BMJ Open

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Journal:	*BMJ Open*
Manuscript ID	bmjopen-2018-021575
Article Type:	Research
Date Submitted by the Author:	11-Jan-2018
Complete List of Authors:	Rubens, F; University of Ottawa Heart Institute, Surgery Rothwell, Diana; Ottawa Hospital Research Institute Al Zayadi, Amal; Ottawa Hospital Research Institute Sundaresan, Sudhir; The Ottawa Hospital Ramsay, Tim; The Ottawa Health Research Institute, Forster, Alan; Ottawa Hospital Research Institute
Keywords:	HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Patient Experience, Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT

Impact of patient characteristics on the Canadian Patient Experiences Survey – Inpatient Care survey- analysis from an academic tertiary care centre

Rubens FD[1], Rothwell DM[2], Al Zayadi A[2], Sundaresan S[1], Ramsay T[2], Forster A[2,3]

1- Department of Surgery, University of Ottawa

2- Clinical Epidemiology, Ottawa Hospital Research Institute

3- Department of Medicine, University of Ottawa

Corresponding author:

Fraser Rubens MD MSc FACS FRCSC

Professor of Surgery

Division of Cardiac Surgery

University of Ottawa Heart Institute

40 Ruskin St.

Ottawa, Ontario

Canada

K1Y 4W7

Fax: 613 696 7303

frubens@ottawaheart.ca

Total word count (figures): 5967

Abstract word count: 245

Running title: Patient experience covariates

Abstract:

Objective: To determine the role of patient demographics, care domains and self-perceived health status in the analysis and interpretation of results from the Canadian Patient Experience Survey-Inpatient Care (CPES-IC).

Design: Cross-sectional survey

Setting: Single large Canadian two campus tertiary care academic centre

Participants: Random sampling of hospital patients post-discharge

Intervention and Main Outcome Measures: Logistic regression models were developed to analyze topbox scoring on four questions of global care (rate experience, recommend hospital, rate hospital, overall helped). Means of each composite domain were correlated to the four overall scores at the patient level to determine Spearman's rank correlation coefficients which were plotted against the overall (hospital) domain score for the key driver analysis.

Results: Topbox scoring was decreased with worse degrees of perceived physical and mental health in all four global questions ($p<0.001$). Female gender and higher levels of education were associated with worse scoring on rate experience, recommend hospital and rate hospital ($p<0.001$). Whereas there was a significant difference between hospital departments in unadjusted measures, these differences were no longer evident after adjustment with patient covariates. Key driver analysis identified person-centred care, care transition and the domain related to emergency admission as areas of highest potential for improvement.

Conclusions: Global measures of overall care are influenced by patient-perceived physical and mental health. Caution should be exercised in using patient-satisfaction surveys to compare performance between different health-care provision entities, as

apparent differences could be explained by variation in patient mix rather than variation in performance.

Strengths and Limitations of Study:

1) This study has demonstrated conclusively that patient-perceived measures of physical and mental health must be taken into account when analyzing data from patient experience surveys
2) Patient demographics such as sex and level of education influence patient experience survey responses
3) The study supports that survey data must be adjusted to account for patient variables before comparison of groups such as hospital departments.

Introduction

Patient experience is now recognized as a critical component of modern health care delivery[1]. Aside from the clear rationale to routinely provide compassionate care, there exists a strong ethical basis for physicians to support excellence in this area as it is of vital interest to patients and governments as a foundation of patient-centred medicine [2]. There is also supportive evidence that improved patient experience may positively impact outcomes[1 3] particularly through better compliance to evidence-based guidelines, such as in areas of chronic disease management[4].

There are many different processes by which inpatient patient experience has been measured internationally[5-8]. In the United States, it is measured using the Hospital Consumer Assessment of Health-Care Provider Systems (HCAHPS) survey[9]. Hospital funding from Medicare is partially dependent on the results from this survey and thus health care organizations are deeply committed to improving results. A modification of the HCAHPS survey (Canadian Patient Experience Survey – Inpatient Care, CPES-IC) was developed through collaboration between the Canadian Institute for Health information (CIHI), Accreditation Canada, the Canadian Patient Safety Institute, the Change Foundation and the Inter-Jurisdictional Patient Experience Group and this survey is now routinely administered in four provinces in Canada[10].

Though the HCAHPS and the CPES-IC are very similar, there are subtle differences that reflect the unique nature of the single-payer system in Canada. The CPES-IC survey consists of 22 questions derived from the HCAHPS as well as other questions that "address key areas relevant to the Canadian context". The questions can be classified in

three specific groups. In the first group, individual questions can be clustered as they reflect care in particular domains such as doctor communication skills (3 questions) and nursing communication skills (3 questions) amongst others. The Canadian survey includes the same domains as the HCAHPS, but also comprises several questions that constitute new domains not addressed in the HCAHPS survey such as admission experience, person-centred care, discharge and transition. Further details regarding differences between the Canadian and American surveys are available on the CIHI web-site (https://www.cihi.ca/en/patient-experience).

The composite questions for each domain can be averaged to provide a mean value which is currently reported at the hospital level for the HCAHPS survey[11]. In the second group there are four questions that reflect overall care that are of particular importance at the institutional level to assess the quality of patient experience. One of these questions is also used as a corporate measure of key interest ("Rate your experience?") and it is most commonly used to rank hospitals nationally after adjustment for regional differences[3]. Results from the three other questions related to overall care include; "Would you recommend this hospital to your friends and family?" (recommend hospital) and "Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?" (rate hospital) and "Overall, do you feel you were helped by your hospital stay?) (overall helped). Success in these and other questions are measured by the percent of "topbox" designation by the patients in which they have ranked a 4 on the recommend hospital question (on a scale of 1 to 4) or 9 or 10 out of an ordinal scale of 10 for the remaining

three questions. The "topbox" metric has been validated and accepted as a marker of excellence in patient experience measurement.[12]

The final group of questions found in both surveys consists of inquiries regarding patient-perceived health status as well as demographic topics such as race and education. These questions are referred to a Patient Mix Adjusters (PMA) and they are used in the HCAHPS survey in order to provide risk adjustment, particularly when comparing between geographic regions. The PMA questions for the HCAHPS are re-assessed quarterly by the Centre for Medicare and Medicaid (CMS) after reviewing national results.

There is limited familiarity in the assessment of patient experience in Canada and the use of such surveys. Although it has been demonstrated that patient sociodemographic factors such as age, ethnicity, sex and socioeconomic class have been shown to influence patient experience responses[13], there is also no understanding of the validity of the PMA questions in adjusting the results of the CPES-IC survey and how they may contribute to credibly compare units or departments within a hospital. In summary, it is not clear how patient factors such as self-described characteristics including perception of mental and physical health, patient demographics and co-morbidities impact the results of the Canadian survey on in-hospital patient experience.

The overall objective of this research was to compare the value of the self-described patient characteristics obtained from the survey with covariates obtained from a hospital database, in the development of a statistical model to predict topbox scoring in the four survey questions related to overall care; a) rate your experience b) recommend hospital c)

rate hospital d) overall helped. We also sought to assess how the PMA questions and other data from the hospital database influence patient experience at the hospital and departmental level and to determine how the composite domain measurements influence the four adjusted global measurements.

Methods

This analysis was conducted as a Quality Assurance project. The Ethics Committee reviewed the protocol and individual patient consent was waived. Data was collected from April 1, 2016 to Nov 30, 2016 from the CPES-IC Survey (see appendix 1) administered by National Research Corporation (Markham, Ontario).

The data was merged with administrative data collected from The Ottawa Hospital Data Warehouse (TOHDW) which is a relational database that contains administrative and clinical data for all patients seen at The Ottawa Hospital. Deciles of income class were derived using the Postal Code Conversion File Version 6.6 based on data from August 2015 (Statistics Canada). The Elixhauser class was derived using a modification of the Elixhauser comorbidity measure after applying the latter to the hospital data (ref van Walraven Med Care 2009). The occurrence of a patient safety indicator (psi) event (i.e. an in-hospital adverse event) was determined using ICD-10 coding from administrative data [14].

