Health Outcomes for Better Information and Care (HOBIC)

Acute Care in Ontario 2014

June 2015

HOBIC

ICES

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HOBIC assessment forms use copyrighted items related to functional and clinical status derived from the interRAI assessment systems for nursing homes and home care settings. These items are used in HOBIC forms in Ontario with permission from interRAI.

Contents

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 34 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.

About HOBIC

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

- Acute care
- Complex continuing care
- Home care
- 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 (including eating, bathing, personal hygiene, walking, transfer to toilet, toilet use, bed mobility, bladder continence)
- Symptom status (including pain, fatigue, dyspnea, nausea)
- Safety outcomes (including falls, pressure ulcers)
- Therapeutic self-care/readiness for discharge (including the ability to manage medications, an understanding of symptoms and how to treat them, a general ability for self-care, a knowledge of who to contact for help, an 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 clinical practice.

Recent studies conducted by ICES scientists provide examples of how HOBIC data are currently being used, from a research perspective, to understand how better information can lead to improved 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 from 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]

List of Exhibits

Introduction

This is the fourth provincial report produced by ICES that examines HOBIC data. This year's report focuses on HOBIC measures in the acute care setting collected from December 1, 2006 to March 31, 2014. The report's findings are presented in the following sections:

1. **Hospital Coverage** – presents a provincial overview of the representativeness of site-specific HOBIC data from 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 HOBIC measure.

3. **Score Changes** – reports mean admission and discharge assessment scores, along with the average percentage improvement observed for each of the HOBIC scales, using the most recent quarter of data available (January to March, 2014).

4. **Decline in Activities of Daily Living** – shows the percentage of patients who experienced a decline in activities of daily living during the course of their hospital stay, by age group and length of stay.

5. **Therapeutic Self-Care** – reports the changes in each therapeutic self-care item score from admission to discharge and the percentage of respondents by type of response to each item.

For acute care, comparisons are also provided, where possible, for small and large hospital sites. While individual hospitals are able to view and use their own HOBIC data, this report adds value through linkages with other databases, such as the Canadian Institute for Health Information's Discharge Abstract Database (CIHI-DAD), and by creating aggregate benchmarking across 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 admission assessment. Thus, it refers to the proportion of patients where data were available, or "covered," in both data sets. The total number of hospital discharges between December 1, 2006 and March 31, 2014 (the denominator) was calculated from the CIHI-DAD. 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 a 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 were obtained in each measurement period.

Exhibit 1.1 presents the median and the interquartile range (the distance between the 25th and 75th percentiles) for bimonthly hospital coverage for participating small and large hospitals. (*See the* **Technical Appendix** *for a full list of hospital sites.*) It is important to consider factors that 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, patients transferred from intensive care) 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 its unique setting into account (the targets may differ for surgical and medical units). The HOBIC scientist, lead and site coordinator 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**, bimonthly hospital coverage for participating hospitals is presented by the type of hospitalization: medical, surgical and "25 CMG" (Case Mix Group). Hospitalizations were broadly categorized as medical and surgical, respectively,

