Health Outcomes for Better Information and Care (HOBIC)

ACUTE CARE IN ONTARIO

HOBIC

ICES Institute for Clinical Evaluative Sciences

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Health Outcomes for Better Information and Care (HOBIC): Acute Care in Ontario

ICES Investigative Report

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ABOUT ICES

The Institute for Clinical Evaluative Sciences (ICES) is an independent, non-profit organization that produces knowledge to enhance the effectiveness of health care for Ontarians. Internationally recognized for its innovative use of population-based health information, ICES evidence supports health policy development and guides changes to the organization and delivery of health care services.

Key to our work is our ability to link population based health information, at the patient level, in a way that ensures the privacy and confidentiality of personal health information. Linked databases reflecting 13 million of 33 million Canadians allow us to follow patient populations through diagnosis and treatment and to evaluate outcomes.

ICES brings together the best and the brightest talent across Ontario. Many of our scientists are not only internationally recognized leaders in their fields but are also practicing clinicians who understand the grassroots of health care delivery, making the knowledge produced at ICES clinically focused and useful in changing practice. Other team members have statistical training, epidemiological backgrounds, project management or communications expertise. The variety of skill sets and educational backgrounds ensures a multi-disciplinary approach to issues and creates a real-world mosaic of perspectives that is vital to shaping Ontario's future health care system.

ICES receives core funding from the Ontario Ministry of Health and Long-Term Care. In addition, our faculty and staff compete for peer-reviewed grants from federal funding agencies, such as the Canadian Institutes of Health Research, and receive project-specific funds from provincial and national organizations. These combined sources enable ICES to have a large number of projects underway, covering a broad range of topics. The knowledge that arises from these efforts is always produced independent of our funding bodies, which is critical to our success as Ontario's objective, credible source of evidence guiding health care.

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List of Exhibits

Health Outcomes for Better Information and Care (HOBIC)

The Health Outcomes for Better Information and Care (HOBIC) initiative is funded by the Ontario Ministry of Health and Long-Term Care's (MOHLTC) Information Management and Investment Division and managed by the Institute for Clinical Evaluative Sciences (ICES). HOBIC introduces the collection of standardized clinical information (HOBIC measures) reflective of patient care in the following settings across Ontario:

1 / Acute care

2 / Complex continuing care

3 / Home care

4 / Long-term care

This information provides feedback to health care providers and health care leaders to support quality improvement in health care delivery.

HOBIC measures include assessments of:

- Functional status / activities of daily living (e.g., eating, bathing, personal hygiene, walking, transfer to toilet, toilet use, bed mobility, bladder continence)

- Symptom status (e.g., pain, fatigue, dyspnea, nausea)

- Safety outcomes (e.g., falls, pressure ulcers)

- Therapeutic self-care / readiness for discharge (e.g., ability to manage medications, understanding of their symptoms and how to treat them, general ability for self-care, knowing who to contact for help, ability to handle or adjust activities of daily living)

These data are a unique source of information that can be used to answer important questions about health system and provider effectiveness, as well as nursing practice, in order to improve health outcomes for Ontarians.

Recent studies conducted by ICES scientists provide examples of how HOBIC data is currently being used, from a research perspective, to understand how better information can improve health outcomes.[1, 2] One study examined the relationship between HOBIC acute care discharge measures and the likelihood of acute care readmission within 3, 30, 60 and 90 days of discharge and found that early readmissions were related to nausea, while those occurring later were more strongly related to dyspnea.[1] In addition, a higher patient score on the therapeutic self-care discharge assessment was negatively related to readmission for all time periods.[1] Another study examined changes in clinical health outcomes between admission and discharge in acute care HOBIC sites and found significant improvements in all of the outcomes studied, with the exception of pressure ulcers.[2] This suggests that nursing care interventions are having the desired effect on clinical outcomes, leading to an improvement in the outcomes by the time of discharge.[2]

Introduction

This is the first provincial report produced by HOBIC and it focuses exclusively on HOBIC measures in the acute care setting collected from December 1, 2006 to March 31, 2011. The report is divided into four main sections as follows:

1 / *Hospital coverage*—sheds light on improvements in the uptake and representativeness of site-specific HOBIC data since the start of data collection.

2 / *Assessment completeness*—presents information about the proportion of patients with complete and incomplete assessments at admission and/or discharge for each measure.

3 / *Score changes*—reports mean admission and discharge assessment scores, along with the average percent improvement observed for each of the HOBIC scales, using the most recent quarter of data available (January to March 2011).