The Ottawa Hospital is a large academic tertiary care teaching centre with two inpatient campuses. There are 6 admitting departments (Surgery, Medicine, Obstetrics-Gynecology, ENT, Family Medicine, Ophthalmology and Psychiatry). A different survey was used in Psychiatry thus these patients were excluded. Ophthalmology was excluded

as it is primarily an outpatient service and accounts for less than 1% of admissions. Data from otolaryngology (ENT) was merged with Surgery due to the combined collaborative quality process. Data from one surgical and one medical division was not available due to inability to merge to administrative data.

Composite domains were identified as follows: communication with doctors (questions 5-7), communication with nurses (questions 1-3), responsiveness of staff (questions 4, 11), communication of medications (questions 16, 17), transition of care (37-39), person-centred care (30-36), direct admission (questions 24, 25) and emergency admission (26-29). The mean was calculated for each patient for each domain as long as more than 50% of the questions in the domain were reported[15] . Spearman's rank correlation coefficients were determined for the continuous value of each domain and the ordinal global question score and this was plotted against the overall (hospital) domain score for the key driver analysis[16]. The median value of the domain scores was used for the vertical separation of the quadrants due to skewness. Points identified in quadrant 1 represent domains with increased potential for improvement due to high correlation with a global score and lower mean value.

Statistical Analyses:

Patient characteristics across department groups were compared using a chi square test. Distribution normality of covariates was tested using the Shapiro-Wilk test.

For categorical variables with equal variances, oneway analysis of variance was used to compare departments, whereas Kruskal-Wallis equality of populations rank test was used for categorical groups with unequal variances.

Multivariable logistic models were developed to test the primary outcomes from the overall care questions (a) rate experience b) recommend hospital c) rate hospital d) overall helped) reported as dichotomous outcomes representing "topbox" response (9 or 10) or no topbox (<9). The association of each covariate was assessed using likelihood ratio tests. Bonferroni correction was used for multiple pairwise comparisons. A p value of < 0.05 was considered significant. Analyses were completed using STATA™ vers. 14.2 (College Station, Tx).

Results

Patient Characteristics

There were 2989 patients who responded to the survey representing hospital admissions under the care of 295 physicians (146 medicine, 110 surgery/ENT, 22 family, 17 obstetrics/gynecology.). Admissions including maternity, rehabilitation and mental health were excluded. The institution consists of 918 inhospital beds geographically situated at 2 campuses. Characteristics of the patients from the total group and from each department are presented in Table 1. There were significant differences between the department groups in terms of physical and mental health, Elixhauser class, admission status, length of stay, marital status and sex.

Topbox Analysis – Overall Measures

The results of the multivariable analyses in the derivation of the model for the overall measures (rate experience, recommend hospital, rate hospital and overall helped) are presented in Tables 2-5. Topbox scoring was decreased with worse degrees of perceived

physical and mental health in all four of the questions. There was a significant relationship with age group in all questions with lowest odds ratios in patients between the ages of 18-34 years. On pairwise comparison the predicted scores in this group were significantly lower than those in the age groups of 55-64 years and 65-79 years ($p<0.05$). Increased level of education and female sex were associated with worse scoring in rate experience, recommend hospital and rate hospital questions. Covariates from the institutional database that were significant contributors to the models included discharge disposition to a facility (recommend and rate hospital), marital status (recommend hospital) and ICU stay (rate hospital). Campus site was found to be a factor as a random effect in rate hospital ($p<0.05$).

Adjusted and unadjusted department-based predicted measures for rate experience, and recommend hospital are presented in Figures 1 - 4. Unadjusted pairwise comparison of rate experience demonstrated a greater likelihood of topbox scoring with surgery as compared to medicine however this was not significant ($p=0.054$). This difference was not seen after adjustment ($p=0.911$). Unadjusted pairwise comparison of the question rate hospital demonstrated a significant increase in surgery as compared to family medicine, however this difference was not present in the adjusted model. Unadjusted analysis of the overall helped question demonstrated greater likelihood of topbox scoring in surgery as compared to medicine and family medicine, as well as obstetrics gynecology as compared to family medicine ($p<0.05$) however these comparisons were no longer significant after adjustment for the covariates in the model.

Key Driver Analysis

Key driver analysis of the global question of rate experience is presented in figure 5. Common domains present in quadrant 1 in all four questions include person-centred care, care transition and the domain related to emergency admission processes. Similar patterns were seen with the other three global questions (results not shown).

Discussion

Results from the CPES-IC survey administered to patients discharged from a large Canadian multi-campus health institution were analyzed after merging with a comprehensive administrative database. Two patient-answered demographic questions collected from the survey (patient-perceived overall physical and mental health) were significant covariates predicting topbox recognition in all four of the overall care questions. Increasing level of education and female sex were associated with decreased topbox scoring in rate experience, recommend hospital and rate hospital. Discharge to a non-home environment was associated with lower topbox scoring on recommend and rate hospital. The only significant contributors to the models from the hospital database included marital status (recommend hospital), and ICU stay (rate hospital). Economic status, in-hospital adverse events and Elixhauser co-morbidity class did not significantly contribute to the models for the four questions related to overall care. After adjustment, there was no significant difference in the predicted measures between the four major departments in any of the four questions that related to the overall patient experience. Finally, key driver analysis using these models, confirmed that the greatest yield for interventions at the hospital level include efforts to improve person-centred care, care transition and the experience for those being admitted through the emergency department.

Patient experience has become a focus of the health care evolution and it has been recognized as a key interest to consumers and patient advocacy groups. The Institute of Healthcare Improvement (IHI) a leader in the transformation of the health care system, has advocated the goal of improving the experience of care within its triple aim of quality [17]. The Affordable Care Act in collaboration with the Centers for Medicare and Medicaid Services (CMS) [12] has emphasized the need to deliver care that provides a quality patient experience. The act has integrated patient experience scores as well as reporting mandates into hospital reimbursement strategies, which further incentivize excellence. Patient experience scores are reported nationally in the US[18] and they may be a source of pride and engagement for health care teams and utilized to compete for patients.

The environment is different in Canada as there is currently no financial benefit and competition between institutions is not a driver for patient services. On the other hand, federal and provincial government health organizations have embraced patient experience as a priority for health care and they have initiated legislation to support its significance in quality delivery. Future public reporting of CPES-IC results and national benchmarking will motivate quality improvement in this area and patient experience surveying is currently mandatory for hospital accreditation. In Ontario, the Excellent Care for All Act (2010) established that hospitals must develop sustained processes to address and improve the patient experience[19]. Our own Institution has raised the profile of patient experience to the level of a corporate target by integrating it as a foundation of the vision of the hospital with a priority equal to other quality outcomes and efficiency.

In order to strategize to bring about improvements in patient experience, it is essential to understand how the current American-based survey applies to Canadian culture and our

single-payer system. Specifically it is crucial to appreciate how to adjust for patient demographics within different settings, not just to externally compare with other urban institutions, but also to begin to internally identify factors that may influence overall scoring and interpretation.

The current study is not the first to examine the role of patient and other covariates in the modeling of measures of overall patient experience in Canada[20]. However in the latter work, the analysis involved the HCAHPS survey focusing on the single question of rate experience. The authors did demonstrate a similar relationship with higher level of education, urgent admission status and longer length of stay as predictive of poorer measures of experience rating however they did not include patient-perceived physical and mental health status, both of which were the most consistent and significant predictors of overall care.

