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Frequently Asked Questions (FAQ)

Updated September 2007

This document answers the most frequently asked questions posed by participating organizations since the first HSMR reports were sent. The questions have been grouped according to the following categories:

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WHAT'S NEW?

1. What is new in the September 2007 Hospital Standardized Mortality Ratio (HSMR) report?

In response to feedback from participating organizations, the following methodology refinements were made:

- Patients with a Type 6 diagnosis: It was identified that patients with type 6 diagnosis were not being properly assigned to a diagnosis group as per details in the Technical Note sent May 2007. This issue has been corrected and is reflected in the results for 2006–07. Those hospitals with many patients with qualifying type 6 conditions might see a shift in their HSMRs because of the change in the number of cases included. Type 6 diagnosis codes are used to determine the diagnosis group when the Type 6 code is one of the ICD-10-CA codes that is part of the top 80% list. For patients who had a Type 6 diagnosis, the original most responsible diagnosis (MRDx) is considered in the Charlson score calculation if that code is on the list of Charlson diagnoses and is not the same as a Type 2 code already present. Please see the *Technical Notes* for further details.

- Comorbidity calculation: We have made some refinements to the way a patient's Charlson Index score is calculated. The changes mostly reflect type 6 cases and patients whose qualifying comorbid condition was the same as their most responsible

or post-admission diagnosis. This change affects few cases overall and has little impact on results. Refer to the *Technical Notes* for further details.

2. Will my results be different because of these changes?

HSMR is a very robust measure and the overall results are well-correlated with those from the May 2007 send-out. However, some individual patients may end up with a lower Charlson comorbidity score because duplicate codes are not counted.

For some individual hospitals, HSMRs may differ because some patients may be newly included or excluded by having their diagnosis flag based on a Type 6 code. These changes had little impact on overall results, which are well correlated with those previously sent (r = 0.997)

PUBLIC RELEASE

3. What will be included in the publicly released report?

The first public release in November 2007 will focus on overall HSMR results (excluding Quebec) for large regions and facilities. The anticipated threshold for eligibility was established based on statistical analysis as a minimum if 2,500 HSMR cases in each of FY2004-2005, FY2005-2006, and FY2006-2007. If a facility is part of a hospital corporation, the threshold is applied at a corporation level. Please contact hsmr@cihi.ca for more details.

4. When will we be able to verify the information that will be released publicly?

If your organization has more cases than the statistical threshold established for reporting, this package includes a preview of your organization's overall HSMR results in a format similar to that which we expect to use for the public report in November. We are providing these preliminary results to your organization for validation purposes. Comments must be received by CIHI **on or before Friday October 5, 2007**. Please use the enclosed feedback form to confirm that organizational information is correct and to provide comments about the results for public release.

HOW TO USE THE HSMR REPORT

5. How have organizations in Canada used HSMR?

Since the beginning of this project, participating organizations have been validating the results and learning more about what the HSMR is. During the development phase, organizations have helped us to find ways to make the HSMR more useful for Canadian hospitals. By taking a closer look at their HSMRs results and using them as a catalyst to drill down further, some have identified areas or developed action plans to focus improvement efforts for reducing avoidable deaths. Learning more about the HSMR has also helped to identify coding issues. Some

organizations have added this measure to accountability frameworks or balanced scorecards. It is important to learn from the experiences of similar organizations. If your hospital would like to share your story, please contact hsmr@cihi.ca.

6. How have hospitals in other countries used HSMRs?
Internationally, organizations have successfully used HSMR results to monitor performance improvements that reduce mortality rates. Two compelling case studies are Walsall Hospitals NHS Trust in the UK and Tallahassee Memorial Hospital in the US. For more details and other examples, refer to *Saving More Lives Using HSMR* and *Getting Started Resources* in the HSMR toolkit.

7. How do our results compare with other similar facilities?
The main purpose of the HSMR is to follow your own progress over time. However, range and peer quartile ranges (QR) for the annual HSMRs are provided to allow for a more meaningful interpretation of the results. The peer range indicates the lowest and highest HSMRs within the HSMR hospital peer group. As well, the peer QR shows the 25th and 75th percentile for your facility's peer group.

8. How can I validate my results?
Using the *Technical Notes*, extract HSMR cases using the inclusion and exclusion criteria from your in-house database. To help you with this validation, a file containing all HSMR cases included in your calculation is available upon request. To replicate the HSMR, refer to the *Technical Notes* for more details.