4 / *Declines in activities of daily living*— shows the percent of patients who experience a decline in activities of daily living during the course of their hospital stay, by age and length of stay.

Comparisons are also provided, where possible, between small and large hospital sites. While individual hospitals are able to view and use their own HOBIC data, this report adds value through linkage with other databases, such as the Canadian Institute for Health Information - Discharge Abstract Database (CIHI-DAD), and by creating aggregate benchmarking across all participating HOBIC sites.

Findings

HOSPITAL COVERAGE

Hospital coverage is defined as the proportion of site-specific acute care discharges—recorded in the CIHI-DAD—that had an associated HOBIC assessment. Thus, it refers to the proportion of patients where data were available, or "covered", in both datasets. The total number of hospital discharges between December 1, 2006 and March 31, 2011 was calculated from the CIHI-DAD (denominator). Any CIHI-DAD record with an admission and/or discharge assessment for any of the HOBIC measures was included in the numerator. Therefore, the coverage estimate measures the proportion of acute care admissions that had any HOBIC assessment (either admission or discharge). Coverage rates for each hospital site were calculated on a bimonthly basis to ensure that at least 30 observations in each measurement period were obtained.

Exhibit 1.1 presents the mean and interquartile range (distance between the 25th and 75th percentiles) for bimonthly hospital coverage for all participating small and large hospitals. (See Technical Appendix for a full list of hospital sites.) It is important to consider factors which could contribute to lower coverage rates (e.g., a higher number of casual or float nursing staff on a unit that may not have been trained in HOBIC assessments, unit preparedness for HOBIC data collection, etc.) in order to develop strategies aimed at improving these rates in the future.

With input from local nursing staff, HOBIC has set specific achievable targets for each site that take their unique settings into account (e.g., the target may differ for surgical and medical units, etc.). HOBIC science and operations leads have been working with hospitals to help them achieve the ultimate goal of 80% coverage. In recent years, small hospitals on average have been meeting this target while coverage for large hospitals remains below target.

In Exhibit 1.2, bi-monthly hospital coverage for all participating hospitals is presented by the type of hospitalization (medical, surgical and "25 CMG" group. Hospitalizations were broadly categorized as medical and surgical, respectively, based on the CMG (Case Mix Groups) partition methodology developed by CIHI. The Case Mix Groups+ (CMG+) is a methodology designed to aggregate acute care inpatients with similar clinical and resource utilization characteristics, using ICD-10-CA (International Statistical Classification of Diseases and Related Health Problems—Tenth Revision, Canada) and CCI (Canadian Classification of Health Interventions).[3] The "25 CMG" group represents all patients hospitalized for one of the 25 CMGs included in the Local Health Integration Network (LHIN) accountability agreements and identified by the MOHLTC Health Analytics Branch as being associated with preventable readmissions. These CMGs fall more broadly under the following disease groups: stroke, chronic obstructive pulmonary disease, pneumonia, congestive heart failure, diabetes, cardiac and gastrointestinal. (See Technical Appendix for a list of the 25 CMGs.)

EXHIBIT 1.1 Hospital coverage (percentage of site-specific acute care discharges with an associated HOBIC assessment), for large and small hospitals, December 2006 to March 2011, Ontario

HOSPITAL COVERAGE (%)

