Hospital Report 2007: Emergency Department Care
System Integration and Change Technical Summary

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Overview

Hospital Report 2007: Emergency Department Care includes System Integration and Change (SIC) indicators in addition to the more traditional areas of performance assessment. SIC

indicators assess efforts made by Ontario hospitals to evaluate the intensity of management activities and investments to improve the overall quality of patient care, to integrate Emergency Department (ED) services with other partners within the continuum of care, to apply information technology to support decision-making, and to support ongoing professional development for hospital staff. This *SIC Technical Summary* presents additional details of the methodology and results not provided in *Hospital Report 2007: Emergency Department Care*.

Unlike the other three quadrants, there are few accepted standard measures in the areas captured by the SIC indicators. While some hospitals collect measures of employee skills and training, few measures of human capital and organizational learning are available through existing administrative databases. Available measures are also often unusable because variations in data coding create difficulties in comparing performance across organizations. Thus, the indicators used in the SIC quadrant of *Hospital Report 2007: Emergency Department Care* were derived from the *2007 SIC survey*.

For each SIC indicator, this *SIC Technical Summary* provides a description of the calculations used to arrive at indicator values and performance categories for participating hospitals. In addition, data on the distribution of scores for each indicator are provided for the province as a whole and for teaching, community and small hospital peer groups.

Methodology

The following sections describe the methodology used to identify indicators for *Hospital Report 2007: Emergency Department Care,* including the modification of the survey instrument, redevelopment of the indicators, the data collection process, a detailed description of how each indicator was constructed and the modified performance allocation method. There are seven SIC indicators presented in *Hospital Report 2007: Emergency Department Care*.

Development of the 2007 Online System Integration and Change Survey

In 2005, Hospital Reports subscribed to an online survey tool to create two electronic surveys for the SIC quadrant. The first, a Board Governance Survey, was sent to Board Chairs for Acute Care hospitals in November 2005, and the second was an online version of the Acute Care SIC Survey: Healthy Workplace Environment section. Hospital Report contacts volunteered to pilot test the online survey and to act in an advisory capacity for the development and pilot testing process. A total of 22 hospitals completed the online Healthy Workplace Environment survey. Results from the pilot test showed a strong desire on the part of hospitals for an online survey process; however, participants provided detailed requirements for development and implementation of a product with more functionality.

A thorough review of software products was conducted and an online vendor was chosen. The online survey software that was chosen provided the most flexibility and ability to customize the survey.

After the multi-sector survey, consisting of 102 questions, was entered into the survey tool, validation, skip logic, and workflow design were developed using the online software. A web-based demonstration and a sample pilot survey consisting of the SIC questions were conducted with eleven participating hospitals to receive feedback on question format and the online tool. The final survey was sent out to Ontario hospitals via email in December 2006. Participant satisfaction, ease of use, and data quality were assessed by various qualitative and quantitative feedback methods.

Compared to previous years' manual data entry process, the online tool eliminated the need to create a MS Access database for data entry and validation, hire and train staff for a six-week data entry period, and perform significant manual quality checks and follow-up calls to hospitals. The online tool effectively reduced the administrative costs such as mailing and printing.

Survey Redevelopment

During the 2005 data verification process, Hospital Report contacts indicated that the SIC survey was lengthy and cumbersome, and that some of the questions were unclear. Over the year, CIHI worked with the HRRC researchers and principle investigators to streamline and restructure the survey sections and questions. The objectives were to reduce the number of questions. Questions were considered for removal if they met one of the following criteria:

1. Questions not being used in an indicator calculation
2. Questions with potential problems with interpretation as indicated by low response rates and frequently asked questions from respondents
3. Response rates for specific questions were the same year after year
4. Questions that were being addressed in one of the new sections

Other changes were made to improve the survey such as clarification on questions and customizing questions to appropriate sectors/respondents. The 2007 SIC survey included 102 questions and nine sections. The assigned sections that all hospitals participating in the *Hospital Report 2007: Emergency Department Care SIC survey* include:

- Management of Human Resources
- Investments in Information Technology
- Use and Dissemination of Information for Clinical Decision Making
- Use and Dissemination of Information for Quality Improvement
- Healthy Work Environment
- Emergency Department Care
- Patient Safety

New Indicators

This year, a new indicator called "Healthy Work Environment" was added to the SIC Emergency Department Care quadrant. This indicator was designed to measure the extent to which hospitals have mechanisms in place to support and promote a healthy work environment and thereby contribute to employee's physical, social, mental and emotional well-being.

Describing the Survey Process

In general, the SIC survey (regardless of which hospital was participating in which sector) was sent to 123 participating Ontario hospitals in mid-December 2006. A total of 103 hospitals completed and returned the surveys for a response rate of approximately 84%. 102 hospitals with ED care completed the SIC survey. Hospitals were asked to complete one survey for the entire corporation.

A web-based survey was distributed via email to the Hospital Report contact at each organization. The Hospital Report contact disseminated the sections of the survey (via the custom-designed workflow) to the person in the organization who possesses the most knowledge about topics covered in that section. At the end of each section, one individual was required to sign-off on a statement of accuracy. This statement required hospital personnel to confirm that their responses were accurate and reflected the current operating circumstances.

Hospitals were given approximately six weeks to complete the survey. One month after the initial distribution of surveys, reminder notices were sent to hospitals that had not yet completed the survey. Three hospitals did not return surveys. ED specific responses, by hospital type, are presented below.

Table 1.1: ED SIC Surveys Completed

	Completed Surveys	Surveys Not Returned/ Non-participating	Total
Teaching	14	1	15
Community	61	4	65
Small	27	17	44
All ED Hospitals	102	22	124

Data Quality

The indicators for this quadrant are based on hospital survey data that are inevitably subject to a "social desirability bias". That is, consciously or unconsciously, respondents may answer questions in a way that puts their organization in the best possible light. To counteract this bias, an effort was made to construct survey questions that focused on specific behaviours rather than attitudes. Despite this focus, opportunities remained for varying interpretations, and some degree of interpretation may still be reflected in answers to many of the questions.