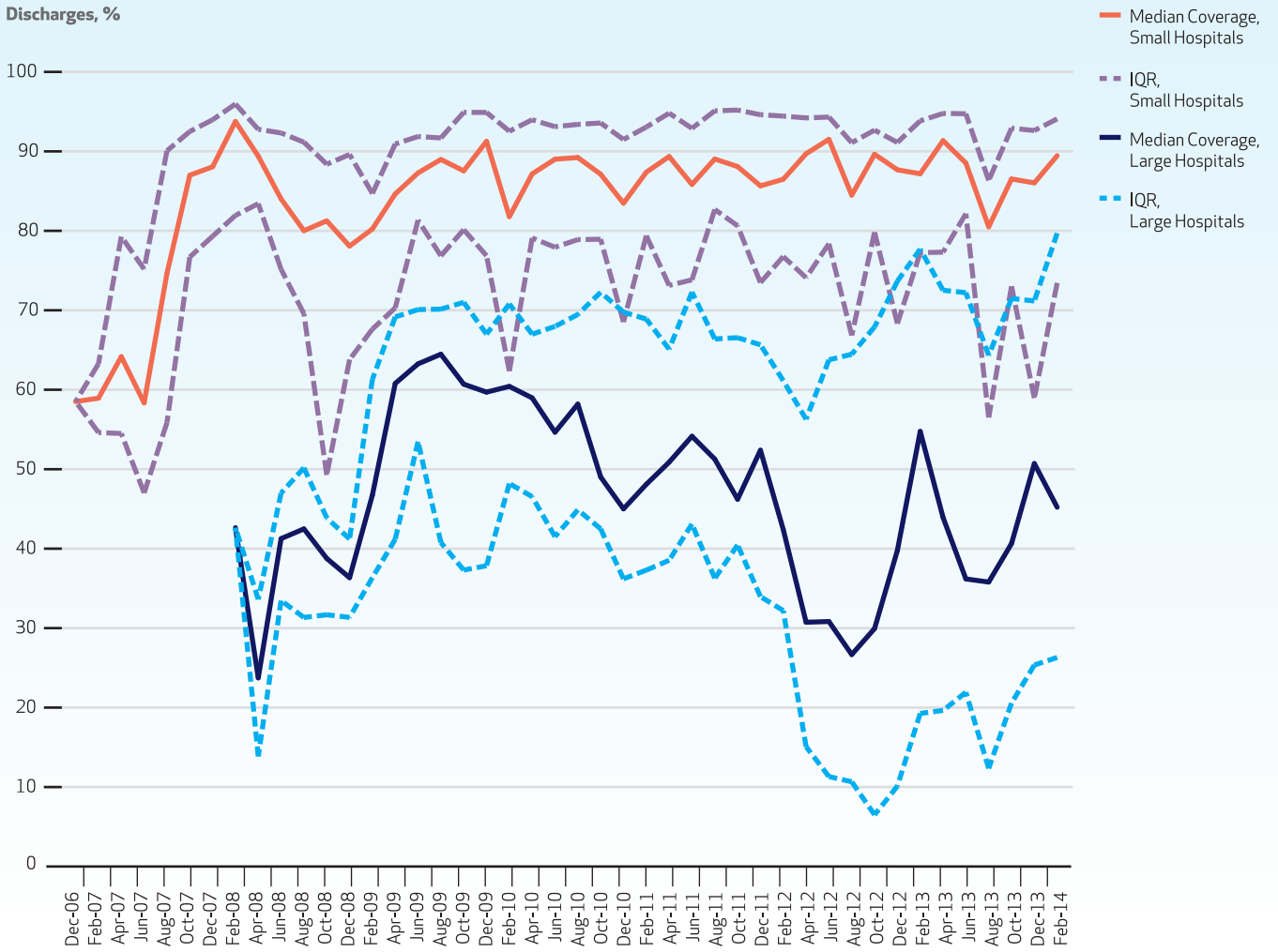
based on the CMG partition methodology developed by CIHI.

Case Mix Groups+ (CMG+) is a methodology designed to aggregate acute care inpatients who have 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 CMGs" represent 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 the* **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, in Ontario, December 2006 to March 2014