— Mean coverage; small hospitals   — Mean coverage; large hospitals   – – IQR; small hospitals   – – IQR; large hospitals
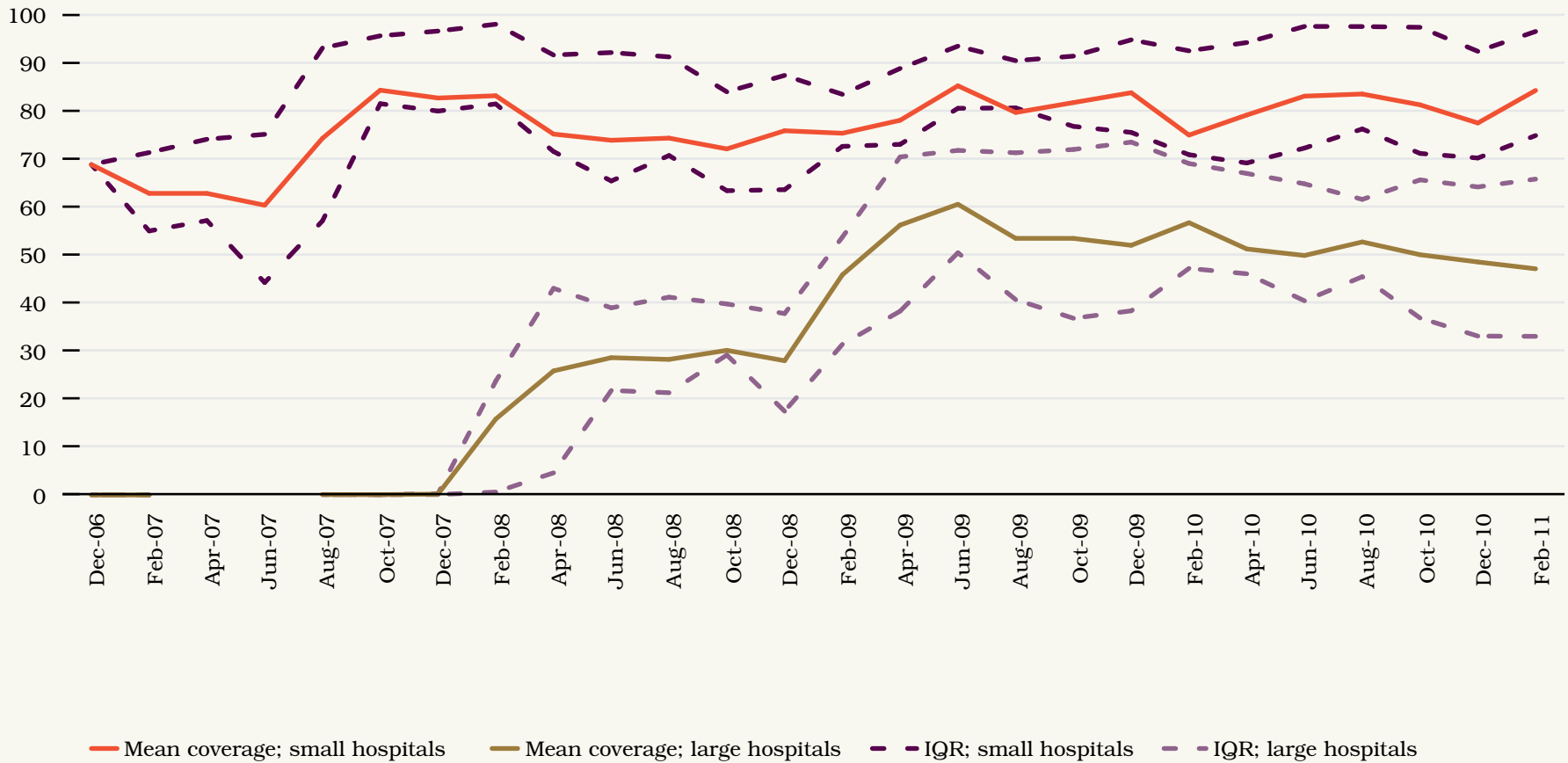
- Mean coverage for small hospitals remained relatively stable from 2006 to 2011, ranging from 60% (June 2007) to 85% (June 2009).
- Mean coverage for large hospitals was quite low until December 2007 and increased rapidly thereafter, ranging from 0.1% (August 2007) to 60% (June 2009).

IQR = interquartile range (distance between 25th and 75th percentiles).

EXHIBIT 1.2 Hospital coverage (percentage of site-specific acute care discharges with an associated HOBIC assessment) for all participating sites, by type of hospitalization, December 2006 to March 2011, Ontario

HOSPITAL COVERAGE (%)