CIHI analysts performed data quality checks on the completed surveys to ensure that all mandatory questions were answered and that skip logic, validation and question masking were performed correctly by the online survey. We found two causes for follow-up which affected ten hospitals. The first technical issue was that if there was a midterm change in participation status in a sector, there was a possibility that some sector-specific questions were not shown to the respondents, and therefore were left unanswered. The other technical issue was that the custom-built validation on one of the questions did not catch all possible answer choices, leaving impossible responses. We followed-up with the ten hospitals via email and asked the Hospital Report contact to complete the effected questions in a hard copy document. Analysts then entered this data into the populated database. Two analysts then developed SAS code for the indicator calculations independently of each other and compared results. Once the SIC indicator scores were produced, random manual checks of hospitals' scores were done by examining the original surveys to ensure a high level of reliability.

Developing the Indicators

The seven SIC indicators used in *Hospital Report 2007: Emergency Department Care* are:

1. Use of Standardized Protocols

2. Internal Coordination of Care
3. External Partnerships
4. Management and Support of Human Resources
5. Clinical Data Collection and Dissemination
6. Use of Clinical Information Technology
7. Healthy Work Environment (***New***)

Once the surveys were completed, the process of confirming the questions to be used in the SIC indicator calculations for *Hospital Report 2007: Emergency Department Care* began. Response distributions were calculated for each question in the *2007 SIC survey*. Hospital-specific data for all ED SIC indicators are available to hospitals in the e-Scorecard.

During the 2007 survey redevelopment process, modifications were made to *Hospital Report 2007*: *Emergency Department Care* SIC indicators such as recalculation and reweighing of indicators, indicator names and adding new or deleting survey indicator questions. Therefore, please note that caution should be taken when comparing indicator results with previous years. Please see Appendix A for list of indicator changes.

Comparability of Indicator Results

There are slight changes to all ED indicators this year. Therefore, caution should be taken when comparing the indicators with previous report's results due to the changes in the calculation of indicator questions and weights. Please review the indicator descriptions and Appendix A to identify the changes.

Scoring of the Indicator

A detailed description of the questions used and points allocated in the construction of each of the 12 indicators is provided below. To calculate the indicator score, each question must be multiplied by the specified weighting. For example:

Hospital A received 18 points for Question **X** out of a possible total of 25 points. To calculate the contribution of this question to the indicator score, divide hospital A's score (18) by the total possible points (25) and multiple by the specified weighting for Question **X** (23%). Therefore, hospital A received 16.56% of the total indicator score for question **X**.

The weights for each question are provided in tables at the end of each indicator. The weighted scores are then summed for each question to get the overall score for that component of the indicator. For example:

Component Score =

$$\left\{\left(\frac{HospitalQuestionScore}{MaximumQuestionScore}\times QuestionWeight\right)+\left(\frac{HospitalQuestionScore}{MaximumQuestionScore}\times QuestionWeight\right)+...\right\}$$

The overall indicator scores are then calculated by summing the scores for each component. When a question is not applicable to a hospital, the question is removed from the denominator for that component.

Detailed Description of the Indicator Calculations

Indicator 1: Use of Standardized Protocols

The Use of Standardized Protocols indicator was constructed to reflect the extent to which EDs are developing and using clinical practice guidelines and medical directives in a broad range of relatively common conditions. It is based on two questions from section 6.

Component 1: Clinical Practice Guidelines Development and Use (47.1%)

Section 6, Question 40:

EDs were asked to indicate the extent to which 12 clinical practice guidelines were developed and in use in the ED at the time of the survey. The 12 items included: asthma/COPD, pneumonia, stroke, chest pain, acute myocardial infarction, ankle trauma, domestic violence, febrile infant, croup, head injury, deep vein thrombosis, and hip fracture. For each condition, EDs were asked to check one of five response options. 1 point was allocated for "Guidelines are being developed and will be implemented within the next 6 months", 2 points were allocated for "Guidelines are developed and few (<25%) patients are cared for using the guideline", 3 points were allocated for "Guidelines are developed and some (25-74%) patients are cared for using the guideline", and 4 points were allocated for "Guidelines are developed and most (75+%) patients are cared for using the guideline". To account for EDs that did not have a given service or have volumes to support a given guideline, researchers chose to calculate the score for based on the top eight guidelines for which the EDs had points; this represents just over 66% of the selected conditions. As such, the total point allocation for Question 40 was 32 points.

Component 2: Medical Directives Development and Use (52.9%)

Section 6, Question 41:

EDs were asked to indicate the extent to which 6 medical directives were developed and in use in the ED at the time of the survey. The 6 items included: asthma, fever, chest pain, anaphylactic shock reaction, wound care, and extremity injury. For each condition, EDs were asked to check one of 3 response options. 1 point was allocated for "A medical directive is being developed and will be implemented within the next six months", and 2 points were allocated for "A medical directive is developed and implemented". To account for EDs that did not have a given service or have volumes to support a given medical directive, researchers chose to calculate the score based on the top 4 medical directives for which EDs had points; this represents 66% of the selected conditions. Therefore, the total point allocation for Question 41 was 8 points.

The following is an example of how the overall Indicator 1 score was calculated for Hospital X.

Example Step 1:

For Question 40, choosing the top 8 points assigned to the clinical conditions presented in the question, Hospital X received 24 points out of a possible total 32 points. To calculate the contribution of this question to the indicator score, divide the hospital's score (24) by the total possible points (32) and then multiply by the specified weighting (47.1%). The result is 0.353.

Example Step 2:

For Question 41, choosing the top 4 points assigned to the clinical conditions presented in the question, Hospital X received 4 points out of a possible total 8 points. To calculate the contribution of this question to the indicator score, divide the hospital's score (4) by the total possible points (8) and then multiply by the specified weighting (52.9%). The result is 0.265.

Example Step 3:
To calculate Hospital X's Indicator 1 score, add the results from the component questions and multiply by 10 {(0.353 +0.265) X 10}. The result is 6.18 out of a maximum indicator score of 10.