It may not be feasible to generalize from the analysis at a single hospital due to the differing contributions of the patient covariates and interactions with the specific domains of patient care at each hospital across the country[21]. For example, race was not found to be a significant factor for most questions unlike in the United States[21]. This finding may only be relevant in the context of our centre (a medium-sized Canadian city), whereas it may not apply to larger metropolitan centers such as Toronto and Montreal, where there may be greater ethnic diversity. On the other hand, the finding that women are less likely to provide a topbox scoring on questions of overall experience is in keeping with previous findings with the HCAHPS survey[22].

Patient experience key driver analysis has been utilized to focus attention and initiatives in patient-care areas with high potential to impact on the overall global measures of care.

The new CPES-IC survey has been designed to not only include domains currently in the HCAHPS survey, but also domains reflecting patient-centred care, transition of care and the processes of direct or emergency admission. Although these new domains have not been formally validated in the Canadian context, they were all identified as areas of potential high yield in our study in terms of overall contribution to the patient experience. Many of these questions refer to key issues of team communication and the perception of coordination of care; items that could be addressed through team re-structuring, checklists and scheduling. On the other hand, nursing and doctor communication skills, though important, did not support targets of high yield in terms of hospital resources.

There are multiple important implications of this work. The analysis highlights the differences in adjusted and unadjusted rankings between departments, which emphasize the importance of the use of the demographic covariates obtained from the survey such as perception of physical and mental health and education level. The adjusted improved measures in Medicine and Family Medicine underscore that chronic disease and comorbidity must be taken into account in patient experience initiatives. Recognition of adjusted results also enhances engagement of staff who face the challenges of chronic disease care and provides the opportunity to follow for improvements.

The analysis may be limited by unknown and unmeasured covariates. Only a few of the covariates from the administrative database were significant in models describing perceptions of excellence in individual questions of overall care (length of stay, ICU stay, marital status). Further work will be necessary to determine if these administrative database variables are important at model development at the unit or provider level. Although there was no difference between departments in any of the questions, more

subtle comparisons such as between divisions and services may be important in understanding how to advance patient experience initiatives. Finally, patient care domains were not included as covariates in the derivation of the multivariable models for the global overall questions. We elected not to do this as we felt the domains as covariates would demonstrate significant bias due to their correlation not only to the outcomes but also to many of the other predictors. Therefore, we elected rather to look at their interactions and correlations using key driver analysis.

In summary, this analysis provides a perspective on drivers that must be considered when assessing patients' perceptions on the overall care at a health care institution in Canada. This understanding will form the basis for a strategy of thoughtful data-driven targeted interventions to improve the patient experience.

Figure Legends:

Figure 1: Unadjusted and adjusted predicted percent topbox of corporate indicator "Rate your experience" by hospital department. Error bars represent 95% CI. Difference between Surgery/ENT and Medicine significant (p=0.05) in Unadjusted, however no differences between departments in Adjusted

Figure 2: Unadjusted and adjusted predicted percent topbox of corporate indicator "Recommend this hospital" by hospital department. Error bars represent 95% CI. No statistically significant difference between groups.

Figure 3: Unadjusted and adjusted predicted percent topbox of corporate indicator "Rate this hospital" by hospital department. Error bars represent 95% CI. Differences between Surgery/ENT and Family Medicine significant ($p<0.05$) in the unadjusted model but not in the adjusted model.

Figure 4: Unadjusted and adjusted predicted percent topbox of corporate indicator "Overall helped" by hospital department. Error bars represent 95% CI. In the unadjusted model, greater predicted measures were seen with surgery as compared to medicine and family medicine, and with obstetrics/gynecology as compared with family medicine ($p<0.05$). The differences were no longer significant in the adjusted model.

Figure 5: Key driver analysis: relationship domain composite measures to the global measure of Overall Experience, direct admission (left) and emergency admission(right). Horizontal black dotted line – mean for all correlation values. Vertical red dotted line – median for all composites. A- Communication doctors, B- Communication nurses, C-Responsiveness staff, D-Care transition, E-Person-centred care, F-Pain management, G-

Communication medications, H – Admission processes emergency, I – Admission processes elective

Contributorship Statement: We certify that all of the authors have fulfilled the following four criteria to justify authorship:

• Substantial contributions to the conception or design of the work (F.D.R, S.S., A.F.); or the acquisition, analysis, or interpretation of data for the work (D.R., A.A.Z., T.R.); AND

• Drafting the work or revising it critically for important intellectual content (F.D.R., D.R., S.S., T.R., A.F.); AND

• Final approval of the version to be published (F.D.R., D.R., A.A.Z., S.S., T. R., A. F.; AND

• Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. (F. D. R., D. R., A. A. Z., S. S. , T. R. , A. F.

Competing Interests: lAl authors have completed the ICMJE uniform disclosure form at *www.icmje.org/coi_disclosure.pdf* and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

Funding: None

Data Sharing: There is no additional unpublished data from the study. The study data is partially de-anonymized and therefore it is kept on a secure server at the Ottawa Hospital.

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	Total (n=2935)	Surgery (n=1699)	Medicine (n=1023)	Family Medicine (n=79)	Obs/Gyn (n=95)	*p*
Physical health, n(%)						<0.001
Excellent	272 (9.3)	210 (12.4)	45 (4.4)	4 (5.1)	11 (11.5)	
Very Good	812 (27.7)	583 (34.3)	166 (16.2)	8 (10.1)	46 (48.4)	
Good	1008 (34.3)	612 (36.0)	328 (32.1)	37 (46.8)	22 (23.2)	
Fair	616 (21.0)	243 (14.3)	329 (32.2)	19 (24.1)	14 (14.7)	
Poor	227 (7.7)	51 (3)	155 (15.2)	11 (13.9)	2 (2.1)	
Mental health, n(%)						<0.001
Excellent	705 (24.0)	484 (28.5)	180 (17.5)	10 (12.8)	23 (29.2)	
Very Good	1036 (35.3)	636 (37.5)	323 (31.5)	25 (32.1)	42 (44.2)	
Good	786 (26.8)	411 (24.2)	321 (31.3)	24 (30.8)	20 (21.1)	
Fair	335 (11.4)	141 (83)	160 (15.6)	15 (19.2)	9 (9.5)	
Poor	76 (2.6)	26 (1.5)	43 (4.2)	4 (5.1)	1 (1.1)	
Education, n(%)						0.289
8th Grade	182 (6.4)	92 (5.6)	78 (7.8)	8 (10.4)	2 (2.2)	
College/CEGEP	676 (23.6)	417 (25.2)	214 (21.4)	12 (15.6)	21 (22.8)	
Some High School	315 (11.0)	178 (10.8)	109 (10.9)	12 (15.6)	10 (10.9)	
High School	682 (23.9)	370 (22.4)	270 (27.0)	18 (23.4)	16 (17.4)	
Undergraduate	456 (16.0)	265 (11.0)	156 (15.6)	15 (19.5)	16 (17.4)	
Post Graduate	548 (19.2)	331 (20.0)	172 (17.2)	12 (15.6)	27 (29.4)	
Race, n(%)						0.223
White	2555 (89.7)	1518 (90.7)	896 (89.2)	62 (79.5)	79 (84.0)	
Black	53 (1.9)	26 (1.6)	26 (2.6)	1 (1.3)	0	
Arab	43 (1.5)	25 (1.5)	13 (1.3)	2 (2.6)	3 (3.2)	
First Nation	20 (0.7)	13 (0.8)	5 (0.5)	1 (1.3)	1 (1.1)	
Oriental	69 (2.4)	36 (2.2)	30 (3.0)	3 (3.9)	0	
Indian	54 (1.9)	24 (1.4)	22 (22.2)	4 (5.1)	4 (4.3)	
Other	55 (1.9)	31 (1.9)	12 (1.2)	5 (6.4)	7 (7.5)	
Elixclass, n(%)						<0.001
<0	90 (3.1)	60 (3.5)	28 (2.7)	2 (2.5)	0	
0	1606 (54.5)	1123 (65.3)	403 (38.3)	42 (51.9)	38 (40)	
1 to 5	693 (23.5)	382 (22.2)	245 (23.3)	26 (32.1)	40 (42.1)	
6 to 13	370 (12.6)	86 (5.0)	269 (25.6)	10 (12.4)	5 (5.3)	
>13	189 (6.4)	69 (4.0)	107 (10.2)	1 (1.2)	12 (12.6)	
Admit, n(%)						<0.001
Elective	1037 (35.2)	896 (50.1)	79 (7.5)	0	62 (65.3)	
Emergent	1709 (58.0)	720 (41.9)	880 (83.7)	80 (98.8)	29 (30.5)	
Urgent	202 (6.9)	104 (6.1)	93 (8.8)	1 (1.2)	4 (4.2)	