Medical — Surgical — 25 CMG
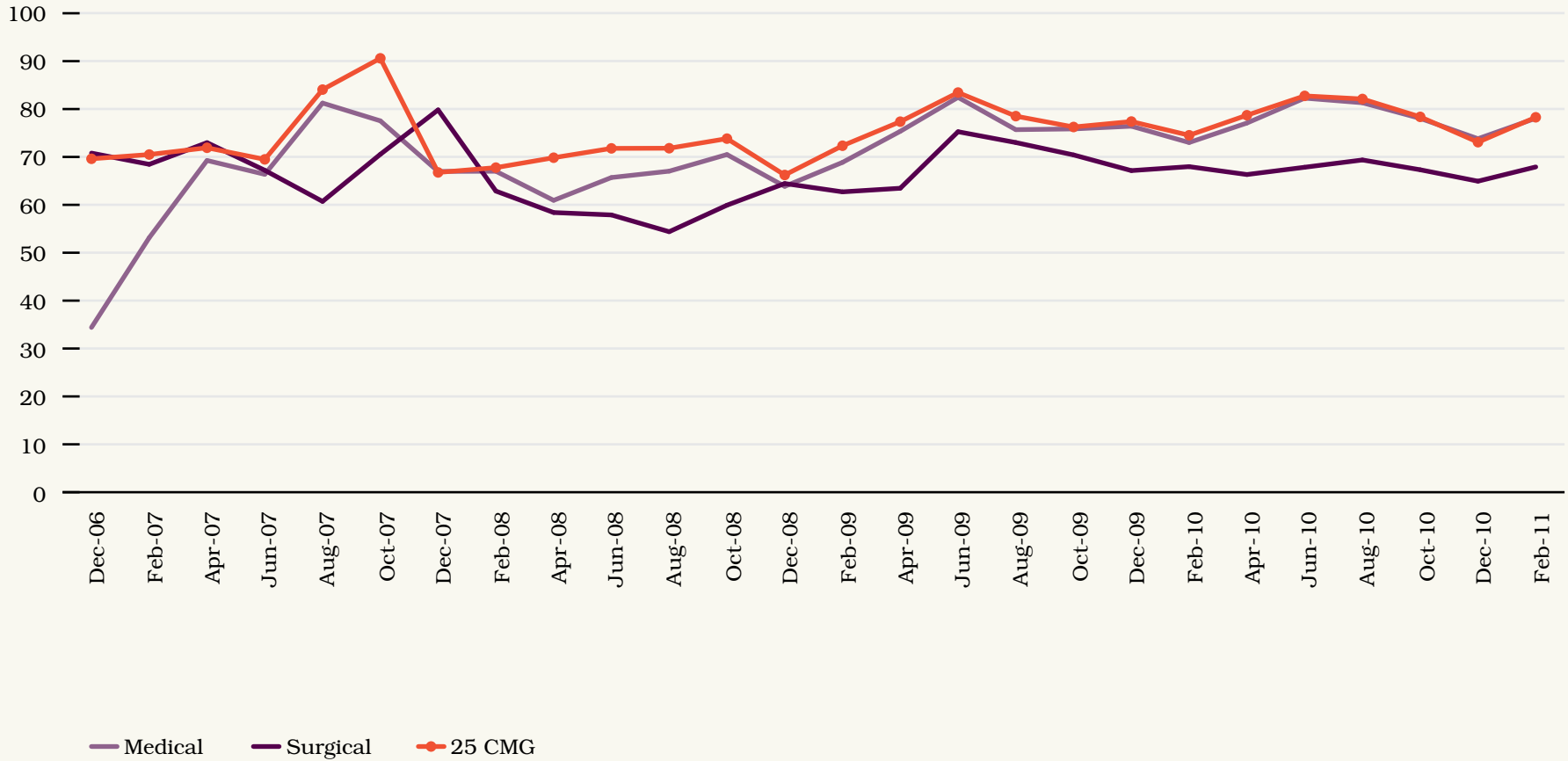
ASSESSMENT COMPLETENESS

In addition to knowing how many eligible patients are receiving a HOBIC assessment, it is also important to look at how complete these assessments are. **Assessment Completeness** is reported in Exhibit 2.1, as the number and proportion of patients who had complete, partially complete, and incomplete assessments for each of the ten HOBIC scales. Data is presented for the most recent quarter (January 1 to March 31, 2011).

Sites should aim to have complete data for all eligible patients—both an admission and discharge assessment for all scales. A patient's HOBIC record was deemed complete if all required items for a given scale were completed at both an admission and discharge. An assessment was considered partially complete for a given scale if one assessment was completed, either at admission or discharge, for that scale.

For the Therapeutic Self-Care (TSC) scale, patients with a recorded TSC version 1 or 2 score were interpreted as having a completed TSC assessment. For instance, patients with a TSC version 1 admission score and TSC version 2 discharge score were counted as complete. The overall patient score indicates overall completeness across all scales, excluding TSC. If a single measure was missing, then an overall score could not be calculated for the patient; hence the measure for that patient record was marked as incomplete. (See Technical Appendix for more details.)

Several practices have been shown to be effective in improving assessment completeness:

- Including a HOBIC information session within hospital orientation.

- Embedding HOBIC within existing patient care assessments to avoid duplication.

- Working with nurses to reinforce the value and importance of the discharge assessment.

- Presenting HOBIC coverage and completion rate information at team meetings to reinforce the importance of these assessments.

- Presenting HOBIC reports to nursing advisory groups and including them in the pursuit of higher completion rates.

- Demonstrating commitment to and use by senior nurse executives.