Table 1.2: Use of Standardized Protocols Indicator Summary

Question	Total Possible Points	Overall Weighting
Component 1: Clinical Practice Guidelines Development and Use (47.1%)		
Section 6, Question 40	32	47.1%
Component 2: Medical Directives Development and Use (52.9%)		
Section 6, Question 41	8	52.9%
Total Score		100%

Indicator 2: Internal Coordination of Care

The Internal Coordination of Care indicator was constructed to reflect the degree to which EDs are engaging in different strategies that facilitate the internal coordination of care. It is based on three questions from section 6 and one question from section 1.

Component 1: Patient Flow Strategy Development and Use (33.7%)

Section 6, Question 44:
EDs were asked to indicate the extent to which different strategies to address patient flow issues had been developed or were in use at the time of the survey's distribution. Points were given for the following six strategies: clinical decision units or observation medicine beds/units, rapid admission units/teams, rapid discharge or quick response teams, medical outpatient follow-up clinics/early intervention clinics, bed allocation policies, and a designated ED discharge planner/patient flow coordinator. For each strategy, EDs were asked to check one of four response options. 1 point was allocated for "This strategy is in development" and 2 points were allocated for "This strategy is being used". The total point allocation for Question 44 was 12 points converted to a score out of10.

However, if a hospital selected "This strategy has been considered and subsequently determined to be not applicable", the denominator was adjusted and was out of 8 instead of 12. If more than 50% of items were identified as "not applicable", then the question was removed from the indicator calculation altogether and its weight was redistributed proportionally among the other questions that make up the indicator.

Component 2: Internal Coordination Communication (36.5%)

Section 7, Question 45a:
EDs were asked to what extent a group (e.g. virtual or face-to-face) met around certain issues. For each issue, EDs were asked to check one of 3 response options. 0 points were allocated for "We did not meet around this issue", 1 point was allocated for "We had ad hoc meetings to address specific issues/concerns", and 3 points were allocated for "We have a forum to address specific issues/concerns".
Points were given for one activity: the development of policies and procedures regarding coordination of patient flow across programs within the hospital. The total point allocation for Question 45a in this indicator was 3 points.

Component 3: Existence of Different Staff Roles to Promote Internal Care Coordination (29.8%)

Section 1, Question 7 and Section 6, Question 44:

In Question 7, organizations were asked to identify which of 17 different staff roles existed at the time of the survey distribution within their organization. Of the 17 roles identified, points were only assigned to 2 for this indicator: case manager and social worker. In Question 44 one role was used: designated ED discharge planner/patient flow coordinator. 1 point was allocated for "This strategy is in development" and 2 points were allocated for "This strategy is being used".

The total point allocation for Question 7 was 4, and for Question 44 was 2, making a total of 6 points. If in either question, the role/strategy was reviewed and determined to be not applicable, the item for which it was checked was eliminated from scoring.

Table 1.3: Internal Coordination of Care Indicator Summary

Question	Total Possible Points	Overall Weighting
Component 1: Patient Flow Strategy Development and Use (33.7%)		
Section 6, Question 44	12	33.7%
Component 2: Internal Coordination Communication (36.5%)		
Section 6, Question 45a	3	36.5%
Component 3: Existence of Different Staff Roles to Promote Internal Care Coordination (29.8%)		
Section 1, Question 7 and Section 6, Question 44	6	29.8%
Total Score		100%

Indicator 3: External Partnerships Indicator

The External Partnerships indicator was constructed to reflect the degree to which EDs are directly engaged in initiatives with other healthcare providers and agencies in their communities. It is based on two questions from section 6.

Component 1: Involvement with External Groups in Selected Activities (65%)

Section 6, Question 46a and 46b:

EDs were asked if they had been involved in a variety of joint initiatives with LHIN partners at the time of the survey. The LHIN partners examined were: other EDs, EMS providers, community care access centres (CCACs), community-based service agencies, long-term care facilities, public health departments, and primary care providers. EDs were asked about their involvement in several strategies with respect to these groups. These joint initiatives included: evaluating clinical outcomes, representation on committees focused on ED program planning and evaluation, planning and carrying out education sessions for community partner staff and

ED staff and cross-training ED and community partner staff[1], enhanced communication through shared technology, improve data collection and data sharing capabilities, developing strategies to reduce offload delay, and developing strategies to address timing considerations.

EDs had the option of responding that it was (1 point assigned), or was not engaged (no points assigned) in the specific joint initiative with the group in question. For 6 of the 7 external groups, the maximum point score was 5 (5 possible strategies * 1 point); for EMS providers, the maximum point score was 7 (7 possible strategies * 1 point), which was then converted to a score out of 10. After receiving a score out of 10 for the intensity of involvement with the different external groups, each of the separate scores was then weighted according to the relative importance which the Advisory Panel had placed on the external partner in question. For example, the ED's score out of 10 on the CCAC affiliation score was adjusted to form 13.2% of the total score out of 10 for this indicator component. After adding up all these weighted scores, a final score out of 10 was then computed that reflected the extent to which the ED was involved in joint initiatives with all the identified external groups together.

Component 2: Involvement with Specialty Programs in Selected Activities (35%)
Section 6, Question 47:
EDs were asked to indicate if they were engaged in collaborative activities with each of 6 selected specialty programs: Regional Geriatric Program, Regional Stroke Program, Regional Trauma Program, Child Health Program, Community Mental Health Program, and Palliative Care Program. EDs had to check whether they were (1 point assigned), or were not (0 points assigned), involved in collaborative activities with the identified 6 groups. The collaborative activities examined were developing clinical practice guidelines, developing standardized processes for referrals, evaluating clinical outcomes, utilization management issues in the ED, representation on committees focused on ED program planning and evaluation, planning and carrying out joint staff education sessions and cross training staff, and enhanced communication through shared technology.

For each of the 6 program areas, the maximum point score was 7 (7 possible strategies * 1 point), which was then converted to a score out of 10. After receiving a score out of 10 for the intensity of involvement with each program, each of the separate scores was then weighted according to the relative importance, which the Advisory Panel had placed on the external partner in question. For example, the ED's score out of 10 on the Regional Geriatric Program involvement was adjusted to form 19.3% of the total score out of 10 for this indicator component. After adding up all these weighted scores, a score out of 10 was then computed that reflected the extent to which the ED was involved in joint initiatives with all the identified external programs together.