Age group, n(%)						<0.001
18-34	134 (4.6)	90 (5.2)	39 (3.7)	2 (2.5)	3 (3.2)	
35-44	152 (5.2)	89 (5.2)	46 (4.4)	3 (3.7)	14 (14.7)	
45-54	313 (10.6)	219 (12.7)	80 (7.6)	0	14 (14.7)	
55-64	622 (21.1)	383 (22.3)	202 (19.2)	10 (12.4)	27 (28.4)	
65-79	1136 (38.6)	687 (39.9)	394 (37.5)	25 (30.9)	30 (31.6)	
>79	590 (20.0)	252 (14.7)	290 (27.6)	41 (50.6)	7 (7.4)	
Any psi, n(%)	321 (10.9)	205 (11.9)	96 (9.1)	10 (12.4)	10 (10.5)	0.145
LOS (days), median(IQR)	4 (2, 7)	3 (2, 6)	5 (3, 8)	5 (3, 9)	3 (2, 4)	<0.001
Income decile, median(IQR)	8 (5, 9)	8 (5, 9)	8 (5, 9)	8 (5, 9)	8 (6, 9)	0.449
ICU, n(%)	102 (3.5)	60 (3.5)	41 (3.9)	1 (1.2)	0	0.914
Married/ partner n(%)	1904 (64.6)	1153 (67.0)	650 (61.8)	42 (51.9)	59 (62.1)	0.003
Sex female n(%)	1435 (48.7)	794 (41.2)	502 (47.7)	45 (55.6)	100	<0.001
Campus A n(%)	1308 (43.8)	834 (48.5)	423 (40.2)	51 (63.0)	0	<0.001
ED isit within 7 days n(%)	226 (7.6)	144 (8.4)	68 (6.5)	8 (9.9)	5 (5.3)	0.195
Discharge disposition n(%)						<0.001
Home	1885 (63.2)	1220 (71.1)	548 (52.2)	35 (43.2)	72 (75.8)	
Home-setting	872 (29.2)	367 (21.4)	425 (40.5)	37 (45.7)	21 (22.1)	
Another health facility	226 (7.6)	130 (7.6)	76 (7.2)	9 (11.1)	2 (2.1)	

Table 1: Characteristics of patients answering patient experience survey. Abbreviations: Elixclass – Elixhauser class, psi – patient safety indicator event, LOS – length of stay, ALC – alternate level of care at discharge, ICU – intensive care unit stay

	Multivariable Analysis	*p*	LR test (*p*)
Department			0.671
Surgery/ENT	reference		
Medicine	1.08 (0.87, 1.34)	0.502	
Family	0.82 (0.49, 1.39)	0.468	
Obs/Gyn	0.88 (0.54, 1.44)	0.620	
Physical Health			<0.001
Excellent	reference		
Very Good	0.71(0.48, 1.05)	0.083	
Good	0.49(0.33, 0.73)	<0.001	
Fair	0.48(0.31, 0.74)	0.001	
Poor	0.40(0.24, 0.67)	<0.001	
Mental Health			<0.001
Excellent	reference		
Very Good	0.77(0.60, 1.00)	0.051	
Good	0.57(0.43, 0.76)	<0.001	
Fair	0.43(0.30, 0.62)	<0.001	
Poor	0.40(0.22, 0.73)	0.003	
Education			0.007
8th Grade	reference		
Some High School	1.02(0.64, 1.64)	0.924	
High School	0.69(0.45, 1.04)	0.077	
College/CEGEP	0.56(0.37, 0.86)	0.007	
Undergraduate	0.44(0.29, 0.69)	<0.001	
Post Graduate	0.42(0.28, 0.65)	<0.001	
Admit-Urgent	0.86(0.72, 1.02)	0.075	0.075
Sex Male	1.22(1.02, 1.47)	0.030	0.031
Race			0.243
White	reference		
Black	1.45(0.73, 2.91)	0.289	
Arab	0.98(0.49, 1.97)	0.958	
First Nation	0.59(0.20, 1.79)	0.355	
Oriental	1.43(0.80, 2.54)	0.226	
Indian	1.18(0.63, 2.21)	0.611	
Other	0.53(0.29, 0.98)	0.043	
Elixclass			0.064
<0	reference		
0	0.56(0.31, 0.99	0.045	
1 to 5	0.72(0.40, 1.31)	0.282	
6 to 13	0.57(0.30, 1.05)	0.073	
>13	0.61(0.32, 1.20)	0.151	

Age Group			0.007
18-34	reference		
35-44	1.64(0.97, 2.77)	0.066	
45-54	1.73(1.09, 2.72)	0.019	
55-64	2.28(1.49, 3.51)	<0.001	
65-79	2.07(1.37, 3.13)	0.001	
>79	1.83(1.18, 2.84)	0.007	
Any psi	0.98(0.73, 1.32)	0.879	0.879
LOS (>3 days)	0.85(0.69, 1.04)	0.122	0.122
Income decile[1]	0.95(0.83, 1.10)	0.521	0.521
ICU	1.24(0.75, 2.04)	0.407	0.402
Married/Partner	0.93(0.76, 1.12)	0.426	0.425
Emergency visit within 7 days post d/c	0.77(0.56, 1.06)	0.107	0.110
Discharge			0.116
Home	reference		
Home setting	0.91(0.74, 1.14)	0.423	
Another facility	0.69(0.48, 0.98)	0.037	
Campus[2]		0.332	

Table 2: Analysis of covariates associated with topbox designation of the corporate measure of "Rate experience". 1 log transformed. 2 Tested as random effect in mixed effects model. Abbreviations: Elixclass – Elixhauser class, psi – patient safety indicator event, LOS – length of stay, ALC – alternate level of care at discharge, ICU – intensive care unit stay, LR – likelihood ratio

	Multivariable Analysis	*p*	LR test (*p*)
Department			0.908
Surgery/ENT	reference		
Medicine	1.06(0.84, 1.34)	0.620	
Family	0.89(0.51, 1.53)	0.669	
Obs/Gyn	1.03(0.62, 1.72)	0.913	
Physical Health			0.018
Excellent	reference		
Very Good	0.74(0.49, 1.12)	0.152	
Good	0.54(0.36, 0.81)	0.003	
Fair	0.56(0.35, 0.88)	0.012	
Poor	0.557(0.323, 0.959)	0.035	
Mental Health			<0.001
Excellent	reference		
Very Good	0.90(0.69, 1.18)	0.435	
Good	0.63(0.47, 0.85)	0.002	
Fair	0.56(0.39, 0.81)	0.002	
Poor	0.39(0.21, 0.71)	0.001	
Education			<0.001
8th Grade	reference		
Some High School	1.07(0.67, 1.73)	0.768	
High School	0.94(0.62, 1.45)	0.793	
College/CEGEP	0.67(0.44, 1.03)	0.069	
Undergraduate	0.57(0.36, 0.89)	0.014	
Post Graduate	0.63(0.41, 0.99)	0.045	
Race			<0.001
White	reference		
Black	5.63(1.72, 18.45)	0.004	
Arab	1.56(0.70, 3.49)	0.273	
First Nation	0.38(0.13, 1.11)	0.078	
Oriental	2.09(1.07, 4.11)	0.032	
Indian	1.64(0.81, 3.33)	0.168	
Other	0.51(0.28, 0.93)	0.028	
Elixclass			0.197
<0	reference		
0	0.48(0.26, 0.93)	0.030	
1 to 5	0.54(0.27, 1.05)	0.068	
6 to 13	0.56(0.28, 1.13)	0.103	
>13	0.51(0.25, 1.07)	0.074	
Admit Urgent	0.98(0.82, 1.17)	0.843	0.843