9. Can I calculate an aggregate HSMR including more than one site? How do I do this?
Aggregate HSMRs can easily be calculated using the results found in the HSMR report. HSMR equals the sum of the observed for all sites divided by the sum of the expected for all sites. To calculate the expected number of deaths, multiply the number of observed deaths by 100 and divide that by the HSMR. Note this is the method used to calculate the Regional and Corporation-level reports.

10. What do we do next? How can we identify areas that need improvement?
The HSMR is a measure of the overall mortality in your hospital compared to the overall average mortality of all acute care hospitals included in the Discharge Abstract Database (DAD). While a single indicator offers useful information, it should be considered a starting point for further analysis. For example, medical program, surgical program, and ICU HSMRs, where applicable, are provided to help further understand your hospital's results. Potential starting points for identifying areas for improvement include: reviewing patient charts, calculating mortality rates for meaningful groups (for example, programs or diagnosis groups), and organizing teams to review clinical practices within the hospital. Refer to *Getting Started Resources* in the HSMR toolkit for examples of what hospitals in Canada, the UK and US have done to improve their HSMR (also see questions 4 and 5).

11. Can I calculate HSMRs for specific patient groups? For example, orthopaedics, cardiac patients, etc.

In order to calculate HSMRs for other specific groups, specific weights from logistic regression models including those specific cases from all acute hospitals should be run. When small numbers of cases are involved, the estimates are less stable. As an alternative, looking at how the crude mortality rates of the diagnosis groups from your hospital compare to the overall crude rates may help to identify areas for improvement. Overall crude mortality rates by diagnosis group are available upon request. Contact hsmr@cihi.ca.

12. Can a separate HSMR for paediatric patients be calculated?

No, a separate HSMR for paediatric patients cannot be calculated at this time. We are currently looking into developing a separate methodology for this unique population. Note that other indicators may be as useful when looking at quality and patient safety in the paediatric population.

METHODOLOGY

General

13. Is the Canadian version of the HSMR similar to that of other countries?

Yes, the Canadian version is similar to that of other countries. HSMR results in the United Kingdom, United States, Canada, and elsewhere are based on methods developed by Sir Brian Jarman. All use similar data and calculation methods and adjust for similar factors, including age, sex, length of stay and admission category. Each country's HSMR results are calibrated based on their national mortality experience.

Based on feedback from Pioneer Group participants, methodological experts and participants in the validation process, the following adaptations were made in Canada:

- The main results exclude palliative care patients (see the *Technical Notes* for details) but results for all patients (including those qualifying cases receiving palliative care) are also included in the report.

- Patient co-morbidity and transfers from an acute care hospital (i.e. "transfers in"), as well as sex, age, length of stay, admission category and diagnosis groups are adjusted for in the model.

- HSMR results for medical program, surgical program, ICU cases are also provided.

- A separate HSMR excluding all patients transferred from and to an acute care institution (i.e. "transfers in" and "transfers out") is provided to help assess how transfers affect patient care in your organization.

14. Is the logistic regression model based on only those hospitals that have signed up to receive their HSMR?

No, the coefficients are derived using all records meeting the inclusion and exclusion criteria from all acute care hospitals in DAD 2004–05.

15. Does the reference population vary over time?

No, the reference population does not vary over time. The coefficients obtained from the logistic regression model using 2004–05 data are used as the baseline for all annual and quarterly HSMR analyses. This facilitates comparison of results over time.

16. How were the top 80% diagnosis groups selected?

The top 80% diagnosis groups were selected based on data from the DAD using the first three digits of the Most Responsible Diagnosis (MRDx). Excluding an MRDx of palliative care (Z51), those diagnoses that accounted for the top 80% of in-hospital deaths in Canada (excluding Quebec) were included in the HSMR calculation. For a list of included diagnosis groups, refer to the *Technical Notes.*

17. What does the HSMR including PC mean?

The HSMR including palliative care (PC) cases works together with the HSMR without PC cases in reflecting the overall picture of hospital mortality, especially where palliative care coding is a substantial concern. Given that there is currently no national coding standard for palliative care, coding may vary across hospitals across the country. While there is an interim guideline in place, coding variations still exist.

Only PC cases that meet the inclusion/exclusion criteria for HSMR are included in the "HSMR including PC". This means that only those patients that are in one of the top 80% diagnosis groups and receive palliative care are included in this measure. See question 26 for more information on palliative care coding.