Table 1.4: External Partnerships Indicator Summary

Question	Total Possible Points	Overall Weighting
Component 1: Involvement with External Groups in Selected Activities (65%)		
Section 6, Question 46	5 or 7	65%

[1] Based on question responses and expert Advisory Panel input, it was decided that these two initiatives be combined. Points were assigned to all options checked off in either "Planning and carrying out education sessions for community partner staff and ED staff" OR "Cross-training ED and community partner staff".

Component 2: Involvement with Specialty Programs in Selected Activities (35%)		
Section 6, Question 47	7	35%
Total Score		100%

Indicator 4: Management and Support of Human Resources

The Management and Support of Human Resources indicator was constructed to reflect the efforts made by EDs to support staff training and education, and mechanisms that facilitate discussion of issues regarding quality of work life and recruitment and retention. It is based on three questions from section 6 and two questions from section 1.

Component 1: Monitoring of Turnover (15.1%)

Section 6, Question 37:

EDs were asked to indicate whether or not they track turnover rates for physicians and nurses. The total point allocation for Question 37 was 3 points. Because the structure of the question changed from the previous survey, hospitals received 1 point for each staff group for whom turnover rates were tracked, and one additional point for tracking turnover rates.

Component 2: Investment in Support Programs for Staff (18.1%)

Section 6, Question 38a and 38b:

EDs were asked the extent to which they currently invest in ED staff and physician attendance at continuing education activities. EDs were asked to identify the percentage of nursing staff and physicians that participated in formal in-service programs, courses and offsite conferences in relation to the identified activities. For each group (nursing staff and physicians), EDs were asked about 6 activities: team building, conflict management, quality improvement, leadership development, communication skills, and identifying and managing adverse events. For each activity listed, hospitals received 0 points if the activity was not offered to the group in the last fiscal year, 1 point if few (<25%) people attended the course, 2 points if some (25-74%) people attended the course, and 3 points if most (75+%) people attended the course. The maximum number of points for both staff groups was 36.

Component 3: Recruitment/Retention/WorkLife Committees (22.6%)

Section 6, Question 45a:

EDs were asked to what extent a committee currently exists that includes a given activity as part of its mandate. Points were given for the following activities if they were part of the committee's mandate: Quality of work life, including scheduling and workload issues, and Identifying and evaluating staff recruitment and retention strategies. For each of these two strategies, EDs were asked to check one of 3 response options. If no committee existed for either issue, no points were allocated. If an ad hoc meeting took place to address specific issues/concerns, then 1 point was allocated. If a group existed to address specific issues/concerns, then 3 points were allocated. The total point allocation for Question 45a in this indicator was 6 points.

Component 4: Existence of Different Staff Roles to Facilitate HR Support (24.2%)

Section 1, Question 7:

Organizations were asked to identify which staff roles existed, at the time of the survey distribution, within their organization. For this indicator, points were assigned to 7 roles: acute

care/specialty nurse practitioner or clinical nurse specialist[2] (whichever had the highest scores); nurse educator in ED; hospitalist; pharmacist for ED; designated staff responsible for professional practice issues; patient advocate/ombudsperson, and volunteer coordinator. If the role did not exist, then no points were allocated. If the role was under development, then 1 point was allocated. If the role was permanent, then two points were allocated. If the role was reviewed and determined to be not applicable, then the item for which it was checked was eliminated from scoring. For example, if one role was determined to be not applicable, the denominator would need to be adjusted so that the score is out of a maximum of 12 and not 14 points (2 points * 6 items, not 7). In general, the total point allocation for Question 7 was 14.

Component 5: Professional Development and Learning (20%)

Section 1, Question 11:

Organizations were asked whether they provide continuing education or professional development support for two staff groups, nurses and other patient care staff. The areas of focus included: reimbursement of continuing education courses, reimbursement of advanced education (e.g. degree), bursaries/scholarships, paid time off to take courses, unpaid time off to take courses, flexible scheduling to take courses, and on-site courses provided by hospital staff or external experts. For every support provided to nurses, two points were allocated. For every support provided to other patient care staff, 1 point was allocated. The maximum number of points for this question was 21.

Table 1.5: Management and Support of Human Resources Indicator Summary

Question	Total Possible Points	Overall Weighting
Component 1: Monitoring of Turnover (15.1%)		
Section 6, Question 37	3	15.1%
Component 2: Investment in Support Programs for Staff (18.1%)		
Section 6, Question 38	36	18.1%
Component 3: Recruitment/Retention/WorkLife Committees (22.6%)		
Section 6, Question 45a	6	22.6%
Component 4: Existence of Different Staff Roles to Facilitate HR Support (24.2%)		
Section 1, Question 7	14	24.2%
Component 5: Professional Development and Learning (20%)		
Section 1, Question 11	21	20%
Total Score		100%

Indicator 5: Clinical Data Collection and Dissemination

The Clinical Data Collection and Dissemination indicator was constructed to reflect the extent to which EDs are collecting and disseminating clinical outcomes and appropriateness data. It is based on three questions from section 6 and one question from section 1. This year, this

[2] Based on question responses and expert Advisory Panel input, it was decided that these two staff roles be combined. Points were assigned to acute care/specialty nurse practitioner or clinical nurse specialist; the higher set of point scores was included in the indicator component calculation.

indicator name was modified from last year's Data Use for Decision-Making indicator. However the components and overall calculation of this year's indicator is very similar to last year's Data Use for Decision-Making indicator.