Age Group			0.048
18-34	reference		
35-44	1.17(0.67, 2.06)	0.566	
45-54	1.82(1.11, 3.00)	0.019	
55-64	1.85(1.16, 2.93)	0.009	
65-79	1.58(1.02, 2.46)	0.042	
>79	1.37(0.86, 2.19)	0.185	
Any psi	1.09(0.79, 1.49)	0.600	0.092
LOS > 3 days	0.88(0.71, 1.09)	0.247	0.248
Income decile[1]	1.01(0.87, 1.17)	0.908	0.908
ICU	1.62(0.92, 2.87)	0.098	0.086
Married/Partner	0.80(0.65, 0.98)	0.031	0.030
Sex male	1.41(1.16, 1.70)	<0.001	<0.001
Emergency visit within 7 days post d/c	0.75(0.54, 1.04)	0.088	0.081
Discharge			0.037
Home	reference		
Home setting	0.76(0.61, 0.96)	0.020	
Another facility	0.71(0.49, 1.03)	0.069	
Campus[2]		1.000	

Table 3: Analysis of covariates associated with topbox measure of "Recommend this hospital". 1 log transformed. 2 Tested as random effect in mixed effects model.Abbreviations: Elixclass – Elixhauser class, psi – patient safety indicator event, LOS – length of stay, ALC – alternate level of care at discharge, ICU – intensive care unit stay

	Multivariable Analysis	*p*	LR test (*p*)
Department			0.496
Surgery/ENT	reference		
Medicine	0.96(0.78, 1.18)	0.676	
Family	0.71(0.43, 1.19)	0.197	
Obs/Gyn	1.20(0.75, 1.93)	0.451	
Physical Health			<0.001
Excellent	reference		
Very Good	0.70(0.50, 0.99)	0.041	
Good	0.49(0.34, 0.69)	<0.001	
Fair	0.61(0.42, 0.91)	0.014	
Poor	0.67(0.41, 1.09)	0.109	
Mental Health			<0.001
Excellent	reference		
Very Good	0.74(0.59, 0.94)	0.013	
Good	0.58(0.45, 0.76)	<0.001	
Fair	0.52(0.37, 0.73)	<0.001	
Poor	0.51(0.28, 0.91)	0.024	
Education			<0.001
8th Grade	reference		
Some High School	1.16(0.75, 1.77)	0.507	
High School	0.90(0.62, 1.32)	0.599	
College/CEGEP	0.61(0.42, 0.90)	0.013	
Undergraduate	0.47(0.32, 0.72)	<0.001	
Post Graduate	0.49(0.32, 0.71)	<0.001	
Race			0.399
White	reference		
Black	1.70(0.88, 3.29)	0.114	
Arab	0.95(0.50, 1.82)	0.879	
First Nation	0.70(0.24, 2.01)	0.503	
Oriental	1.26(0.74, 2.14)	0.403	
Indian	1.23(0.67, 2.26)	0.501	
Other	0.66(0.36, 1.19)	0.166	
Admit Urgent	0.87(0.74, 1.02)		0.093
Sex Male	1.31(1.10, 1.55)	0.002	0.002
Elixclass			0.073
<0	reference		
0	0.56(0.34, 0.93)	0.025	
1 to 5	0.69(0.40, 1.17)	0.169	
6 to 13	0.66(0.38, 1.16)	0.148	
>13	0.59(0.32, 1.07)	0.083	

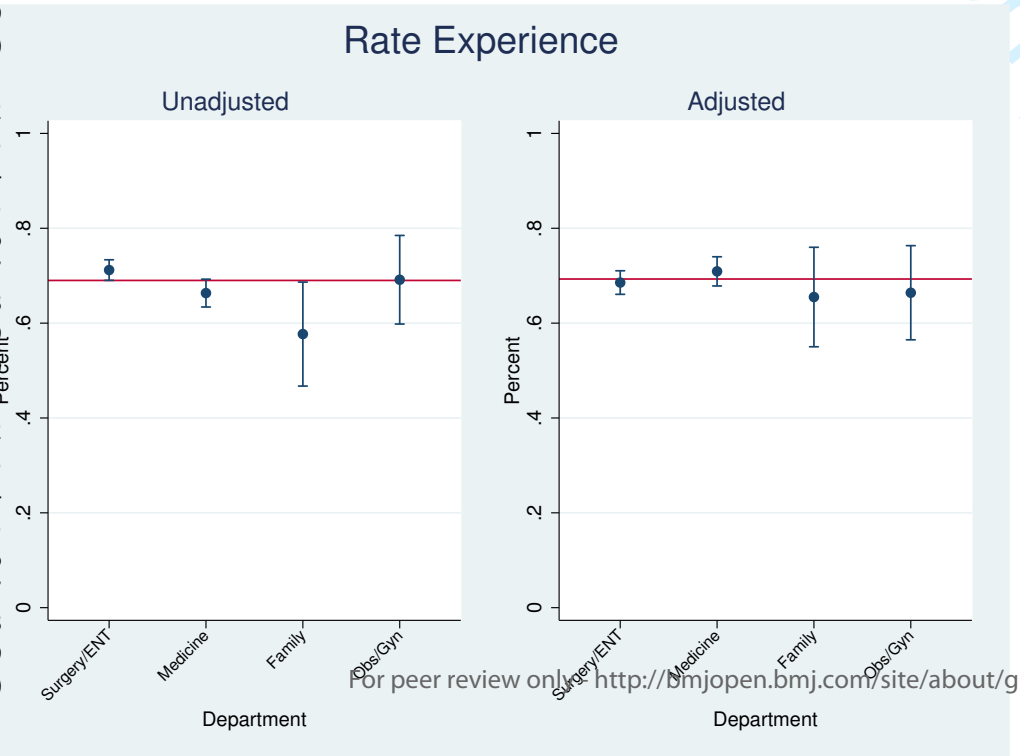
Age Group			0.001
18-34	reference		
35-44	1.47(0.89, 2.44)	0.136	
45-54	2.03(1.30, 3.17)	0.002	
55-64	2.35(1.54, 3.58)	<0.001	
65-79	2.03(1.35, 3.04)	0.001	
>79	1.82(1.19, 2.80)	0.006	
Any psi	0.92(0.69, 1.22)	0.544	0.544
LOS > 3 days	0.96(0.79, 1.16)	0.668	0.668
Income decile[1]	1.06(0.93, 1.21)	0.395	0.395
ICU	1.93(1.17, 3.19)	0.010	0.008
Married/Partner	0.89(0.74, 1.06)	0.200	0.200
Emergency visit within 7 days post d/c	0.76(0.56, 1.04)	0.083	0.084
Discharge			0.016
Home	reference		
Home setting	0.81(0.66, 1.00)	0.052	
Another facility	0.70(0.50, 0.99)	0.046	
Campus[2]		0.008	

