (Esmail and Walker, 2007) [13], which compares Canada's health policies and healthcare performance with other nations that guarantee their citizens access to healthcare insurance.

Other avenues of hospital performance reporting and monitoring in Canada have largely been in the form of private hospital assessments of performance by a contracted third party using a proprietary performance indicator 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).

[8] Report available at <http://www.ices.on.ca/WebBuild/site/ices-internet-upload/file_collection/Ccort%5FFull%5FReport%2Epdf>.

[9] Further details available at <http://www.gta905health.com/mediaroom/2005-may3.html>. Report available at <http://www.gta905health.com/whatsnew/gta905-hospitalreport.pdf>.

[10] Article available at <http://www.pubmedcentral.gov/articlerender.fcgi?tool=pubmed&pubmedid=15078845>. Also, the Manitoba Center for Health Policy recently released an in-hospital patient safety report using the AHRQ Patient Safety Indicators (Bruce et al., 2006).

[11] Article available at <http://www.cmaj.ca/cgi/content/full/170/11/1678>.

[12] Report available at <http://www.fraserinstitute.org/commerce.web/publication_details.aspx?pubID=4962>.

[13] Report available at <http://www.fraserinstitute.org/commerce.web/publication_details.aspx?pubID=5035>.

Canadian Institute for Health Information's Hospital Standardized Mortality Ratio (HSMR)

The Canadian Institute for Health Information (CIHI) published its own measure of hospital and regional performances, the *Hospital Standardized Mortality Ratio* (HSMR), in 2007. While both CIHI's measure and the *Hospital Report Card: Ontario 2008* use data from CIHI's Discharge Abstract Database, there are several significant differences between the measure published by CIHI and those published by The Fraser Institute. These differences make comparisons between the two reports difficult and lead to the conclusion that CIHI and the *Hospital Report Card: Ontario 2008* are measuring mortality in two very different ways.

The most significant difference between the measures published by The Fraser Institute and those published by CIHI is the level of detail available. According to the CIHI 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. These include:

- 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
- 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
- Hip fracture
- 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
- Pneumonitis due to solids and liquids
- Post-procedural respiratory disorders, not elsewhere classified
- Pulmonary embolism
- Respiratory failure
- Secondary malignant neoplasm of other sites
- Secondary malignant neoplasm of respiratory and digestive organs
- 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

By comparison, the measures published in the *Hospital Report Card: Ontario 2008* allow for the examination of hospital performance in specific and detailed areas, thus providing patients with a greater level of information regarding their particular interest or diagnosis and allowing providers greater insight into the areas of care that are of particular concern in their facilities. In the latest year of data, 39 specific and well-defined indicators of quality of care are examined in The Fraser Institute's report. The composite measure published in the *Hospital Report Card: Ontario 2008*, the Hospital Mortality Index (HMI), is also a more specific measure of mortality in acute-care hospitals than CIHI's composite measure and includes only the following nine measures:

- 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)

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. 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. [14] Conversely, the 39 indicators published in the Hospital Report Card [15] and the Hospital Mortality Index (HMI) composite measure give an absolute measure of patient safety or in-patient quality of care.

These significant differences in the approaches used by CIHI and the *Hospital Report Card: Ontario 2008* 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 2008* or the HMI composite measure, and because of the differences between an absolute and relative measure (i.e. 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 2008* are risk-adjusted using the publicly-available 3M/AHRQ methodology/software and are not risk adjusted in the manner developed and employed by 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 2008*. [16] 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 into where mortality rates are unacceptably high or exceptionally low. [17] In this sense, the authors of this report welcome CIHI's measure and hope that greater reporting of, and attention to, provider performances on mortality leads to improved outcomes from care for Canadians.

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

[15] In some years, more than 39 indicators are available (see Appendix G).

[16] Note that the regional results published by CIHI are based on where patients were treated, while municipal measures published in the *Hospital Report Card* are based on where patients lived.

[17] 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* 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: Ontario 2008* is that it names all hospitals for which data is published while many hospitals in Ontario elected to remain unnamed in the report produced by The Fraser Institute.