Component 1: Clinical Data Collection (37.5%)

Section 6, Question 42:

EDs were asked whether and how they currently collect data to improve care delivery processes. Points were allocated for the following areas:

Data on Timing Issues
Time from triage to full nursing assessment
Time from triage to ED Physician/Nurse Practitioner initial assessment
Time from ordering of laboratory tests to availability of results
Time from requesting a consult to the decision made by the consultant regarding patient disposition
Time from decision to admit to transfer to inpatient bed
Fractile response (e.g. the proportion of patient visits for a given triage level where the patients were seen within the CTAS time frame defined for that level)
Data on Patient Care Management Issues
Number of patients who are registered and leave without being seen by a physician
Number of patients who leave ED prior to the completion of treatment
Unscheduled return visits within 48-72 hours for same/related condition
Unscheduled return visits within 48-72 hours that result in hospitalization
Patient & family complaints/compliments in the ED
Data on Adverse Events
Adverse events (including medication errors, drug reactions)

For each of the above topic areas, EDs were asked to check all the response options that apply. If no data are collected, then no points were allocated. If data are collected and shared with a senior medical staff group/group responsible for quality of care issues in the ED, then 1 point was allocated. If data are collected and compared internally across specialties and/or to past performance, then 2 points were allocated. If data are collected and compared externally with other organizations, including other EDs, then 2 points were allocated. The maximum number of points for this question is 60.

Component 2: Clinical Data Dissemination (21.2%)

Section 6, Question 43:

EDs were asked to indicate with which groups and in what format they shared data collected for clinical quality improvement. The groups of stakeholders were: the Board or Board committees (including committee/task force looking at utilization), senior management team, ED clinical leadership, clinical leadership from programs other than ED, ED front-line staff, and front-line staff from programs other than ED. If no data were shared, no points were allocated. If an internal written report was circulated about key highlights, then 1 point was allocated for each group. If there was a verbal presentation and discussion of results, 3 points were allocated for each group. Hospitals were able to check all that apply. The maximum number of points for this question was 24.

Component 3: Communication About Data Use and Dissemination (23.4%)

Section 6, Question 45a:

EDs were asked to what extent a committee currently exists that includes a given activity as part of its mandate. Points were given for the following activities if they were part of the committee's mandate: Evaluating ED clinical outcomes, ED quality improvement initiatives, and Improve data collection and data sharing capabilities across programs within the hospital. For each of these three strategies, EDs were asked to check one of 3 response options. If no committee existed for either issue, no points were allocated. If an ad hoc meeting took place to address specific issues/concerns, then 1 point was allocated. If a group existed to address specific issues/concerns, then 3 points were allocated. The total point allocation for Question 45a in this indicator was 9 points.

Component 4: Existence of Staff Roles to Facilitate Data Use and Dissemination (17.9%)
Section 1, Question 7:
Organizations were asked to identify which of 17 different staff roles existed at the time of survey distribution within their organization. Of the 17 roles identified, points were only assigned to 3 in the calculation of this indicator: Decision support role, Utilization review analyst, and Quality and/or risk management analyst. If the role did not exist, then no points were allocated. If the role was under development, then 1 point was allocated. If the role was permanent, then two points were allocated. If the role was reviewed and determined to be not applicable, then the item for which it was checked was eliminated from scoring. For example, if one role was determined to be not applicable, the denominator would need to be adjusted so that the score is out of a maximum of 4 and not 6 points (2 points * 2 items, not 3). In general, the total point allocation for Question 7 was 6 points.

Table 1.6: Clinical Data Collection and Dissemination Indicator Summary

Question	Total Possible Points	Overall Weighting
Component 1: Clinical Data Collection (37.5%)		
Section 6, Question 42	60	37.5%
Component 2: Clinical Data Dissemination (21.2%)		
Section 6, Question 43	24	21.2%
Component 3: Communication About Data Use and Dissemination (23.4%)		
Section 6, Question 45a	9	23.4%
Component 4: Existence of Staff Roles to Facilitate Data Use and Dissemination (17.9%)		
Section 1, Question 7	6	17.9%
Total Score		100%

Indicator 6: Use of Clinical Information Technology

The Use of Clinical Information Technology indicator was developed to reflect the extent to which EDs are using or developing an electronic tracking system, electronic records, and performing selected functions online. It is based on one question from section 6 and two questions from section 2.

Component 1: Use or Development of an Electronic Patient Tracking System (32.5%)
Section 6, Question 39:

EDs were asked to what extent they were currently developing/using an electronic patient tracking system. 1 point was allocated if the ED was exploring the use of an electronic patient tracking system or if the ED was involved in collaborative efforts with other organizations to explore joint acquisition and implementation of an electronic patient tracking system. 2 points were allocated if either the ED had an electronic patient tracking system in place or if the ED had an electronic patient tracking system in place and was networked to a regional tracking system. The maximum number of points for this question is 2.

Component 2: Use of Electronic Records as a Primary Information Source (37.5%)

Section 2, Question 14:
This question asks hospitals if they are using electronic records and data as a primary source of information. Points were given for the use of electronic records and data in the following clinical areas:

Clinical Areas
Patient visit registration information (e.g. ADT system)
Diagnostic imaging reports (e.g. textual reports)
Electronic medical images (e.g. CT scans, x-rays)
Diagnostic laboratory results
Patient-based pharmacy/drug profiles
Standardized protocols for ED
Physician order entry system for ED
Nursing clinical documentation
Physician clinical documentation
Clinical documentation by other health professionals

For each of these clinical areas, if the organization did not use electronic records/data as the primary source of information, no points were allocated. If the organization used electronic records/data as the primary source of information in the program area, then 1 point was allocated for each data type. If the organization used electronic records/data and remote access was possible, then 1.5 points were allocated for each data type. The maximum number of points for this question is 15.

Component 3: Online Functionality of Selected Activities (30%)

Section 2, Question 15a:
Organizations were asked the extent to which selected functions could be performed online by patient-care staff while in a clinical area. To answer in the affirmative, the relevant function must be implemented on computers located in the clinical area(s), patient-care staff must be trained in its use and have received relevant access codes (e.g. passwords), and at least one patient-care staff member must have used this function. Points were given for online functionality in the following program areas:

Functions
Accessing archived medical records
Accessing clinical data from previous visits of a patient (e.g. obtain test or assessment data from previous visits)
Recording workload data
Ordering diagnostic tests or imaging

Ordering supplies (pharmacy or other)
Making referrals to care providers, internal to the organization
Making referrals to care providers, external to the organization

For each of the functions, if ED staff could not perform the function online, no points were allocated. If ED staff could perform that function online, 1 point was assigned. The maximum number of points for this question is 7.