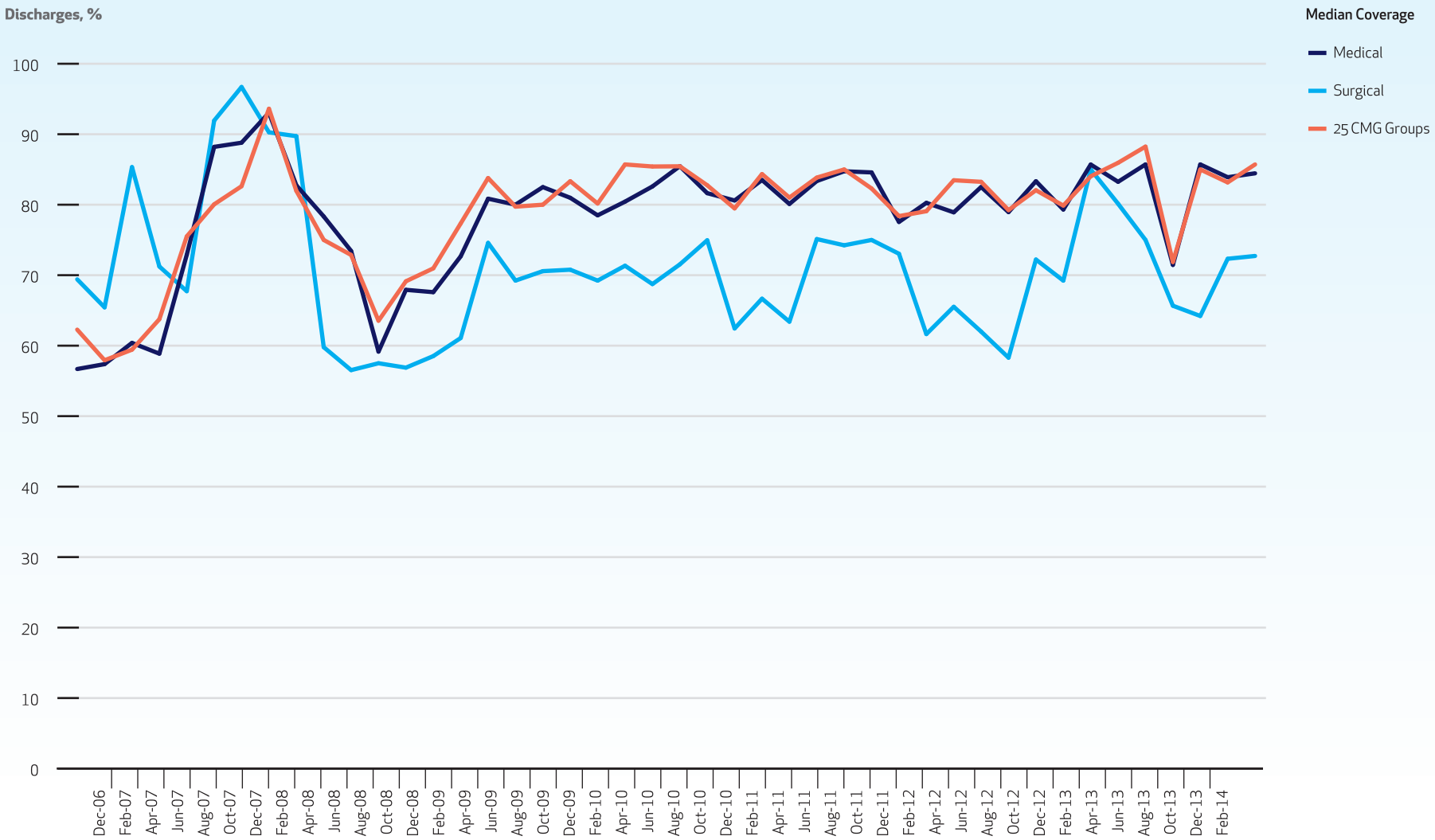
Key Findings

- Median coverage for small hospitals increased from December 2006 to February 2008 and has remained above 80% since 2009.
- Median coverage for large hospitals was less than that of small hospitals over the study period, ranging from 24% to 65%.



IQR = interquartile range (between 25th and 75th percentile)

EXHIBIT 1.2 Median hospital coverage (percentage of site-specific acute care discharges with an associated HOBIC assessment) for participating sites, by type of hospitalization, in Ontario, December 2006 to March 2014



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 or incomplete assessments for each of the 10 HOBIC scales. Data are presented for the most recent quarter, January 1 to March 31, 2014.

Sites should aim to have complete data for all eligible patients with 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 admission and discharge. An assessment was considered partially complete for a given scale if one assessment was completed at either admission or discharge for that scale.

For the Therapeutic Self-Care (TSC) Scale, patients with a recorded TSC version 2 score were considered to have a completed TSC assessment. The overall patient score indicates 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 the* **Technical Appendix** *for more details.*)

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

- Including a HOBIC information session in hospital orientations.
- 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 of HOBIC reports by senior nurse executives.

EXHIBIT 2.1 Completeness of HOBIC assessments (at admission and/or discharge) performed at participating sites for 10 HOBIC scales, in Ontario, January 1 to March 31, 2014

Key Findings

- Rates of completion for both admission and discharge assessments for the HOBIC scales ranged from 19.0% (ADL composite) to 33.0% (fatigue), and 12.4% of all assessments were completed across all scales, excluding therapeutic self-care, version 2.
- For partially completed assessments, most scales had a higher proportion of missing discharge assessments than missing admission assessments, which may lead to gaps in discharge planning (e.g., patient education and postdischarge care).