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. [18]

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" [19] 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" 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). [20]

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

[18] For Pennsylvania data, see *Cardiac Care: Pennsylvania's Guide to Coronary Artery Bypass Graft Surgery 1994–1995*, <http://www.phc4.org/reports/cabg/95/default.htm> (April 2, 2002). For New Jersey, see *Report Shows Cardiac Surgery Death Rates Decline to Lowest Level in a Decade* (press release), <http://nj.gov/cgi-bin/dhss/njnewsline/view_article.pl?id=3046> (March 2008). For the northern New England initiative, see G.T. O'Connor et al., "A Regional Intervention to Improve the Hospital Mortality Associated with Coronary."

[19] "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.

[20] <http://papers.nber.org/papers/w10489>.

Hospital Report Card: Ontario 2008

The primary focus of this project was the construction of a patient-friendly hospital and patient-care report card focused on clinical outcomes. The report itself includes information about all health facilities treating patients through the Ontario Health Insurance Program, 30 of which (out of a total of 136) are identified in the report. [21] The report is built on a recognized hospital-report-card methodology from the Agency for Healthcare Research & Quality (AHRQ) in the United States that is also used in more than 12 US States including New York, Texas, Colorado, [22] California, Florida, Kentucky, Maryland, Massachusetts, Minnesota, New Jersey, Oregon, Utah, Vermont, and parts of Wisconsin.

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

The first stage of the research process 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

[21] 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 FY 2004 to 30 facilities in FY 2005.

[22] New York <http://www.myhealthfinder.com; Texas <http://www.dshs.state.tx.us; Colorado <http://www.hospitalquality.org>.

accepted and proven methodologies that were not otherwise proprietary information and thus could be employed by The Fraser Institute. [23] The search also turned up methodologies that, though available, would be less effective in providing a patient-friendly clinical outcomes-focused hospital report card.

Further examination of these available methodologies led to the selection of the performance indicator framework developed by AHRQ in the United States. [24] AHRQ's indicator modules 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, gender, 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. [25] 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 regarding 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 further 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 [26]

[1] Prevention Quality Indicators (PQIs) [27] Consisting of ambulatory care sensitive conditions, these indicators pertain to hospital admissions that could have been prevented via high-quality outpatient care.

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

[23] For a clear example of how individual report card methodologies are proprietary, please refer to Healthgrades user agreement at <http://www.healthgrades.com/aboutus/index.cfm?fuseaction=modnw&modtype=content&modact=UserAgreement>.

[24] An agency of the US federal government's Department of Health and Human Services.

[25] Further information regarding the HCUP Quality Indicators can be found at <http://www.qualityindicators.ahrq.gov/hcup_archive.htm>.

[26] The Fraser Institute's *Hospital Report Card* is composed of 50 indicators from the quality and 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.

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

[3] Patient Safety Indicators (PSIs) These indicators focus upon preventable instances of harm to patients such as complications arising from surgery and other iatrogenic [28] events.

[4] Pediatric Quality Indicators (PDIs) [29] 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. [30]

The Fraser Institute's *Hospital Report Card* uses the Inpatient Quality Indicators and Patient Safety Indicators indicators; it is made up of 50 of the 63 available indicators in these categories [31]. These two modules were chosen because of their widespread use and high quality record.

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, gender, 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* analyze over 9.5 million patient records extracted from the DAD for the period of fiscal years 1997/98 to 2005/06. The data are also risk-adjusted using the 3M™ All Patient Refined™ DRG (APR™-DRG) software, commonly recognized to be the gold-standard system for risk-adjusting hospital data [32]. The AHRQ IQIs were in fact designed to be used in conjunction with 3M™ All Patient Refined Diagnosis Related Groups™ (APR™-DRG) software, which risk adjusts the IQIs for patients' clinical conditions and severity of illness or risk of mortality.

Participation in the report card project was not mandatory for hospitals in Ontario. Of Ontario's 136 acute care facilities, 30 hospitals, representing 54,316 inpatient records or 4.94% of inpatient records in Ontario (in Fiscal 2005/06), agreed to have their institution identified (see Appendix D for a list of participating institutions).

Since this report is based on administrative data, the results have limitations. Coding variations exist among hospitals 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 quality and patient safety measures, 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 to choose a hospital based solely on statistics and descriptions such as those given in this report.

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

[29] The PDI module became available in February 2006 and was therefore not used in the first edition of the *Hospital Report Card* for Ontario. The PDI module is being considered for future updates of the *Hospital Report Card*s.