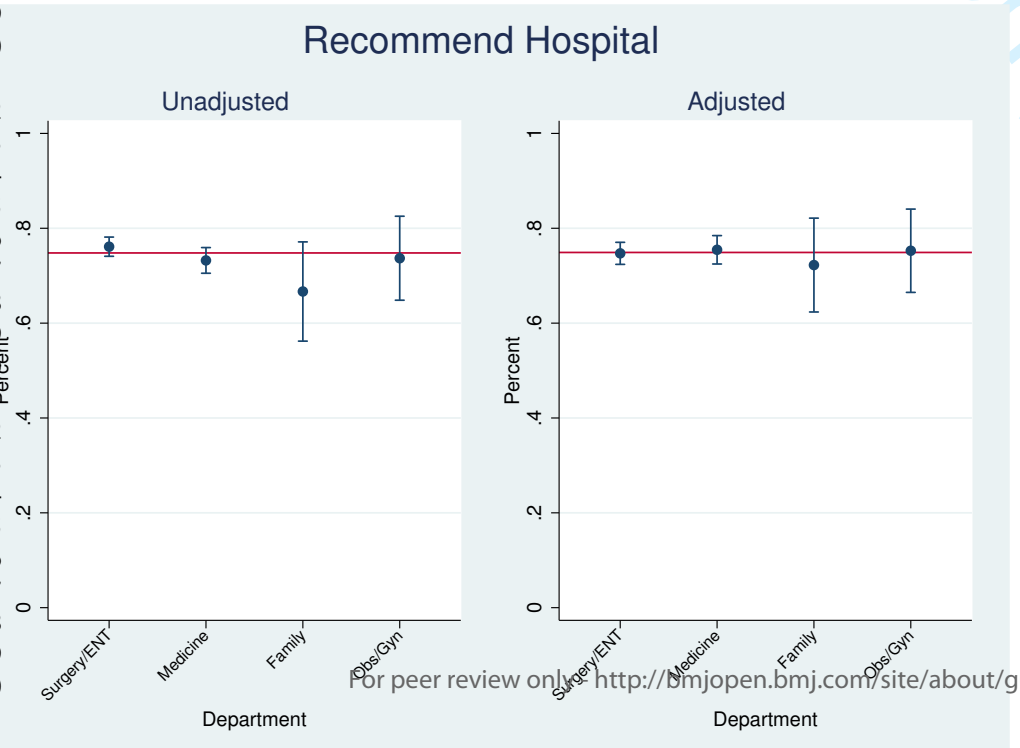
Table 4: Analysis of covariates associated with topbox measure of "Rate this hospital". 1 log transformed. 2 Tested as random effect in mixed effects model.Abbreviations: Elixclass – Elixhauser class, psi – patient safety indicator event, LOS – length of stay, ALC – alternate level of care at discharge, ICU – intensive care unit stay

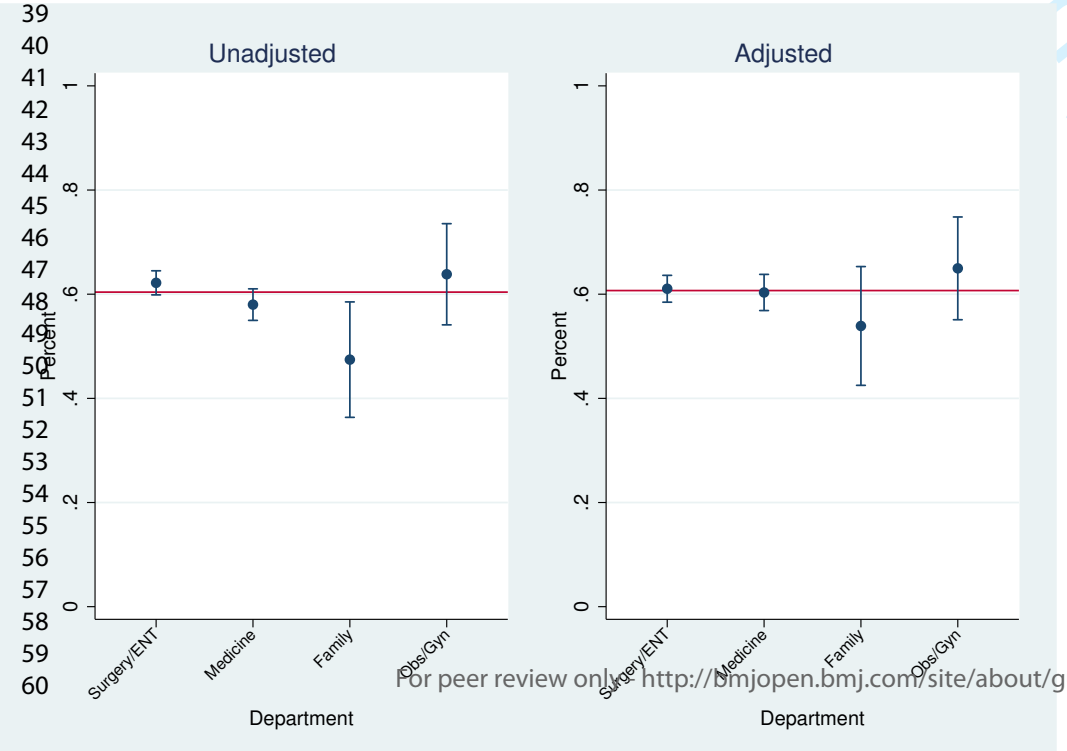
	Multivariable Analysis	*p*	LR test (*p*)
Department			0.167
Surgery/ENT	reference		
Medicine	0.83(0.66, 1.04)	0.113	
Family	0.60(0.36, 1.01)	0.047	
Obs/Gyn	0.85(0.49, 1.47)	0.558	
Physical Health			<0.001
Excellent	reference		
Very Good	0.89(0.58, 1.37)	0.601	
Good	0.59(0.38, 0.90)	0.014	
Fair	0.57(0.36, 0.91)	0.019	
Poor	0.39(0.23, 0.68)	0.001	
Mental Health			<0.001
Excellent	reference		
Very Good	0.70(0.53, 0.94)	0.019	
Good	0.52(0.39, 0.71)	<0.001	
Fair	0.44(0.30, 0.64)	<0.001	
Poor	0.44(0.24, 0.81)	0.008	
Education			0.126
8th Grade	reference		
Some High School	1.03(0.64, 1.63)	0.914	
High School	0.87(0.57, 1.31)	0.500	
College/CEGEP	0.81(0.53, 1.23)	0.319	
Undergraduate	0.63(0.41, 0.98)	0.039	
Post Graduate	0.79(0.51, 1.22)	0.285	
Race			0.505
White	reference		
Black	1.81(0.81, 4.01)	0.146	
Arab	0.83(0.41, 1.69)	0.612	
First Nation	0.94(0.28, 3.12)	0.920	
Oriental	1.17(0.65, 2.12)	0.606	
Indian	1.04(0.55, 2.00)	0.895	
Other	0.61(0.33, 1.14)	0.122	
Admit Urgent	0.86(0.72, 1.03)	0.108	0.109
Sex Male	1.01(0.83, 1.23)	0.906	0.906
Elixclass			0.079
<0	reference		
0	0.70(0.39, 1.28)	0.252	
1 to 5	0.98(0.52, 1.82)	0.938	
6 to 13	0.71(0.37, 1.37)	0.309	
>13	0.81(0.40, 1.62)	0.547	