Table 1.7: Use of Clinical Information Technology Indicator Summary

Question	Total Possible Points	Overall Weighting
Component 1: Use or Development of an Electronic Patient Tracking System (32.5%)		
Section 6, Question 39	2	32.5%
Component 2: Use of Electronic Records as a Primary Information Source (37.5%)		
Section 2, Question 14	15	37.5%
Component 3: Online Functionality of Selected Activities (30%)		
Section 2, Question 15a	7	30%
Total Score		100%

Indicator 7: Healthy Work Environment (*New*)

The Healthy Work Environment indicator was designed to measure the extent to which hospitals have mechanisms in place to support and promote a healthy work environment and thereby contribute to employee's physical, social, mental and emotional well-being. Eleven questions from section 5 were used to calculate this indicator. This year, the Healthy Work Environment indicator is calculated across all sectors. **Note:** Hospitals who participated in multiple sectors would have the same Healthy Work Environment score across all sectors. However, the provincial average and performance allocation for that indicator would vary because it is based on participating hospitals within that sector only.

Component 1: Healthy Workplace Policy/Plan (30%)

Section 5, Question 31a:

Organizations were asked about their workplace policy/plan. Three points were given to organizations that had a policy/plan that extended beyond policies mandated by health and safety legislation. The total point allocation for this question was 3 points.

Section 5, Question 31b:

This question asked if the organization's healthy workplace policy/plan was based on an employee needs assessment. Organizations with an informal assessment process in place to evaluate employee needs, attitudes and preferences in regard to healthy workplace programs were given 1 point and 2 points were assigned to organizations with a formal assessment. The total point allocation for this question was 2 points.

Component 2: Accountability & Responsibility (10%)

Section 5, Question 32a:

This question asked if accountability and responsibility for healthy workplace initiatives were formally assigned within the organization. Organizations were given 3 points if accountability and responsibility were formally assigned. The total point allocation for this question was 3 points.

Section 5, Question 32b:
If accountability and responsibility for healthy workplace initiatives were formally assigned within the organization, they were then asked to specify which group was accountable and responsible for healthy workplace initiatives. Organizations that chose senior management received 1 point. If accountability and responsibility were shared broadly throughout the organization, organizations were given 2 points. The total point allocation for this question was 3 points.

Component 3: Assessment, Analysis, & Improvement (20%)
Section 5, Question 33a:
Organizations were asked if there were processes in place to assess and analyze the organization's approach to healthy workplace issues. Three points were given if there were ongoing processes in place. The total point allocation for this question was 3 points.

Section 5, Question 33b:
Organizations were asked to identify which of the following outcomes associated with developing a healthy workplace were collected and analyzed within the organization. There were 11 outcomes provided in the question. Organizations who indicated there was an informal process received 1 point and those with a formal process received 2 points. The total point allocation for this question was 22 points.

Section 5, Question 33c:
This question asks organizations how they disseminated information about the outcomes associated with their healthy workplace policy/programs. For each of the 4 groups, organizations received 1 point if an internal written report was circulated about key highlights. If either a verbal presentation and discussion of results occurred or results were reviewed beyond the initial verbal presentation for a specific initiative, organizations received 3 points. The total point allocation for this question was 16 points.

Component 4: Key Dimensions (40%)
Section 5, Question 35:
Organizations were asked about 7 processes in place to support a positive psychosocial environment. Hospitals with a process in place to encourage the participation of front-line employees in decision-making and overall control of their jobs were given 2 points for an informal process and 4 points for a formal process. Additionally, hospitals with a process in place to create innovative schedules, hours of work and job sharing arrangements to meet the needs of work settings was allocated 2 points for an informal process and 4 points for a formal process. Hospitals received 1 point for an informal process and 2 points for a formal process for the 5 other processes in place. The total point allocation for this question was 18 points.

Section 5, Question 36a:
This question asked if there were one or more healthy lifestyle programs offered by your organization. If organizations answered yes, they received 3 points. The total point allocation for this question was 3 points.

Section 5, Question 36b:

If an organization indicated there was a healthy lifestyle program offered, they were asked which of the healthy lifestyle program(s) included any of the 4 components (e.g. formal approach to education and skill development, assessment of behaviour change, monitoring/evaluation of utilization of programs, long term planning). 1 point was allocated to each of the 4 components. The total point allocation for this question was 4 points.

Section 5, Question 36c:
Organizations were asked if their program(s) were developed (or lack thereof) based on an employee needs assessment. If an organization identified yes, they were given 3 points. The total point allocation for this question was 3 points. If organizations answered in Q36a='NO' and Q36c='YES', then Q36 was removed from the component and the key dimensions component was composed of Q35 only.

Table 1.8: Healthy Work Environment Indicator Summary

Question	Possible Points	Overall Weighting
Component 1: Healthy Workplace Plan/Policy (30%)		
Section 5, Question 31a	3	30%
Section 5, Question 31b	2	
Component 2: Accountability & Responsibility (10%)		
Section 5, Question 32a	3	10%
Section 5, Question 32b	3	
Component 3: Assessment, Analysis, and Improvement (20%)		
Section 5, Question 33a	3	20%
Section 5, Question 33b	22	
Section 5, Question 33c	16	
Component 4: Key Dimensions (40%)		
Section 5, Question 35	18	27%
Section 5, Question 36a	3	13%
Section 5, Question 36b	4	
Section 5, Question 36c	3	
Total Score		100%

Verification

Hospitals were not sent preliminary values for the survey questions that were used in the calculations of the SIC indicators. This is because there were phone calls made and emails were sent after the surveys were received, where hospitals were given ample time to respond to any data quality issues or missing answers that were detected.

Methodology to Determine Relative Performance in Hospital Report 2007: Emergency Department Care

As in previous report, a three-point scale was used to designate performance allocations as "above average", "average" or "below average". This section describes the method for determining relative performance between organizations.

Determining relative performance among hospitals for the ten indicators derived from the *Hospital Report 2007 SIC Survey* was based on two peer groups: teaching/community hospitals and small hospitals. Peer group reporting was adopted because small hospitals face different challenges in carrying out many of the activities reported in the SIC areas. In addition, not all of these indicators apply equally to small hospitals and teaching/community hospitals. For example, it might be less meaningful for a small hospital to conduct a formal patient or employee satisfaction survey when they only have 200 discharges annually or 80 full-time staff. Small hospitals were defined as those hospitals funded using the JPPC Small Hospital Rate Model. Please refer to www.jppc.org for more information.