[30] For details, please see <http://www.qualityindicators.ahrq.gov/pdi_download.htm>.

[31] Intrinsic differences between ICD9/CCP and ICD10CA/CCI resulted in several indicators being reported in either data coded in ICD9/CCP (DAD data from FY1997 to FY2001) or data coded in ICD10CA/CCI (DAD data from FY2002 to FY2005), but not both (see Appendix G for details). Moreover, three indicators were dropped in the last year due to changes in the AHRQ software.

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

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. [33] The DAD is a major data source used to produce various CIHI reports, including annual reports on the performance of the hospitals and health-care system and for seven of the health indicators adopted by the federal, provincial, and territorial governments. [34] These data have been used extensively in previous reports on health-care performance and form the basis for many journal articles. [35]

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 five data quality dimensions of accuracy, timeliness, relevance, comparability, and usability. [36]

There have been reports on data quality that we have assessed, including up-coding allegations in Ontario but those applied to information earlier in our dataset. We also considered the effect that SARS could have on the results, as 44 patients died in Ontario from SARS between February and July 2003 and hospital operations were affected. However, we note that the median HMI score rose by 6.6 points in 2003 and dropped by 6.5 points in 2004, leaving the score virtually unchanged between 2002 and 2004 at 71.3. It is difficult to discern a SARS effect in these data, something supported by recent research at ICES in Toronto. [37]

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 that go back to the original patient charts and recode the information using a different set of expert coders. [38]

The reabstraction studies note the following rates of agreement between what was initially coded compared to 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

[33] DAD Data Quality Reabstraction study. Combined findings for FY 1999/2000 and 2000/2001. Dec 2002.

[34] DAD Data Quality Reabstraction study. Combined findings for FY 1999/2000 and 2000/2001. Dec 2002.

[35] A joint initiative of the Ontario Hospital Association and the Government of Ontario. *Hospital Report 2006: Acute care*. <http://www.oha.com/Client/OHA/OHA_LP4W_LND_WebStation.nsf/resources/2007+Hospital+Reports/$file/OHA_Acute07_EN_final.pdf>..

[36] The CIHI Data Quality Framework. June 2005 Revision.

[37] *Research Utilization of Ontario's Health System during the 2003 SARS Outbreak. ICES 2004*. Report available at <http://www.ices.on.ca/file/SARS_report.pdf>.

[38] 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.

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 well as, or better than, the rates previously.

However, with regard to the coding of pneumonia, a potential data quality issue exists because some reabstraction coders selected pneumonia instead of chronic obstructive pulmonary disease (COPD) as the most responsible diagnosis. [39] 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. We have noted this proviso in our report.

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: acute myocardial infarction (AMI) (8.9%), hip fracture (6.0%), hospitalization due to pneumonia and influenza (6.9%), and injury hospitalization (5.3%). [40]

Discrepancy rates were noted in conditions that are diagnosis driven: AMI [41], stroke, pneumonia, and COPD [42] (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." [43] 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 [44] 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" (p. 11). Further, a recently released report by the Manitoba Center for Health Policy that used the AHRQ Patient Safety Indicators [45] 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.

[39] Canadian Coding Standards for ICD-10-CA and CCI 2004.

[40] DAD Data Quality Reabstraction study. Combined findings for FY 1999/2000 and 2000/2001. Dec 2002.

[41] DAD Data Quality, Reabstraction Study Combined finding for Fiscal Years 1999/2000 and 2000/2001. CIHI 2002: 8.

[42] Data Quality of the DAD following the First year implementation of ICD-10-CA/CCI. September 2004.

[43] Data Quality of the DAD following the First year implementation of ICD10CA/CCI. September 2004: 41.

[44] John Millar, Soeren Mattke, and the Members of the OECD Patient Safety Panel. *Selecting Indicators for Patient Safety at the Health Systems Level in OECD Countries*. <http://www.oecd.org/dataoecd/53/26/33878001.pdf>.

[45] Bruce et al., 2006.

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Methodology Overview

All hospital data used in The Fraser Institute's *Hospital Report Card: Ontario 2008* 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 in DAD data releases unless those institutions have explicitly granted permission to the researchers requesting the data. 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 (see Appendix D for a list of participating institutions).