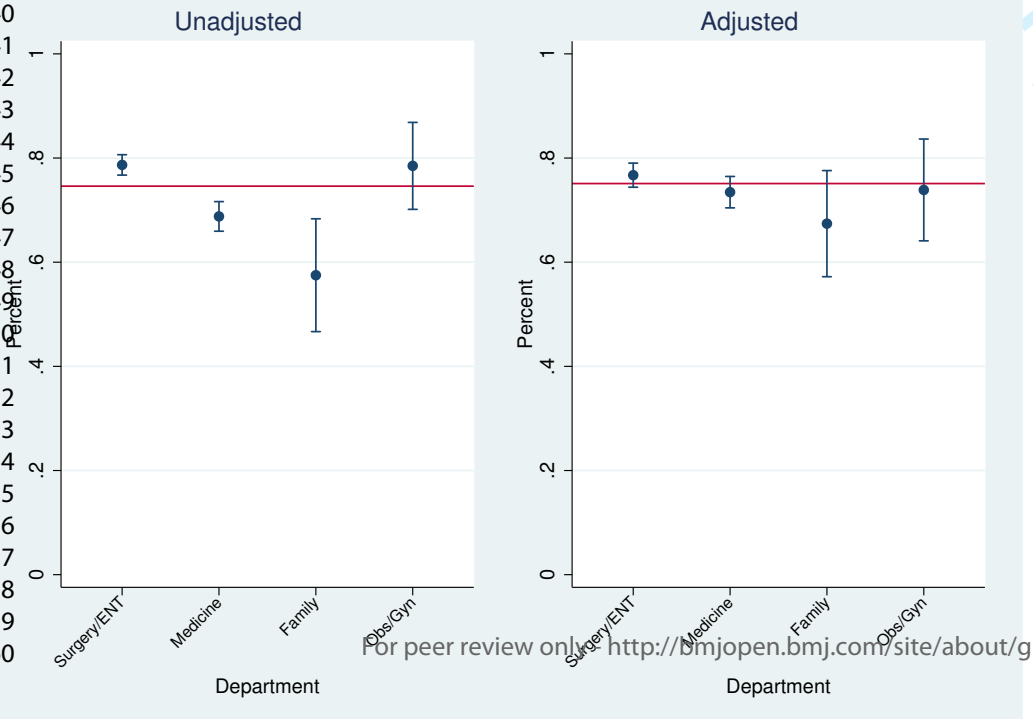
Age Group			0.042
18-34	reference		
35-44	1.10(0.63, 1.91)	0.739	
45-54	1.82(1.10, 3.00)	0.019	
55-64	1.73(1.10, 2.75)	0.018	
65-79	1.56(1.01, 2.42)	0.047	
>79	1.42(0.89, 2.26)	0.254	
Any psi	1.12(0.81, 1.54)	0.492	0.490
LOS > 3 days	0.91(0.73, 1.13)	0.378	0.379
Income decile[1]	1.01(0.87, 1.17)	0.912	0.912
ICU	1.32(0.76, 2.27)	0.325	0.316
Married/Partner	0.92(0.75, 1.13)	0.418	0.417
Emergency visit within 7 days post d/c	0.76(0.54, 1.06)	0.102	0.107
Discharge			0.088
Home	reference		
Home setting	0.84(0.67, 1.05)	0.128	
Another facility	0.68(0.47, 0.99)	0.043	
Campus[2]		0.999	

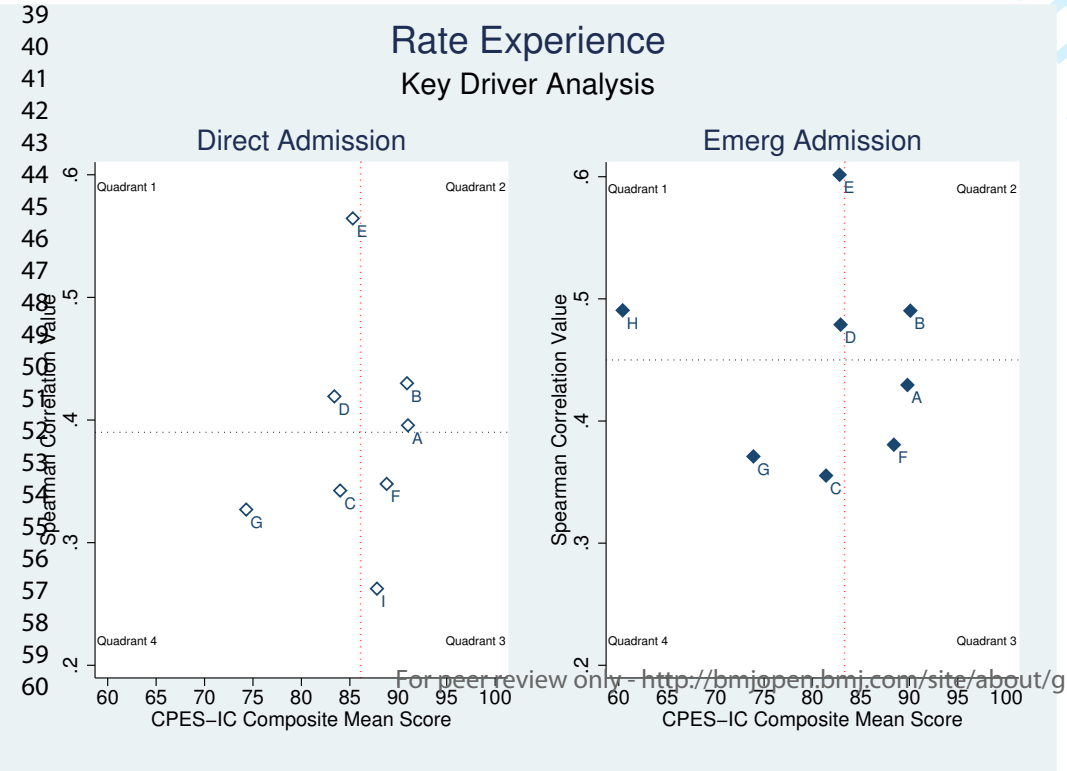
Table 5: Analysis of covariates associated with topbox measure of "Overall helped". 1 log transformed. 2 Tested as random effect in mixed effects model.Abbreviations: Elixclass – Elixhauser class, psi – patient safety indicator event, LOS – length of stay, ALC – alternate level of care at discharge, ICU – intensive care unit stay











Canadian Patient Experiences Survey—Inpatient Care

Survey Instructions

- You should fill out this questionnaire only if you were the patient named on the envelope. You may need to get help from a family member or friend to answer the questions. That's okay.
- Answer all the questions by checking the box to the left of your answer.
- Your response to this survey is voluntary but will provide us with important information.
- You are sometimes told to skip over some questions in this survey. When this happens, you will see an arrow with a note that tells you what question to answer next, like this:

☐ Yes

☑ No ➔ **If No, go to Question 1**

Placeholder for jurisdiction comments.

Please answer the questions about your recent stay at the hospital named on the cover letter. Do not include any other hospital stays in your answers.

YOUR CARE FROM NURSES

1. During this hospital stay, how often did nurses treat you with courtesy and respect?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

2. During this hospital stay, how often did nurses listen carefully to you?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

3. During this hospital stay, how often did nurses explain things in a way you could understand?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

4. During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it?

☐ Never
☐ Sometimes
☐ Usually
☐ Always
☐ I never pressed the call button

YOUR CARE FROM DOCTORS

5. During this hospital stay, how often did doctors treat you with courtesy and respect?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

6. During this hospital stay, how often did doctors listen carefully to you?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

7. During this hospital stay, how often did doctors explain things in a way you could understand?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

THE HOSPITAL ENVIRONMENT

8. During this hospital stay, how often were your room and bathroom kept clean?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

9. During this hospital stay, how often was the area around your room quiet at night?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

YOUR EXPERIENCES IN THIS HOSPITAL

10. During this hospital stay, did you need help from nurses or other hospital staff in getting to the bathroom or in using a bedpan?

- ☐ Yes
- ☐ No ➔ **If No, go to Question 12**

11. How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

12. During this hospital stay, did you need medicine for pain?

- ☐ Yes
- ☐ No ➔ **If No, go to Question 15**

13. During this hospital stay, how often was your pain well controlled?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

14. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

15. During this hospital stay, were you given any medicine that you had not taken before?

☐ Yes
☐ No ➔ **If No, go to Question 18**

16. Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

17. Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

WHEN YOU LEFT THE HOSPITAL

18. After you left the hospital, did you go directly to your own home, to someone else's home or to another health facility?