EXHIBIT 2.1 Completeness of HOBIC assessments (admission and/or discharge) performed at participating sites for 10 HOBIC scales, January 1 to March 31, 2011, Ontario

	COMPLETE	PARTIALLY COMPLETE		INCOMPLETE
	COMPLETED ADMISSION AND DISCHARGE ASSESSMENT	MISSING ADMISSION ASSESSMENT	MISSING DISCHARGE ASSESSMENT	MISSING ADMISSION AND DISCHARGE ASSESSMENT
HOBIC scales	NUMBER (%)	NUMBER (%)	NUMBER (%)	NUMBER (%)
1 ADL composite	130 (24)	153 (29)	131 (25)	120 (22)
2 Bladder continence	178 (33)	140 (25)	169 (32)	46 (9)
3 Pain composite	162 (30)	130 (25)	172 (32)	69 (13)
4 Fatigue	190 (35)	131 (25)	176 (33)	36 (7)
5 Dyspnea	180 (34)	140 (26)	170 (32)	42 (8)
6 Nausea	181 (34)	139 (26)	172 (32)	41 (8)
7 Falls	179 (34)	134 (25)	175 (33)	45 (8)
8 Pressure ulcers	174 (33)	140 (26)	169 (32)	50 (9)
9 TSC, versions 1 or 2	174 (33)	132 (25)	177 (33)	50 (9)
10 Overall patient score	76 (15)	140 (26)	102 (19)	215 (40)

- Rates of completion for discharge assessments were lower than for admission assessments, which may lead to gaps in discharge planning (e.g., patient education and post-discharge care).
- The ADL composite measure and the concomitant overall patient score had the most incomplete assessments.
- Therapeutic self-care assessments are only required for patients being discharged home. Approximately 20% of patients were legitimately missing a TSC discharge assessment since they were discharged to long-term care, complex continuing care or other inpatient care (i.e., they did not require a TSC).

ADL = activities of daily living; TSC = therapeutic self-care.
Note: Denominator excludes patients who died, were transferred from or to another hospital or intensive care unit (ICU), mental health admissions and patients with a length of stay less than 48 hours.

SCORE CHANGES

For patients with both an admission and discharge assessment, the average percent score change for each measure was calculated (mean score at discharge minus the mean score at admission, divided by the mean score at admission) and reported in Exhibit 3.1. In order to present the percent change as a positive improvement, all changes (incidence of declines) are measured on a positive scale (to measure incidence of improvement). Data is presented for the most recent quarter (January 1 to March 31, 2011).

HOBIC measures for pressure ulcers and falls are not included in Exhibit 3.1. We examined the incidence of new falls and pressure ulcers among patients at all participating sites between January 1 and March 31, 2011. An average of 4% of patients with both an admission and discharge assessment for falls experienced a fall during the course of their hospitalization, and 3% of patients developed a pressure ulcer during their hospital stay. These are patients with admission score of zero and discharge score greater than zero on these measures.

Several practices have been shown to be effective in improving score changes:

• Using HOBIC measures in clinical care huddles to target specific areas of focus for the interdisciplinary team (e.g., improving ambulation and continence).

• Using the TSC scale on admission and 24-48 hours before discharge to give nurses more information about the needs of their patients, thus making them better able to target patient-specific education requirements at discharge.

EXHIBIT 3.1 Percent change in HOBIC assessment score on select measures from admission to discharge, for small and large hospitals, January 1 and March 31, 2011, Ontario

| | | | PERCENT CHANGE IN SCORES | | | | | |
| | | | SMALL HOSPITALS | | | LARGE HOSPITALS | | |
Scale	MEAN SCORE AT ADMISSION	MEAN SCORE AT DISCHARGE	25TH PERCENTILE	50TH PERCENTILE (MEDIAN)	75TH PERCENTILE	25TH PERCENTILE	50TH PERCENTILE (MEDIAN)	75TH PERCENTILE
ADL composite	7.1	5.0	13	32	40	15	32	41
Bladder continence	0.5	0.4	13	25	37	12	24	37
Pain composite	1.0	0.5	39	50	63	41	54	64
Fatigue	1.2	0.8	24	30	41	28	35	41
Dyspnea	0.6	0.3	31	48	57	45	51	59
Nausea	0.4	0.1	67	73	83	64	75	78
TSC, version 1	4.1	4.2	0	2	12	2	4	5
TSC, version 2	1.6	1.7	1	3	7	2	3	4
Overall patient score	10.6	6.8	27	35	44	21	35	49

- For each of the scales presented above, patients on average improved from admission to discharge. The magnitudes of improvement were similar across large and small hospitals.
- The median percent improvement for the health outcomes of bladder continence, pain assessment and management, and management of nausea and dyspnea symptoms show substantial improvements from admission to discharge (reflected by a lower score at discharge). This is consistent with initial research in this field, which suggests that care interventions are leading to improvements in the outcomes.[2]

ADL = activities of daily living; TSC = therapeutic self-care; IQR = interquartile range (25th to 75th percentile).