	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 (%)
ADL composite	96 (19.0)	142 (28.1)	123 (24.3)	144 (28.6)
Bladder continence	159 (31.5)	118 (23.3)	180 (35.7)	48 (9.5)
Pain composite	138 (27.4)	109 (21.5)	184 (36.4)	75 (14.8)
Fatigue	167 (33.0)	112 (22.2)	179 (35.3)	48 (9.5)
Dyspnea	163 (32.2)	116 (22.9)	183 (36.3)	44 (8.7)
Nausea	162 (32.1)	114 (22.6)	185 (36.5)	44 (8.8)
Falls	161 (32.0)	110 (21.8)	186 (36.9)	47 (9.4)
Pressure ulcers	161 (31.9)	112 (22.1)	182 (36.1)	50 (10.0)
Therapeutic self-care, v. 2	148 (29.4)	112 (22.2)	174 (34.4)	71 (14.0)
Overall patient score	63 (12.4)	116 (23.0)	102 (20.2)	224 (44.4)

ADL = activities of daily living

Note: Excludes patients who died, patients who were transferred from or to another hospital or intensive care unit, mental health admissions, and patients with a length of stay of less than 48 hours.

Score Changes

For patients with both an admission and discharge assessment, the average percentage change in the score for each measure is reported in **Exhibit 3.1**. In order to present the percentage change as a positive improvement, all changes are measured on a positive scale. Higher scores for therapeutic self-care are better, while higher scores for all other measures represent greater dependency and worse outcomes. Therefore, changes in therapeutic self-care are calculated as the mean score at discharge minus the mean score at admission, divided by the mean score at admission. For all other measures (where lower scores are better), changes are calculated as the mean score at admission minus the mean score at discharge, divided by the mean score at admission. Data are presented for the most recent quarter, January 1 to March 31, 2014.

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

- Using HOBIC measures in clinical care huddles to target areas of focus for the interdisciplinary team (e.g., improving ambulation and continence).
- Using the therapeutic self-care scale on admission and 24 to 48 hours before discharge to give clinicians more information about the needs of their patients, thus making them better able to target patient-specific education requirements at discharge.

EXHIBIT 3.1 Percentage change in HOBIC assessment scores on selected measures from admission to discharge, by small and large hospitals, in Ontario, January 1 to March 31, 2014

Key Findings

- On average, patients improved from admission to discharge for each of the HOBIC scales. The magnitudes of improvement across scales were similar for small and large hospitals.
- The most substantial improvement in health outcomes was observed in the management of pain, nausea and dyspnea symptoms, with each averaging a greater than 40% improvement from admission to discharge. This is consistent with existing research developed using HOBIC data, which suggests that care interventions are leading to improvements in outcomes.[2]

HOBIC Scales	Mean Score at Admission	Mean Score at Discharge	Percentage Change in Scores						Average Percentage Improvement
			Small Hospitals			Large Hospitals			
			25th Percentile	50th Percentile (Median)	75th Percentile	25th Percentile	50th Percentile (Median)	75th Percentile	
ADL composite	6.8	4.1	27	39	51	11	30	43	33.7
Bladder continence	0.5	0.3	30	36	44	16	34	45	31.0
Pain composite	0.8	0.4	42	65	77	-1	11	43	42.2
Fatigue	1.1	0.7	18	33	43	19	32	44	26.8
Dyspnea	0.5	0.2	31	45	59	28	44	64	44.2
Nausea	0.3	0.1	67	77	87	52	71	78	66.2
Falls	0.6	0.4	26	39	53	16	29	44	33.5
Pressure ulcer	0.1	0.1	0	22	44	-8	1	51	2.7
Therapeutic self-care, version 2	1.7	1.8	1	4	8	1	2	6	5.9
Overall patient score	10.3	6.0	30	42	54	19	33	58	39.9

ADL = activities of daily living

Declines in Activities of Daily Living

The decline in activities of daily living (ADL) functioning associated with long lengths of stay in acute care settings is problematic, particularly for older adults who may decompensate during hospital stay. While **Exhibit 3.1** shows considerable improvement in ADL for most patients, a substantial proportion of patients, particularly older adults, do experience declines in ADL, and longer lengths of stay exacerbate this. **Exhibit 4.1** presents 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 were defined as having a decline. The measure includes only patients who had both admission and discharge assessments for ADL between December 1, 2006 and March 31, 2014. In order to better characterize patients with a functional decline in ADL, the percentage of patients with a decline in ADL was calculated for different lengths of stay (1–7, 8–14, 15–30, 31–90, more than 90 days) and age groups (18–40, 41–65, 66–79, 80–89, more than 89 years).