18. How are medical and surgical programs defined in the HSMR report?

In order to help hospitals further understand their HSMR, separate medical and surgical program HSMRs are also provided. Surgical program cases are identified as having generic surgery codes recorded on their discharge, using the Canadian Classification of Interventions (CCI) from chapter 1 with fourth and fifth digits of 50 and above or from chapter 5 with fourth and fifth digits of 45 and above. All other cases, except those with a Mental Health diagnosis group, are considered Medical program cases. See *Technical Notes* for further details.

19. How are ICU-related cases defined?

Patients admitted to a special care unit any time during their hospital stay are considered intensive care unit (ICU)-related cases. An ICU case is identified by any "special care unit number" equal to 10, 20, 25, 30, 35, 40, 45, 50, 60, 70, or 80 (This includes Medical, Surgical, Trauma, Combined Medical/Surgical, Burn, Cardiac, Coronary, Neonatal, Neurosurgery, Paediatric and Respirology Intensive Care Nursing Units).

20. How should I interpret program- and unit-specific HSMR results (medical program, surgical program, and ICU-related HSMRs)?

In addition to the overall HSMR, program- and unit-specific HSMRs have been developed to enable clinical teams within organizations to compare results with their peers. For example, for the medical HSMR, 100 represents the average level of mortality for medical cases for that hospital's HSMR hospital peer group. Thus, each group has a different set of coefficients for medical program (i.e., four sets of coefficients for medical cases for the four HSMR hospital peer groups). The HSMRs for surgical program, ICU-related and "excluding transfers" are determined using this methodology as well. Consequently, these HSMR results cannot be directly compared across hospital groups.

21. My hospital performs surgical procedures and has an ICU, but my report does not have any supplementary HSMRs for surgical program and ICU. Why?

Surgical and ICU HSMRs were not calculated for hospitals in the HSMR hospital peer group 1 since the number of cases in smaller hospitals was too small to obtain meaningful results.

22. Do regional reports include only reportable sites or all hospitals in the region?

Annual, year-to-date and quarterly regional (or corporation-level) reports include HSMR cases and deaths from all acute hospitals in the region (or corporation), excluding specialty hospitals. This provides a comprehensive picture of the quality of care at the regional level. A list of hospitals included in the regional/corporation-level calculations is also provided with the reports. Note that if a site did not have cases or deaths in HSMR top 80% list, it was not included in the roll-up and does not appear on the list of hospitals included in regional/organizational calculations. If there are sites that do not belong to your organization of if sites are missing, please notify hsmr@cihi.ca.

Comparability

23. Our hospital treats more complicated patients. How has this been taken into account in the HSMR methodology?

A number of factors contribute to in-hospital mortality. The HSMR methodology adjusts for several of them. Complicated patients tend to be those who are older, admitted under the urgent or emergent category, and those who stay longer in the hospital. The methodology has taken these factors into account, which is consistent with the HSMR methods used in different countries.

In addition, the methodology adjusts for a patient's Charlson Index score, which reflects co-morbidities recorded during their hospital stay. The Charlson Index is an overall co-morbidity score that has been shown to be highly associated with mortality and has been widely used in clinical research. For more information about the Charlson Index, refer to the *Technical Notes*.

Note that the HSMR provides a measure of overall mortality and it is intended primarily as a tool to track changes over time within a facility. If the patient mix within a facility is relatively stable over time, then changes in outcomes may be identified.

24. Have socioeconomic factors been shown to affect HSMRs?
Interestingly, research in the UK found that socioeconomic deprivation did not explain significant variability in hospital-specific HSMR results.[1] Similarly, our analysis showed that neighbourhood income quintile did not explain variability in HSMRs among Canadian hospitals.

25. How are palliative care patients identified? Why are palliative care patients excluded?
Palliative care patients are terminally ill patients who receive supportive care from hospitals. Given the variation in palliative care services provided in hospitals across the country, exclusion of palliative care patients helps ensure the integrity of the analysis. An HSMR result that includes palliative care patients (as is done in other countries) is also provided for your reference. A DAD bulletin outlining the palliative care coding guideline for 2006–07 was released in June 2006. Until this coding guideline is implemented across all hospitals, coding of palliative care may differ from one hospital to another.

Patients are identified as palliative care patients if they fulfill one of the following criteria: (1) ICD-10-CA Z51.5 is listed as a diagnosis code, or (2) main patient service = 58, or (3) patient service transfer = 58. To be included in the HSMR analysis, they must have a most responsible diagnosis in the top 80% list (see *Technical Notes* Appendix II); thus, patients with Z51.5 as most responsible diagnosis are not included. See question 17 for more details about the HSMR including PC results.