DECLINES IN ACTIVITIES OF DAILY LIVING

Declines in activities of daily living (ADL) functioning associated with long length of stays in acute care settings are problematic – particularly for older adults who can decompensate during hospital stay. Exhibit 4.1 shows the percentage of patients who experienced a decline in their ADL score over the course of their acute care hospital stay. Patients with a discharge score that was greater than their admission score for ADL were defined as having a decline. The measure only includes patients who had both an admission and discharge assessment for ADL from December 1, 2006 to March 31, 2011. In order to better characterize patients with a functional decline in ADL, we calculated the percent of patients with a decline in ADL for different lengths of stay (1–7, 8–14, 15–30, 31–90, ›90 days) and age groups (‹60, 60–74, 75–84, ›84 years).

Several practices have been shown to be effective in preventing decline in activities of daily living:

• Posting HOBIC information on unit-based quality boards so that the team can use this information to focus practice.

• Incorporating the HOBIC information into 'Senior-Friendly Care' programs, restorative care units and acute geriatric units—information that can add value in focusing on specific areas for these populations (e.g., function, fatigue, falls and continence).

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EXHIBIT 4.1 Percent of patients with a decline in ADL across all participating sites, by age group (years) and length of stay (days), December 1, 2006 to March 31, 2011, Ontario

PATIENTS WITH
DECLINE IN ADL (%)

AGE AND LENGTH OF STAY (DAYS)
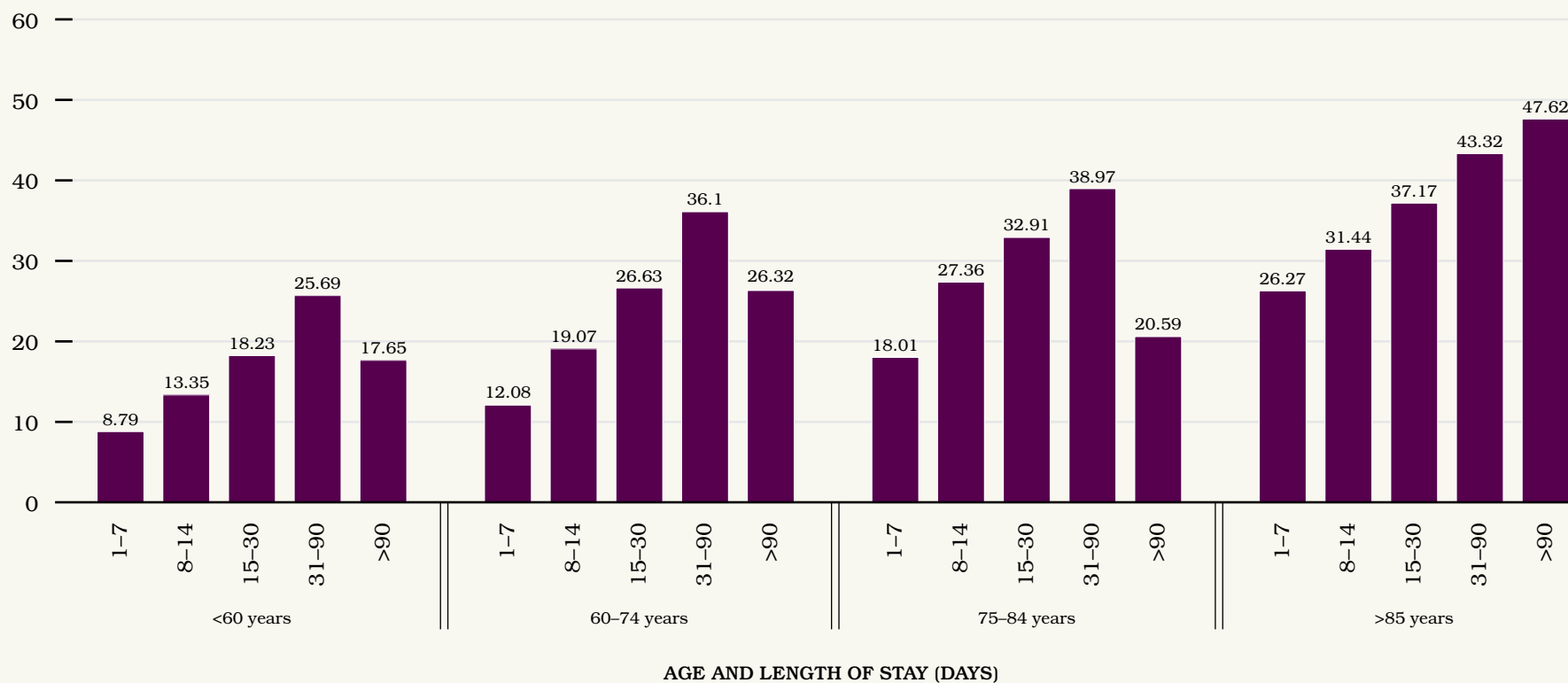
- As LOS increased, the percentage of patients experiencing a decline in ADL functioning increased, except among those aged less than 85 years with a LOS greater than 90 days.
- Within a given LOS category, the percentage of patients experiencing a decline in ADL functioning increased with age.
- These trends were not seen consistently across all sites (data not shown). It would be quite valuable for health care leaders to understand the reasons for these differences across sites.