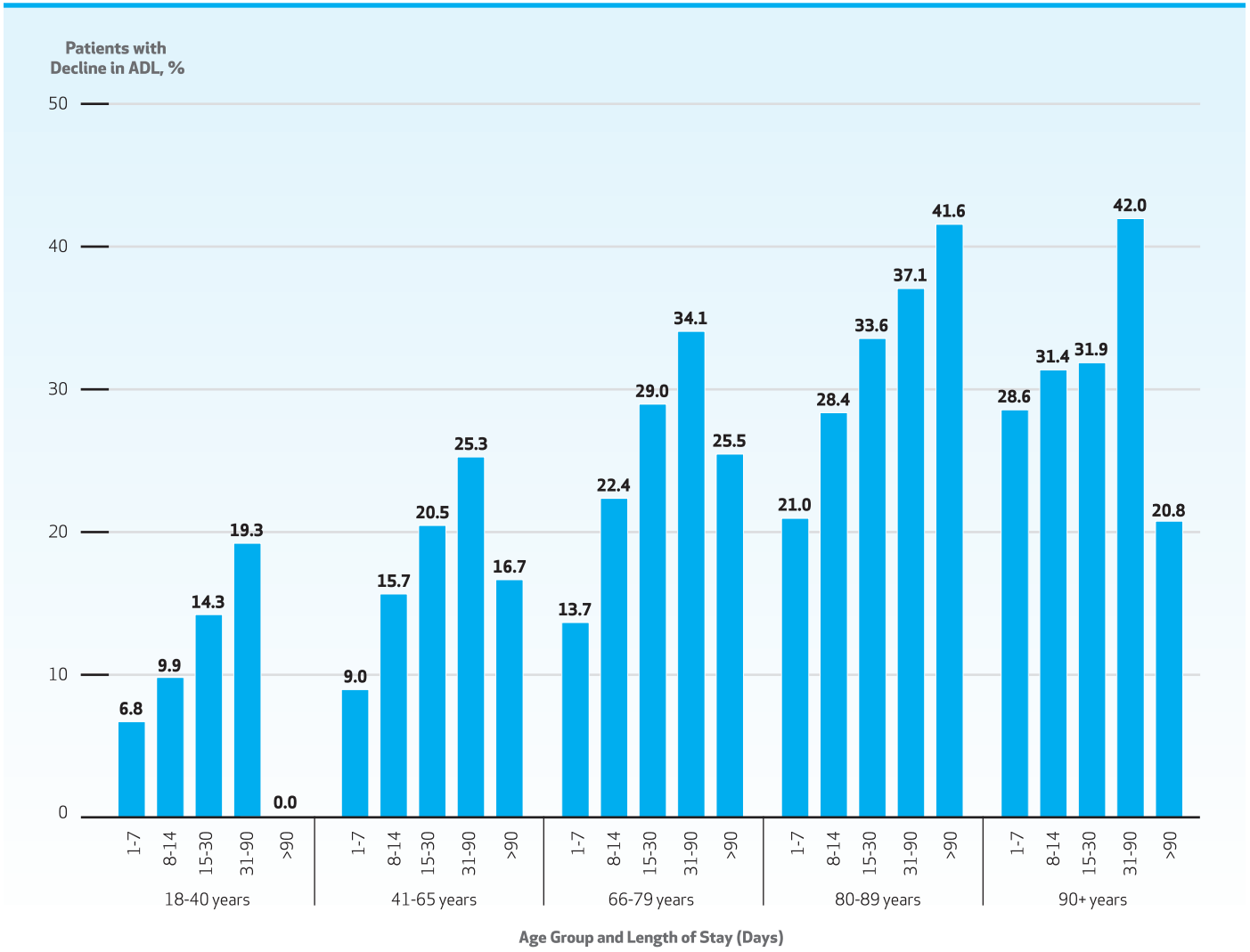
The following practices have been shown to be effective in preventing a decline in ADL:

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

EXHIBIT 4.1 Percentage of patients with a decline in ADL functioning, by age group and length of stay in acute care, in Ontario, December 1, 2006 to March 31, 2014

Key Findings

- Within each length of stay grouping, the percentage of patients experiencing a decline in ADL functioning increased with age.
- Within a given age category, the percentage of patients experiencing a decline in ADL functioning increased with length of stay in acute care.
- These trends were not observed 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

Note: For all age groups, a length of stay of greater than 90 days was based on less than 20 patients.