26. Is there a national coding guideline for palliative care available?
An interim coding guideline to capture terminally ill patients receiving palliative care in hospital was released in June 2006. It is intended for all DAD participating facilities. The guideline is to be used until a national coding guideline can be put in place. Work has begun on the development of a national coding guideline.

27. How does the analysis handle transfers between hospitals?
Transfers between hospitals were assumed to be separate admissions. This is consistent with the approach taken in other countries' HSMR calculations. The current methodology adjusts for "transfers in", which are patients transferred from an acute care institution.

Peer-based HSMRs excluding all acute transfers (in and out) are provided to help assess how transfers affect patient care in your organization and how your results compare with peer hospitals. These results can be found in the "Supplementary Information" section of the Report.

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1 Jarman B., S. Gault, B. Alves, A. Hider, S. Dolan, A. Cook, B. Hurwitz, and L.I. Iezzoni. Explaining differences in English hospital death rates using routinely collected data. BMJ 1999; 318:1515-1520 http://bmj.bmjjournals.com/cgi/content/full/318/7197/1515

Reliability

28. How is the 95% confidence interval interpreted?

The 95% confidence interval can help to evaluate the precision of the calculated HSMR. The true value of the HSMR is estimated to be within the upper and lower confidence interval 19 times out of 20 (95% confidence interval). The width of the confidence interval is an indication of the degree of variability associated with the HSMR point estimate: the wider the interval, the greater the variability.

29. What is the volume cut-off for "reliable" HSMR results? Our organization receives a report for one of our smaller sites, but does not receive one for other small sites. How is the "!" on the report determined?

The HSMR reports are not available for smaller hospitals in which the number of cases included in the calculation was too small to provide a reliable estimate. Hospitals in which the annual number of expected deaths is at least 20 as of 2004-05 or 2005-06 are eligible to receive reports. Reports are available for hospitals that exceed 20 expected deaths during subsequent years as well. Contact hsmr@cihi.ca for further details.

Note that results in which less than 20 expected deaths are involved in the calculation are marked with a "!" on the report. These results should be interpreted with caution due to a small sample size.

30. Why do my quarterly results differ between reports?

Quarterly HSMRs are based on available data as of the corresponding data submission cut-off dates. Data may change significantly throughout the course of the year due to continuous updates to the database. Thus, quarterly HSMRs reported during the year may vary until the database is closed. Note that results with a "!" should be interpreted with caution.

31. How reliable are quarterly results?

Quarterly results are provided to hospitals to enable ongoing monitoring of HSMR performance. However, there may be large variation in the quarterly HSMRs depending on the number of discharges per fiscal quarter. Generally, the larger the number of discharges in a quarter, the more stable the HSMR.

32. Is there seasonal variation in the quarterly HSMR?

The HSMR Report presents all quarterly HSMRs from the three most recent years, which makes identifying seasonal variation easier. Analysis on Canadian data has shown that quarterly HSMRs are higher during Q4 (Jan-Mar) and similar results were observed in the United States.

Peer groups

33. How are HSMR hospital groups determined?

For the purpose of HSMR reporting, four hospital peer groups were created: teaching hospitals and three groups of community hospitals.

Teaching hospitals were defined based on their membership in the Association of Canadian Academic Healthcare Organizations (www.acaho.org).

Cluster analysis was then performed to initially separate the community hospitals into three groups based mainly on the number of acute cases included in 2004-05 HSMR calculations (i.e. cases that account for top 80% of in-hospital mortality). Descriptive statistics of other factors, such as case severity, weighted cases and ICU cases, were also examined to get a sense of the main differences between the hospitals in each group.

Significant changes in case volume from one year to the next is used as an indicator of change in hospital service(s). In such cases, the hospital would be assigned to a more appropriate group. For more details on the cluster analysis and/or the HSMR hospital peer groups, refer to the *Technical Notes*.

34. Is the new HSMR hospital grouping comparable to the eCHAP peer groups or peer groups developed for other projects?

No. eCHAP peer groups are self-reported by hospitals and based primarily on bed size, while the HSMR hospital grouping is based on HSMR-related cases and is developed for the HSMR reporting. It is not recommended to use this HSMR hospital grouping for other purposes.

35. Where can I get a list of hospitals in my HSMR hospital peer group?

A list of hospitals in your hospital's HSMR peer group is available upon request at hsmr@cihi.ca.