ADL = activities of daily living; LOS = length of stay.
Note: Across all age categories, percentages for those with a LOS greater than 90 days were based on less than 20 patients.

Conclusion

This report provides information about the coverage and completion rates of HOBIC measures for acute care sites that are using HOBIC across the province. There have been improvements in coverage and completion rates over time; however larger hospitals have not achieved their target completion rates.

The information on changes in HOBIC scores from admission to discharge provides organizations with information to use in examining local nursing practice. There have been improvements over time in score changes from admission to discharge. These improvements may reflect strategies that were implemented since preliminary studies in this area highlighted some of the challenges with collecting and using HOBIC data,[4,5] and demonstrate the commitment and value placed on HOBIC by health care leaders in the province.[5]

With an aging population and an increased focus on length of stay, the ADL decline data provides organizations with valuable information to examine practice and implement strategies targeted at people whose hospital stay may be greater than 15 days.

Throughout the report effective strategies for improving assessment completeness, score changes and declines in ADL are highlighted. Health care leaders are encouraged to incorporate these strategies to enable better data quality, facilitate better decision making and ultimately improve patient care.

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Technical Appendix

PEER HOSPITALS

All participating sites were categorized as either a small or large hospital. In total, there were 35 small hospitals and 17 large hospitals (two academic/teaching hospitals and 15 community hospitals). The small hospitals ranged in the number of acute care beds (excluding mental health, and chronic, general and special rehab beds) from four to 104, and large hospitals (community/academic/teaching) ranged in the number of acute care beds from 92 to 458. Below is a list of the sites that fell under each category.

—

TABLE 1 HOBIC sites by hospital size

SMALL HOSPITALS	LARGE HOSPITALS
Alexandra Hospital	Brant Community Healthcare System-Brantford
Campbellford Memorial Hospital	Chatham-Kent Health Alliance
Collingwood General and Marine Hospital	Grand River Hospital Corporation-Waterloo Site
Deep River and District Hospital	Hamilton Health Sciences Corporation-Mcmaster
Englehart and District Hospital	Joseph Brant Memorial Hospital
Georgian Bay General Hosp-Midland Site	Lakeridge Health Corporation-Oshawa Site
Grey Bruce Health Services-Lions Head	Peterborough Regional Health Centre
Grey Bruce Health Services-Markdale Site	Quinte Healthcare Corporation-Belleville
Grey Bruce Health Services-Meaford Site	Ross Memorial Hospital
Grey Bruce Health Services-Southampton	Royal Victoria Hospital Of Barrie (The)
Grey Bruce Health Services-Wiarton Site	Scarborough Hospital-Grace Site
Groves Memorial Community Hospital	Scarborough Hospital-Scarborough General Site
Haldimand War Memorial Hospital	Southlake Regional Health Centre
Haliburton Highlands Health Services Corporation-Haliburton	St. Mary's General Hospital
Hanover and District Hospital	St. Michael's Hospital
Headwaters Health Care Centre-Dufferin	Timmins & District General Hospital
Kirkland and District Hospital	Trillium Health Centre-Mississauga
Lakeridge Health Corporation-Bowmanville	
Lakeridge Health Corporation-Port Perry	
Niagara Health System-Fort Erie Douglas	
Niagara Health System-Niagara-On-The-Lake	
Norfolk General Hospital	
North Wellington Health Care-Mount Forest	
North Wellington Health Care-Palmerston	

TABLE 1 CONTINUED...