Therapeutic Self-Care

Therapeutic self-care (TSC) is critical for successful transition to and management of conditions in the community. Self-care refers to patients' ability to perform activities that are aimed at maintaining health and managing their health conditions at home, after discharge from hospital.

The TSC assessment is designed to determine a patient's perceived ability to engage in four aspects of self-care:

- Taking medications
- Managing symptoms
- Performing activities of daily living
- Managing changes in condition

The TSC Scale, which has displayed adequate reliability and validity, was originally designed as a self-reporting measure. However, nurses also administer the scale, ideally within 24 hours of hospital admission and again upon discharge. In 2010, refinements to version 1 of the scale were made in response to feedback from nurses and researchers. The questions were modified to make them easier to use, understand and respond to, resulting in version 2 of the scale.[4] All results shown in this report are based on version 2.

To provide a full perspective on the outcomes of the TSC measure, it is presented in two ways: **Exhibit 5.1** shows the changes in each TSC item score between admission and discharge, and **Exhibit 5.2** shows the percentage of all respondents by type of response to each item on admission and discharge.

Several practices have been shown to be effective in improving therapeutic self-care. These include:

- Teaching back the four aspects of self-care through clinician and patient interaction, clarification and comprehension.
- Sharing the discharge assessment, including TSC scores, with Community Care Access Centres, physicians and others involved in patient care following discharge.
- Reviewing the results of the TSC Scale on admission and 24–48 hours before discharge makes clinicians better informed about the needs of their patients on discharge and allows them to target education specific to each patient with the goal of reducing readmission rates.

EXHIBIT 5.1 Percentage change in therapeutic self-care item scores from hospital admission to discharge, by response, in Ontario, April 1, 2013 to March 31, 2014

Knowledge of Medications

% of total frequency		Discharge 0	Discharge 1	Discharge 2
Admission	0	2.1	2.1	2.1
	1	1.2	6.9	12.2
	2	0.7	7.1	65.7

Carrying Out Treatments for Symptoms

% of total frequency		Discharge 0	Discharge 1	Discharge 2
Admission	0	1.8	2.1	2.7
	1	1.2	7.4	14.2
	2	0.8	8.0	61.7

Reason for Medications

% of total frequency		Discharge 0	Discharge 1	Discharge 2
Admission	0	2.0	1.9	1.9
	1	1.1	6.9	11.4
	2	0.6	7.6	66.7

Ability to Do Everyday Things

% of total frequency		Discharge 0	Discharge 1	Discharge 2
Admission	0	2.5	2.9	2.8
	1	1.8	9.0	14.7
	2	1.4	10.9	54.0

Taking Medications

% of total frequency		Discharge 0	Discharge 1	Discharge 2
Admission	0	1.0	0.8	1.8
	1	0.6	2.6	8.0
	2	1.1	6.1	78.0

Available Contact to Help with Everyday Things

% of total frequency		Discharge 0	Discharge 1	Discharge 2
Admission	0	1.1	0.8	2.4
	1	0.6	2.2	8.6
	2	1.5	5.5	77.5