36. What happens if the number of acute cases seen in my hospital has changed substantially? For example, all cardiac cases are now going to the hospital on the other side of town.

HSMR peer groups may be revised at the end of each fiscal year, when appropriate. For example, when there is a significant change in the number of acute cases seen, we will investigate whether an adjustment is necessary. If such a change has occurred recently at your hospital, please let us know.

TIMELINESS

37. How timely are the HSMR results? How often will I get the reports?

CIHI is providing near real-time data on a quarterly basis for larger institutions participating in the DAD. Smaller institutions may not have sufficient patient volumes for the quarterly calculations to be viable. Quarterly HSMRs will be available to those facilities that have submitted data by the quarterly eReports deadlines for DAD.

Quarter 1 data are sent upon request only, please contact hsmr@cihi.ca. The tentative schedule is as follows: Q2 – January, Q3 – April, Q4 and annual – September.

For more information on the factors that affect the timeliness of hospital and health region data submission and strategies to improve timeliness, please see the Timeliness of Discharge Abstract Database data report at http://secure.cihi.ca/cihiweb/dispPage.jsp?cw_page=GR_3_E. General information about the DAD can be found at www.cihi.ca/dad.

38. Why didn't I get a Q1 report?
In some cases, there may not be sufficient data to calculate a reliable estimate for the first quarter of a fiscal year. Q1 reports are available upon request.

39. What if our hospital did not provide a complete quarterly data submission?
The HSMR Report uses all data submitted from hospitals as of the eReports deadlines. If your hospital has one or two fiscal periods missing from a quarter, the HSMR of that quarter should be interpreted with caution. For your convenience, the number of periods outstanding (i.e., not submitted as of the deadline) is indicated in the report.

40. Hospitals in British Columbia hospitals submit 13 periods per year, compared to 12 submission periods in other provinces and territories. Is this difference being accounted for in the reports?
Yes, for hospitals in BC, the "number of periods outstanding" line of the HSMR reports reflects the actual number of missing periods of data submission according to the BC schedule.

41. Are HSMR reports available online?
Monthly and cumulative HSMR reports will be available for open-year reporting through the electronic Hospital Specific Reporting system (eHSR) in Fall 2007.

OTHER ISSUES

42. Why did our facility not receive an HSMR report?
Hospital sites/regions must register for the HSMR project. For registration information, please contact hsmr@cihi.ca. Please note that, at this time, CIHI is not able to provide reliable HSMR results to specialty facilities (for example, paediatric hospitals) and smaller facilities. For further information, refer to the *Technical Notes*. If any of the above does not apply and you have not received your HSMR report, please contact hsmr@cihi.ca for package tracking information.

43. I used to receive reports for my hospital, but not anymore. Why?
As of May 2007, the criteria for HSMR-reportable hospitals have been revised. Annual HSMR results based on less than 20 expected deaths are less reliable and should be interpreted with caution. As such, reports are not produced for hospitals that do not meet this threshold as of the reference year (2004–05). However, if your hospital meets the criteria in subsequent years, a report will be provided. For more details, contact hsmr@cihi.ca.

44. Is there a cost involved to receive reports?
The HSMR data are available at no charge. In fact, the HSMR is calculated using data already submitted to the DAD. As with any quality improvement tool, organizations that wish to actively use these results to support and track change processes will need to devote staff time to do so.

45. Can I get electronic version of the HSMR results to help with internal dissemination?
Electronic versions of the HSMR report, as well as Excel tables, are available upon request. Contact hsmr@cihi.ca.

46. Will subscribers to the CIHI Portal have access to HSMR data?
Yes. Subscribers to the CIHI Portal have access to closed year DAD data and could use the tool to explore their HSMR results (for example, examining the mortality experience of a particular patient group) and how they compare with their peers or other organizations. Organizations that would like more information on how to subscribe to the CIHI Portal can email portal@cihi.ca.

47. Where can we get more information on HSMR?
A list of resources related to HSMR is included in the *Getting started resources* document of the HSMR toolkit. Background information and additional reference material are also available on the CIHI website at www.cihi.ca, or the *Safer Healthcare Now!* website at www.saferhealthcarenow.ca. Additional information is also available by email through hsmr@cihi.ca.

48. How can we provide feedback to CIHI?
We welcome your comments and suggestions about your facility's results or the HSMR methodology. Please complete the feedback form enclosed in your HSMR toolkit or email hsmr@cihi.ca.