SMALL HOSPITALS	LARGE HOSPITALS
Northumberland Hills Hospital	
Quinte Healthcare Corporation-Bancroft	
Quinte Healthcare Corporation-Picton	
Quinte Healthcare Corporation-Trenton	
Smooth Rock Falls Hospital	
South Bruce Grey Health Centre-Chesley	
South Bruce Grey Health Centre-Durham	
South Bruce Grey Health Centre-Walkerton	
South Bruce Grey Health Centre-Kincardine	
St. Francis Memorial Hospital	
Stevenson Memorial Hospital Alliston	

HOSPITAL COVERAGE

To calculate hospital coverage we excluded from the denominator all Canadian Institute for Health Information Discharge Abstract Database (CIHI-DAD) records prior to the first HOBIC assessment submitted by each site. In accordance with HOBIC business rules, we also excluded all transfers to or from another hospital or intensive care unit (ICU), mental health admissions and hospitalizations with a length of stay less than 48 hours. The numerator included any site-specific acute care hospitalization identified within the CIHI-DAD (same exclusions as denominator), that also had a linkable HOBIC record. Any CIHI-DAD record with an admission and/or discharge assessment for any of the HOBIC measures was included in the numerator.

25 CMG GROUPS

This group represents all patients hospitalized for one of the 25 CMGs included in the LHIN accountability agreements and identified as being associated with preventable readmissions by the MOHLTC Health Analytics Branch. These CMGs fall broadly under the following disease groups: stroke, chronic obstructive pulmonary disease (COPD), pneumonia, congestive heart failure (CHF), diabetes, cardiac and gastrointestinal.

TABLE 2 List of CMGs in the "25 CMG" group used to classify type of hospitalization for HOBIC assessments

CMG+		CMG+ DESCRIPTION
STROKE (AGE ≥ 45)		
CMG 2009	25	Hemorrhagic event of central nervous system
	26	Ischemic event of central nervous system
	28	Unspecified stroke
COPD (AGE ≥ 45)		
CMG 2009	139	Chronic obstructive pulmonary disease
PNEUMONIA (ALL AGES)		
CMG 2009	136	Bacterial pneumonia
	138	Viral/unspecified pneumonia
	143	Disease of pleura
CONGESTIVE HEART FAILURE (AGE ≥ 45)		
CMG 2009	196	Heart failure without cardiac catheter
DIABETES (ALL AGES)		
CMG 2009	437	Diabetes
CARDIAC CMGS (AGE ≥ 40)		
CMG 2009	202	Arrhythmia without cardiac catheter
	204	Unstable angina/atherosclerotic heart disease without cardiac catheter
	208	Angina (except unstable)/chest pain without cardiac catheter

TABLE 2 CONTINUED...

CMG+		CMG+ DESCRIPTION
GASTROINTESTINAL CMGS (ALL AGES)		
CMG 2009	231	Minor upper gastrointestinal intervention
	248	Severe enteritis
	251	Complicated ulcer
	253	Inflammatory bowel disease
	254	Gastrointestinal hemorrhage
	255	Gastrointestinal obstruction
	256	Esophagitis/gastritis/miscellaneous digestive disease
	257	Symptom/sign of digestive system
	258	Other gastrointestinal disorder
	285	Cirrhosis/alcoholic hepatitis
	286	Liver disease except cirrhosis/malignancy
	287	Disorder of pancreas except malignancy
	288	Disorder of biliary tract

ASSESSMENT COMPLETENESS

To calculate assessment completeness, we excluded patients who were ineligible to receive a HOBIC assessment based on the following criteria: patients who were transfers to or from another hospital or ICU, mental health admissions, deaths, and hospitalizations with a length of stay less than 48 hours. The denominator only includes site-specific hospitalizations that were identified within the HOBIC database; therefore, patients who had at least one assessment either at admission or discharge for any of the HOBIC scales. Patients discharged to long-term care homes do not require a therapeutic self-care (TSC) assessment on discharge; however, they were not excluded from the TSC assessment completeness calculation. Patients discharged to long-term care, complex continuing care or other inpatient care, represented 12% of patients with HOBIC assessments overall, and less than 20% of the patients who lacked a TSC assessment at discharge.

AVERAGE PERCENT IMPROVEMENT

The average percent improvement represents the site-specific mean score difference (discharge score minus admission score) divided by the mean admission score. In order to present the percent change as a positive improvement, all values (except TSC versions 1 and 2) were converted to a positive scale (e.g. multiplied by negative one).

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