These records were then grouped into diagnosis-related groups (DRGs) using The Centers for Medicare and Medicaid Services (CMS) Diagnosis Related Groups (DRG) Grouper software for fiscal years 1997 through 2004 and the CMS Grouper with Medicare Code Editor software for FY 2005. The program sorts patients' records into groups that are expected to have similar hospital resource use. 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). [1]

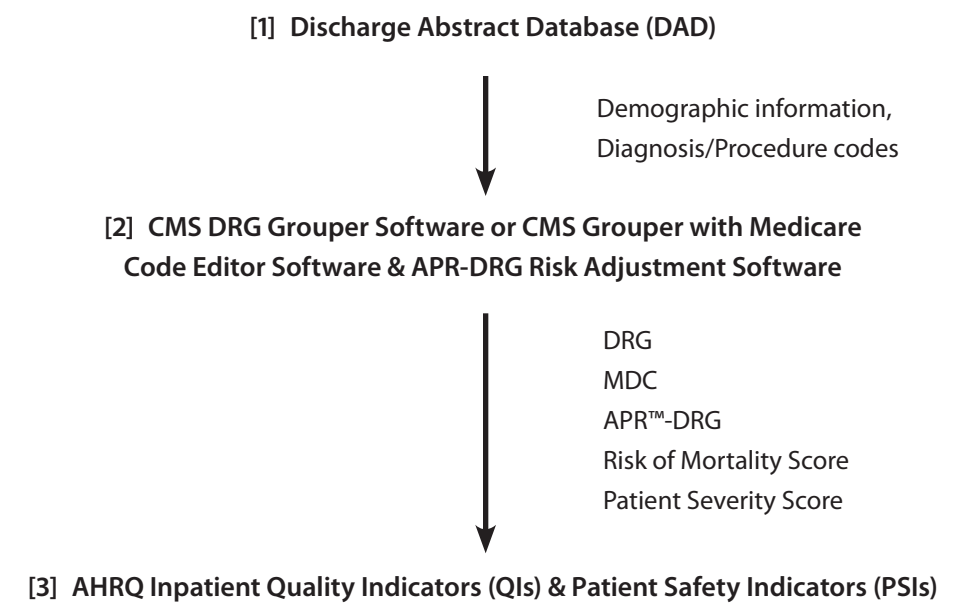
Since more specialized hospitals may treat more high-risk patients and some patients arrive at hospitals sicker than others, it is difficult to compare hospital mortality and utilization rates for patients with the same condition but a different health status. In order to compensate for this potential difference in hospital case mix, the international standard for risk adjustment, developed by 3M Corporation (for information, see <http://www.3m.com/us/healthcare/his/products/coding/refined_drg.jhtml>), 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 (see Appendix B for details).

The final step in the 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 [2] (for information, see <http://www.qualityindicators.ahrq.gov/>; see Appendix C for details). 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'

[1] In order to use the Centers for Medicare and Medicaid Services (CMS) - and All Patient Refined-Diagnosis Related Groups (APR™–DRG) Groupers 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 ICD9/CCP (the *International Statistical Classification of Diseases, Injuries, and Causes of Death, Ninth Revision* [ICD-9] and the *Canadian Classification of Diagnostic, Therapeutic, and Surgical Procedures* [CCP]) (data from 1997/98 to 2001/02) or ICD10CA/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) (data from 2002/03 to 2005/06) to ICD-9-CM. Please see Appendix J for details.

[2] 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, policymakers and researchers can use with easily accessible inpatient data to identify apparent variations in the quality of inpatient care.

Figure 1: Methodology Overview



Note: For FY 2005, the CMS Grouper with Medicare Code Editor Software was used rather than the CMS DRG Grouper Software. Also, for FY 2005, the AHRQ built-in limited APR-DRG Grouper provided by 3M was used.

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 2008* comprises 39 indicators of the quality of inpatient care and patient safety (for a list of all indicators used in the report, see Appendix E). [3]

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 hundred patients while PSI rates are expressed per thousand. Each institution was also given a score from 0 to 100 for each indicator based on its risk-adjusted rate and was then ranked based on their scores (see Appendix F for details on calculating scores and ranks). [4]

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 2005/06: [5] *hip replacement mortality* (IQI 14), *acute myocardial infarction mortality* (only included from 2002/03 to 2005/06) (IQI 15), *congestive heart failure mortality* (IQI 16), *acute stroke mortality* (IQI 17), *gastrointestinal hemorrhage mortality* (IQI 18), *hip fracture mortality* (IQI 19), *pneumonia*

[3] 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. Years 2002 to 2004 report 42 main indicators. Due to changes in AHRQ software, 3 indicators were dropped in 2005 for a total of 39 indicators..