Hospitals were allocated into three categories: "below average", “average”, and "above average", determined by the position of the hospital’s indicator value relative to the mean indicator value of its peer group. These values were reviewed to ensure meaningful differences among hospitals in the three categories. The criteria used to determine relative performance in each peer group is described below.

For each indicator, a higher score and above average performance classification is interpreted as a better result. The maximum score for each indicator is 100. As in last year’s report, a three-point scale (above average, average, below average) was used to describe performance.

In Hospital Report 2005, the method of assigning performance allocation was based on the k-means cluster analysis. The k-means approach was applied separately for each indicator. However for this year, in order to be consistent with other sectors of the SIC quadrant’s performance allocation methods, a new performance allocation method was applied. It sets the upper and lower cut points at the 95th percentile and the 5th percentile, respectively. This method does not require normality, yet produces an interval similar the one obtained by mean +/- 1.645 standard deviations and should capture roughly 90% of the indicator values.

System-Level Findings

This section provides provincial findings for the seven indicators of SIC. In addition, the data are presented for teaching, community and small hospitals separately.

For each of the seven SIC indicators several statistics are displayed: the valid N (number of hospitals that received a score for this indicator), the mean and the standard deviation. In addition, the minimum score and maximum score received for each indicator are displayed along with three percentile rankings: the 25th, 50th (median) and 75th. Just as the median is the value above and below which 50% of cases fall, percentiles provide the same information for different percentages of cases. For example, the value in the 25th percentile is the value that 25% of hospitals scored at or below (and the value above which 75% of hospitals scored).

The statistics in each indicator table are displayed for the 102 hospitals with Emergency Department Care that returned a survey, as well as for teaching, community and small hospital groups. Combined, these statistics provide important measures of central tendency and detailed information about the dispersion of scores for each indicator.

Peer Group Differences

In *Hospital Report 2007: Emergency Department Care*, teaching and community hospitals were included in the same peer group for performance allocations. Below, they are separated out to provide more detailed data at the hospital group level. In reporting data at this level, it is important to clarify that data are provided for these different groups so that hospitals can situate

themselves relative to their peers, not to facilitate comparisons between these two different groups.

Table 1.9: Use of Standardized Protocols Indicator

	Overall	Teaching	Community	Small
Valid N	102	14	61	27
Mean	79.15	78.26	84.05	68.52
Std Deviation	22.54	20.94	20.09	25.47
Minimum	8.83	30.89	17.64	8.83
25th Percentile	61.75	60.33	71.31	45.58
Median	86.78	86.76	93.39	70.56
75th Percentile	100.00	93.39	100.00	91.17
Maximum	100.00	100.00	100.00	100.00

Table 1.10: Internal Coordination of Care

	Overall	Teaching	Community	Small
Valid N	102	14	61	27
Mean	60.12	78.07	67.44	34.28
Std Deviation	28.91	17.58	24.77	26.16
Minimum	0.00	43.27	0.00	0.00
25th Percentile	42.12	64.04	47.38	7.45
Median	65.26	84.78	71.44	36.50
75th Percentile	85.10	89.89	88.77	55.05
Maximum	100.00	100.00	100.00	83.33

Table 1.11: External Partnerships

	Overall	Teaching	Community	Small
Valid N	102	14	61	27
Mean	39.38	55.90	41.45	26.14
Std Deviation	22.75	19.41	21.70	19.91
Minimum	0.00	34.50	0.00	2.82
25th Percentile	18.74	39.74	25.64	11.36
Median	39.44	52.74	44.74	18.49
75th Percentile	56.24	63.16	56.91	40.10
Maximum	96.82	96.82	79.64	83.47

Table 1.12: Management and Support of Human Resources Indicator

	Overall	Teaching	Community	Small
Valid N	102	14	61	27
Mean	66.08	82.09	70.39	48.02
Std Deviation	20.23	15.31	16.52	17.97
Minimum	13.60	47.07	23.71	13.60
25th Percentile	51.24	72.61	61.07	35.34
Median	67.44	85.78	72.54	49.20
75th Percentile	82.57	92.52	82.57	58.62
Maximum	100.00	100.00	95.13	86.61

Table 1.13: Clinical Data Collection and Dissemination Indicator

	Overall	Teaching	Community	Small
Valid N	102	14	61	27
Mean	62.34	70.80	67.76	45.70
Std Deviation	19.94	13.42	16.90	20.03
Minimum	12.33	51.98	18.48	12.33
25th Percentile	52.33	56.97	56.88	26.67
Median	62.46	75.35	69.35	46.56
75th Percentile	78.86	78.86	80.63	57.28
Maximum	96.10	96.10	94.38	88.29

Table 1.14: Use of Clinical Information Technology Indicator

	Overall	Teaching	Community	Small
Valid N	102	61.00	27.00	14.00
Mean	50.94	68.81	56.67	28.74
Std Deviation	23.04	16.36	19.01	18.24
Minimum	2.50	45.36	6.79	2.50
25th Percentile	34.29	58.57	47.50	14.29
Median	52.14	70.54	57.14	27.86
75th Percentile	64.82	81.96	68.75	46.25
Maximum	97.50	97.50	91.96	67.68

Table 1.15: Healthy Work Environment Indicator

	Overall	Teaching	Community	Small
Valid N	102	14	61	27
Mean	72.09	87.09	73.80	60.44
Std Deviation	25.20	15.16	24.86	25.62
Minimum	18.00	47.36	18.00	20.17
25th Percentile	50.83	84.04	53.47	36.51
Median	83.96	92.24	84.60	59.32
75th Percentile	93.13	98.05	93.42	88.87
Maximum	100.00	100.00	100.00	96.38