Symptoms

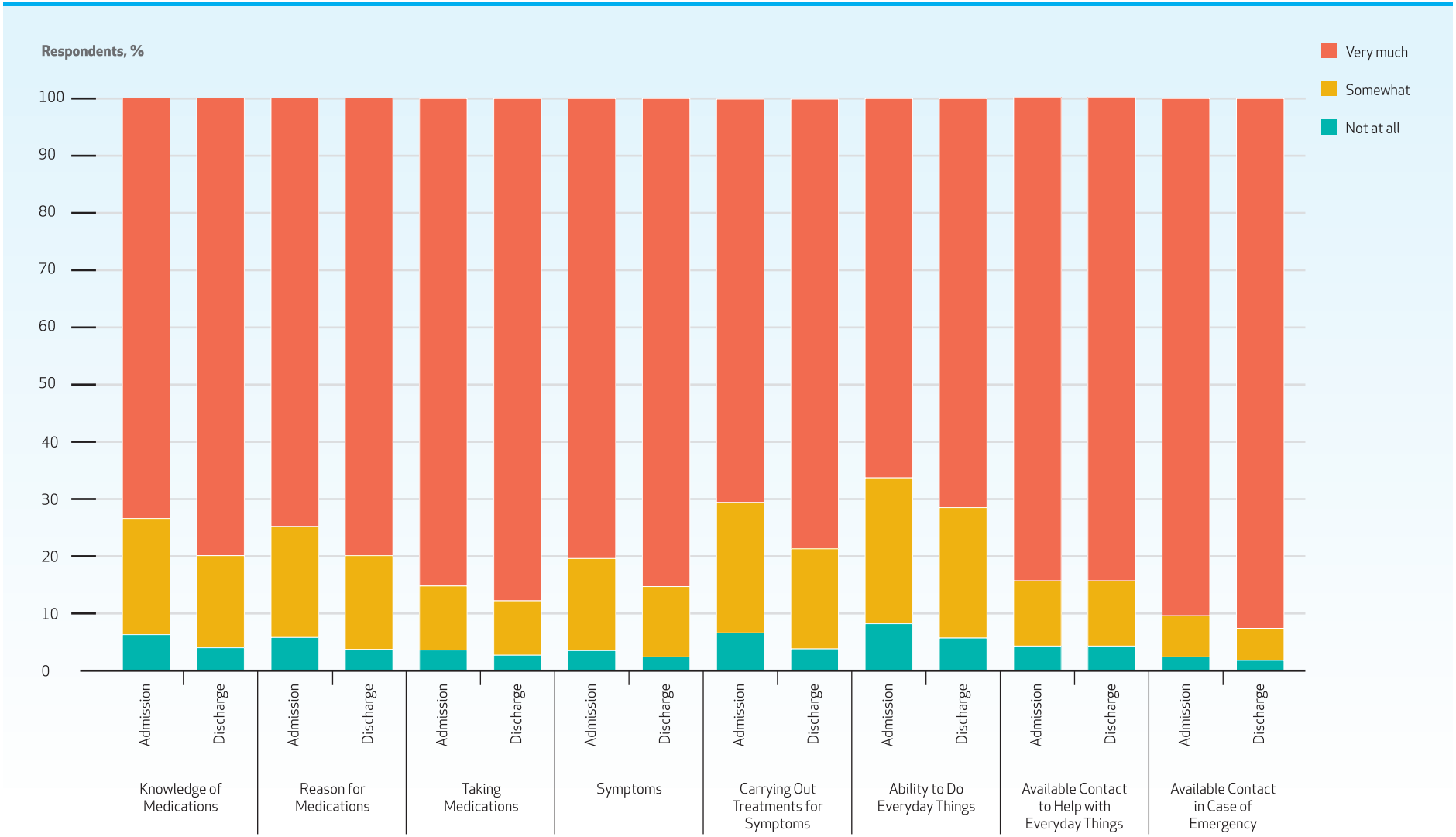
% of total frequency		Discharge 0	Discharge 1	Discharge 2
Admission	0	1.0	1.1	1.4
	1	0.8	4.7	10.6
	2	0.6	6.5	73.3

Available Contact in Case of Emergency

% of total frequency		Discharge 0	Discharge 1	Discharge 2
Admission	0	0.7	0.5	1.2
	1	0.4	1.3	5.5
	2	0.7	3.8	85.9

Note: Responses are based on the Therapeutic Self-Care Scale, version 2.

EXHIBIT 5.2 Proportion of response options for therapeutic self-care items on hospital admission and discharge, in Ontario, April 1, 2013 to March 31, 2014



Note: Responses are based on the Therapeutic Self-Care Scale, version 2.

Conclusion

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

The examination of changes in HOBIC scores from admission to discharge provides health care organizations with evidence to use for improving patient care and clinical practice. There have been improvements over time in score changes from admission to discharge. These improvements may reflect strategies that were implemented after preliminary studies highlighted some of the challenges involved in collecting and using HOBIC data[5,6] and demonstrate the commitment to and value placed on HOBIC by health care leaders in the province.[6]

Given Ontario's aging population and increased attention to acute care length of stay, the HOBIC data demonstrating decline in activities of daily living (ADL) during a hospital stay provide health care organizations with valuable information with which to implement and evaluate interventions to mobilize patients, particularly older adults, early in their stay. Furthermore, with the increased focus by acute care sites on readmission rates, the assessment of therapeutic self-care offers clinicians the opportunity to work with patients regarding management of their self-care.