[4] 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.

[5] Intrinsic differences between the ICD9/CCP and ICD10CA/CCI resulted in several indicators being reported on in either data coded in ICD9/CCP (DAD data from FY1997 to FY2001) or data coded in ICD10CA/CCI (DAD data from FY2002 to FY2005), but not both (see Appendix G for details).

mortality (IQI 20), *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 2005/06 an indicator had to contain at least 824,770 records in order to be included in the HMI. [6] 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).

[6] The total number of patient records 2005/06 was 1,099,694.

Throughout the *Hospital Report Card*, several measures were taken in order to protect patient confidentiality. First, patient identifiers such as patients' names and addresses were removed prior to The Fraser Institute accessing 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, 5 in any institution and/or municipality.

Legend for Sample Table

Use the sample table and the explanations below to help you understand how each indicator is displayed in the data tables of the *Hospital Report Card: Ontario 2008*.

[A] The name of the Agency for Healthcare Research and Quality's (AHRQ) Inpatient Quality Indicator (IQI) or Patient Safety Indicator (PSI). [7]

[7] Please see Appendix E for a complete list of the indicators used in the *Hospital Report Card*.

[B] All indicators were expressed as:

- **[a]** an Observed Rate (which are raw measures)
- **[b]** a Risk Adjusted Rate (incorporating patient severity and risk of mortality scores from 3M™ All Patient Refined Diagnosis Related Groups [APR™-DRG] Software) [8]
- **[c]** a Score [9]
- **[d]** a Rank

[8] Please see Appendix B for details.

[9] Please see Appendix F for details on calculating scores, ranks, HMI, and rank of the HMI.

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 [10] and by Municipality. [11]

[10] Please see Appendix D for a list of participating institutions.

[11] Postal Codes were truncated to Forward Sortation Areas (FSAs) before The Fraser Institute accessed the dataset. All patient FSAs were grouped into corresponding municipalities as described by Canada Post. Please see Appendix H for details.

[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 Fiscal 1997 (April 1, 1997 to March 31, 1998) to Fiscal 2005 (April 1, 2005 to March 31, 2006).

[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 ICD9/CCP

to ICD10CA in 2002/03; and that it is not possible to compare data from 2002/03–2004/05 and 2005/06 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).

[H] Indicators were calculated for all of Ontario's 136 acute-care hospitals. Forty-three hospitals agreed to participate in The Fraser Institute's *Hospital Report Card: Ontario 2006* (representing 41% of inpatient records in the Ontario in 2004/05) covering the period 1997/98 to 2004/05. Thirty hospitals agreed to participate in the *Hospital Report Card: Ontario 2008* (representing 4.94% of inpatient records in 2005/06). [12]

[12] 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 Ontario.

A B C D

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

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

Hospital	1997–1998	1998–1999	1999–2000	2000–2001	2001–2002	2002–2003	2003–2004	2004–2005	2005–2006
Arnprior and District Memorial Hospital (The)	1.05	6.84	14.35	8.33	0.00	1.22	1.56	0.78	8.40
Cambridge Memorial Hospital	4.17	1.05	0.00	2.28	3.17	3.08	4.03	1.66	—
Carleton Place and District Memorial Hospital	2.47	2.17	2.15	2.31	E	1.27	7.56	0.68	—
Clinton Public Hospital									
Dryden Regional Health Centre	0.00	0.00	4.04	5.93	5.36	5.75	2.40	1.14	—
[illegible] Hospital	2.96					16.50	1.81	2.89	
Hospital 234	—	—	—	—	—	—	—	—	—
Hospital 235	—	—	—	—	—	—	—	—	0.00
Hospital 236	—	—	—	—	—	—	—	—	6.71
Hospital 237	—	—	—	—	—	—	—	—	0.00
Hospital 238	—	—	—	—	—	—	—	—	5.92
Ontario Average	4.11	3.74	3.07	3.28	3.09	3.75	4.15	3.91	4.66

F F G H I J