Table 1.16: Average Indicator Scores by LHIN

LHIN	Healthy Work Environment	Use of Standardized Protocols	Internal Coordination of Care	External Partnerships
LHIN 1 (Erie St. Clair)	84.5	90.3	61.6	35.5
LHIN 2 (South West)	64.9	81.1	51.4	29.6
LHIN 3 (Waterloo Wellington)	74.5	87.0	67.9	46.9
LHIN 4 (Hamilton Niagara Haldimand Brant)	86.6	76.1	76.7	50.2
LHIN 5 (Central West)	59.3	91.5	78.5	52.8
LHIN 6 (Mississauga Halton)	93.7	100.0	89.7	65.7
LHIN 7 (Toronto Central)	95.0	79.6	83.1	56.2
LHIN 8 (Central)	65.6	91.9	80.1	33.3
LHIN 9 (Central East)	66.8	88.2	72.0	50.7
LHIN 10 (South East)	65.9	80.3	53.0	58.7

LHIN 11 (Champlain)	81.5	76.8	57.3	40.0
LHIN 12 (North Simcoe Muskoka)	69.3	83.8	68.8	37.6
LHIN 13 (North East)	55.4	65.4	32.7	19.1
LHIN 14 (North West)	54.1	55.2	28.9	16.6

LHIN	Management and Support of Human Resources	Clinical Data Collection and Dissemination	Use of Clinical Information Technology
LHIN 1 (Erie St. Clair)	67.6	66.9	61.5
LHIN 2 (South West)	58.6	59.5	55.7
LHIN 3 (Waterloo Wellington)	74.8	68.9	60.1
LHIN 4 (Hamilton Niagara Haldimand Brant)	73.5	74.7	53.5
LHIN 5 (Central West)	78.3	67.8	74.7
LHIN 6 (Mississauga Halton)	88.2	89.2	72.3
LHIN 7 (Toronto Central)	86.1	77.2	73.5
LHIN 8 (Central)	84.0	69.4	65.0
LHIN 9 (Central East)	77.0	65.1	47.5
LHIN 10 (South East)	66.9	66.5	61.2
LHIN 11 (Champlain)	64.5	63.4	31.6
LHIN 12 (North Simcoe Muskoka)	64.2	67.6	55.8
LHIN 13 (North East)	43.7	40.1	34.5
LHIN 14 (North West)	43.7	33.6	31.0

Summary of Results

The results from this year's system integration and change survey highlight indicate that EDs are engaged in a variety of activities to evaluate and improve clinical practices. For example, approximately 8/10 of all participating EDs reported that they had established formalized committee to evaluate ED clinical outcomes and 9/10 EDs had formalized committees to address specific issues and concerns for ED quality improvement initiatives, representing an increase from 2005. Currently, all participating EDs involve both ED staff and staff from other program areas in their forums to address specific issues on improving data collection and sharing capabilities across programs whereas in 2005, 80% of EDs were engaged in this type of activity.

The indicators of SIC provide a performance profile reflecting efforts by hospitals with Emergency Department Care in Ontario to meet these challenges. These indicators capture three broad but key areas:

- Investing in recruitment and retention strategies for all hospital staff
- Integration of activities to evaluate and improve clinical practices
- Levels of hospital integration with other LHIN partners in joint initiatives

Overall, hospitals have made considerable improvements in the several indicators, or investments, when compared to *Hospital Report: 2005* survey results.
This year's results for the System Integration and Change quadrant indicate that highest scores were related to use of standardized protocols in EDs. This is consistent with previous results, and may reflect increased awareness of the use and potential benefits of the introduction of

standardized protocols in clinical practice.[3]. However, there continues to be variation in performance for all indicators, indicating opportunities for improvement in targeted areas for some hospitals.

[3] Brand C, Landgren F, Hutchinson A, Jones C, Macgregor L, Campbell D (2005). "Clinical practice guidelines: Barriers to durability after effective early implementation." *Internal Medicine Journal*, 35(3): 162-169.

Appendix A: 2007 Methodology Changes

During the 2007 SIC survey redevelopment phase of the survey, questions were reviewed by both the HRRC researchers and CIHI staff. The methodology changed for six indicators. Wording changes were made to better clarify the questions and provide more defined answer choices. The table below indicates the major changes to the questions where the changes effected the indicator calculation and scoring.

INDICATOR NAME	***Hospital Report 2007 SIC Survey***
Use of Standardized Protocols	Q.40: Three clinical practice guidelines were dropped during redevelopment (Sexual Assault, Neck injury and Cellulitis). Two response options were dropped (Service not offered at our hospital and Guidelines were in the early stages of development). One response option was changed to Guidelines are being developed and will be implemented within the next 6 months. Total points remain the same. --- Q.41: Two medical directives were dropped during redevelopment (Abdominal pain and Use of Backboards). Two response options were dropped (Service not offered at our hospital and Guidelines were developed but not yet implemented at this time). One response option was changed to A medical directive is being developed and will be implemented within the next six months. Total points remain the same.
Internal Coordination of Care	Q.44: One strategy was dropped during redevelopment (Urgent care clinics). Total points=12 but still converted to 10 like previous year. --- Q.45a: One strategy was dropped during redevelopment (Development of clinical practice guidelines and/or medical directives for the ED). Total points=3 but still converted to score out of 10.
External Partnerships	Q.46: One LHIN partner was dropped during redevelopment (Correctional Services). Five joint initiatives were dropped as well (Looking at utilization management issues, Developing standardized protocols, Developing processes for standardized referrals,

	Community-based injury-surveillance monitoring and Community-based prevention activities). Total points was either 6 or 8 depending on LHIN partner but converted to a score out of 10 as in previous year.
Management and Support of Human Resources	Q.7: One staff role was dropped during redevelopment (Infection control practitioner). Total points=14 --- Q.11: Other regulated and unregulated patient care staffs were merged. On-site courses provided by hospital staff or external experts were merged. Total points=21
Clinical Data Collection and Dissemination	Modified the indicator name from last year. --- Q.42: One topic was dropped during redevelopment (Inpatient days in the ED). Total points=60
Use of Clinical Information Technology	Q.15a: Six functions were dropped during redevelopment (Recording nursing workload data, Accessing literature search databases, Accessing other library resources/educational materials, Accessing hospital policies/procedures, Giving/receiving consultation by videocare, Accessing clinical decision support tools). Total points=7
Healthy Work Environment	New indicator