Throughout this report, effective strategies for improving assessment completeness, score changes, declines in ADL, and therapeutic self-care 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

Participating HOBIC sites in Ontario were categorized as either small or large hospitals. In total, there were 35 small hospitals and 17 large hospitals, the latter consisting of two academic/teaching hospitals and 15 community hospitals. The small hospitals had from four to 104 acute care beds (excluding mental health, chronic care, general and special rehabilitation beds). The large hospitals had from 92 to 458 acute care beds. **Exhibit 6.1** lists the hospitals in each category.

EXHIBIT 6.1 HOBIC sites grouped by hospital size, in Ontario, 2014

Small Hospitals	Large Hospitals
Alexandra Hospital	Brant Community Healthcare System – Brantford Site
Campbellford Memorial Hospital	Grand River Hospital Corporation – Waterloo Site
*Collingwood General and Marine Hospital	Hamilton Health Sciences Corporation – McMaster Site
Deep River and District Hospital	*Joseph Brant Memorial Hospital
Englehart and District Hospital	*Lakeridge Health Corporation – Oshawa Site
Georgian Bay General Hospital – Midland Site	Peterborough Regional Health Centre
Grey Bruce Health Services – Lions Head Site	Public General Hospital Society of Chatham
Grey Bruce Health Services – Markdale Site	Quinte Healthcare Corporation – Belleville Site
Grey Bruce Health Services – Meaford Site	Ross Memorial Hospital
Grey Bruce Health Services – Southampton Site	Royal Victoria Hospital of Barrie
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 Site	St. Mary's General Hospital
Hanover and District Hospital	St. Michael's Hospital
*Headwaters Health Care Centre – Dufferin Site	Timmins and District General Hospital
Kirkland and District Hospital	Trillium Health Centre – Mississauga Site
*Lakeridge Health Corporation – Bowmanville Site	
*Lakeridge Health Corporation – Port Perry Site	
Niagara Health System – Fort Erie Douglas Site	
Niagara Health System – Niagara-on-the-Lake Site	
*Norfolk General Hospital	
*North Wellington Health Care – Mount Forest Site	
*North Wellington Health Care – Palmerston Site	
Northumberland Hills Hospital	
Quinte Healthcare Corporation – Bancroft Site	
Quinte Healthcare Corporation – Picton Site	
Quinte Healthcare Corporation – Trenton Site	
Smooth Falls Hospital	
South Bruce Grey Health Centre – Chesley Site	
South Bruce Grey Health Centre – Durham Site	
South Bruce Grey Health Centre – Walkerton Site	
South Bruce Grey Health Centre – Kincardine Site	
St. Francis Memorial Hospital	
Stevenson Memorial Hospital, Alliston	

*Site did not submit data in 2013/14.

Hospital Coverage

In calculating hospital coverage, CIHI-DAD records created prior to the first HOBIC assessment submitted by each site were excluded from the denominator. In accordance with HOBIC business rules, the following were also excluded:

- Patients younger than 18 years at hospital admission
- Maternity care admissions
- Mental health admissions
- CIHI-DAD records with an ICU flag

The numerator included any site-specific acute care hospitalization identified in the CIHI-DAD (same exclusions as for the denominator) for which there was also 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 CMGs

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 Health Analytics Branch of the Ministry of Health and Long-Term Care. These CMGs are available from the CIHI-DAD and fall broadly under the following disease groups: stroke, chronic obstructive pulmonary disease, pneumonia, congestive heart failure, diabetes, cardiac and gastrointestinal.

EXHIBIT 6.2 Case Mix Groups in the 25 CMGs used to classify the 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
Chronic Obstructive Pulmonary Disease (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 (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
Gastrointestinal (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, patients who were ineligible to receive a HOBIC assessment were excluded based on the following criteria: they were transfers to or from another hospital or intensive care unit, were mental health admissions, died or had a hospital length of stay of less than 48 hours. The denominator includes only site-specific hospitalizations that were identified in the HOBIC database; these include 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 assessment on discharge; however, they were not excluded from the assessment completeness calculation.

Average Percentage Improvement

The average percentage improvement represents the site-specific mean score difference (the discharge score minus the admission score) divided by the mean admission score. In order to present the percentage change as a positive improvement, all values (except therapeutic self-care, version 2) were converted to a positive scale (i.e., multiplied by negative one).

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