☐ Own home
☐ Someone else's home
☐ Another health facility ➔ **If Another health facility, go to Question 21**

19. During this hospital stay, did doctors, nurses or other hospital staff talk with you about whether you would have the help you needed when you left the hospital?

☐ Yes
☐ No

20. During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?

☐ Yes
☐ No

OVERALL RATING OF HOSPITAL

Please answer the following questions about your stay at the hospital named on the cover letter. Do not include any other hospital stays in your answers.

21. Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?

☐ 0 Worst hospital possible
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10 Best hospital possible

22. Would you recommend this hospital to your friends and family?

☐ Definitely no
☐ Probably no
☐ Probably yes
☐ Definitely yes

In this next section, we ask several more questions about your stay at the hospital.

YOUR ARRIVAL AT THE HOSPITAL

23. When you arrived at the hospital, did you go to the emergency department?

☐ Yes ➔ **If Yes, go to Question 26**
☐ No ➔ **If No, please continue below**

24. Before coming to the hospital, did you have enough information about what was going to happen during the admission process?

☐ Not at all
☐ Partly
☐ Quite a bit
☐ Completely

25. Was your admission into the hospital organized?

☐ Not at all
☐ Partly
☐ Quite a bit
☐ Completely

Go to Question 30

Answer questions 26 to 29 only if you were admitted through the emergency department.

26. When you were in the emergency department, did you get enough information about your condition and treatment?

☐ Not at all
☐ Partly
☐ Quite a bit
☐ Completely

27. Were you given enough information about what was going to happen during your admission to the hospital?

☐ Not at all
☐ Partly
☐ Quite a bit
☐ Completely

28. After you knew that you needed to be admitted to a hospital bed, did you have to wait too long before getting there?

☐ Yes
☐ No

29. Was your transfer from the emergency department into a hospital bed organized?

☐ Not at all
☐ Partly
☐ Quite a bit
☐ Completely

Continue with Question 30

DURING YOUR HOSPITAL STAY

30. Do you feel that there was good communication about your care between doctors, nurses and other hospital staff?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

31. How often did doctors, nurses and other hospital staff seem informed and up-to-date about your hospital care?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

32. How often were tests and procedures done when you were told they would be done?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always
- ☐ I did not have any tests or procedures

33. During this hospital stay, did you get all the information you needed about your condition and treatment?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

34. Did you get the support you needed to help you with any anxieties, fears or worries you had during this hospital stay?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always
- ☐ Not applicable

35. Were you involved as much as you wanted to be in decisions about your care and treatment?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

36. Were your family or friends involved as much as you wanted in decisions about your care and treatment?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always
- ☐ I did not want them to be involved
- ☐ I did not have family or friends to be involved

LEAVING THE HOSPITAL

37. Before you left the hospital, did you have a clear understanding about all of your prescribed medications, including those you were taking before your hospital stay?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely
- ☐ Not applicable

38. Did you receive enough information from hospital staff about what to do if you were worried about your condition or treatment after you left the hospital?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely

39. When you left the hospital, did you have a better understanding of your condition than when you entered?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely

YOUR OVERALL RATINGS

40. Overall, do you feel you were helped by your hospital stay? Please answer on a scale where 0 is "not helped at all" and 10 is "helped completely."

Overall . . . (Please circle a number)

Not helped at all — Helped completely

0 1 2 3 4 5 6 7 8 9 10

41. Overall . . . (Please circle a number)

I had a very poor experience — I had a very good experience

0 1 2 3 4 5 6 7 8 9 10

ABOUT YOU

42. In general, how would you rate your overall physical health?

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

43. In general, how would you rate your overall mental or emotional health?

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

44. What is the highest grade or level of school that you have completed?

- ☐ 8th grade or less
- ☐ Some high school, but did not graduate
- ☐ High school or high school equivalency certificate
- ☐ College, CEGEP or other non-university certificate or diploma
- ☐ Undergraduate degree or some university
- ☐ Post-graduate degree or professional designation

45. What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other

46. What is your year of birth?

(Please write in; for example, "1934.")

_____

47. Was your most recent stay at this hospital for a childbirth experience?

☐ Yes
☐ No

48. The following question will help us to better understand the communities that we serve. Do you consider yourself to be . . .

(Check all that apply)

☐ White
☐ Chinese
☐ First Nation, Métis, Inuk or mixed (others may say Aboriginal or Indigenous)
☐ South Asian (East Indian, Pakistani, Sri Lankan, etc.)
☐ Black
☐ Filipino
☐ Latin American
☐ Southeast Asian (Vietnamese, Cambodian, Malaysian, Laotian, etc.)
☐ Arab
☐ West Asian (Iranian, Afghan, etc.)
☐ Korean
☐ Japanese
☐ Other

49. Is there anything else you would like to share about your hospital stay?

Questions 1 to 22 and 43 are adapted from the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) questionnaire.

Questions 23 to 49 (excluding question 43) were adapted and/or developed by the Canadian Institute for Health Information in consultation with an interjurisdictional committee of experts.

Reporting Checklist for Submitted Manuscript: Impact of patient characteristics on the Canadian Patient Experiences Survey – Inpatient Care survey- analysis from an academic tertiary care centre
Rubens FD et al.
BMJ Open 2018

Based upon: Proposed Reporting Guidelines: Burns KE et al 2008. A guide for the design and conduct of self-administered surveys for clinicians. CMAJ 179;245-252

Paper Section	Question	Identified in Text
Abstract	Is the objective clearly stated?	Page 2
	Is the design of the study stated?	Page 2
	Is the study setting well-described?	Page 2
	Is the survey population described?	Page 2
	Is the response rate reported?	No – not available
	Are the outcome measures identified?	Page 2
	Are the main results clearly reported?	Page 2
	Are the conclusions appropriate?	Page 2
Introduction	Is the problem clearly stated?	Pages 5-7
	Is the pertinent literature cited and critically appraised?	Pages 5-7
	Is the relevance of the research question explained?	Pages 5-7
	Is the objective clearly stated?	Pages 7-8
Methods	Is the study design appropriate to the objective?	Pages 8-9
	Is the setting clearly described?	Page 8
	Are the methods described clearly enough to permit other researchers to duplicate the study?	Pages 8-10
	Is the survey sample likely to be representative of the population?	Page 8
	Is the questionnaire described adequately?	Appendix
	Have the validity and reliability of the questionnaire been established?	Not applicable – survey developed elsewhere and validated by CIHI
	Was the questionnaire administered in a satisfactory way?	Page 8
	Are the statistical methods used appropriately?	Pages 9-10
Results	Do the results address the objective?	Pages 10-12
	Are all the respondents accounted for?	Pages 10-12
	Are the results clearly and logically	Pages 10-12,

	presented?	Figures 1-5, Tables
	Are the tables and figures appropriate?	Figures 1-5, Tables
	Are the numbers consistent in the text and the tables?	Pages 10-12
Discussion	Are the results succinctly summarized?	Page 12
	Are the implications of the results stated?	Pages 14-15
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	Are the limitations of the study and its results explained?	Pages 15-16
	Are appropriate conclusions drawn?	Page 16

BMJ Open

Impact of patient characteristics on the Canadian Patient Experiences Survey – Inpatient Care survey- analysis from an academic tertiary care centre

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2018-021575.R1
Article Type:	Research
Date Submitted by the Author:	03-May-2018
Complete List of Authors:	Rubens, F; University of Ottawa Heart Institute, Surgery Rothwell, Diana; Ottawa Hospital Research Institute Al Zayadi, Amal; Ottawa Hospital Research Institute Sundaresan, Sudhir; The Ottawa Hospital Ramsay, Tim; The Ottawa Health Research Institute, Forster, Alan; Ottawa Hospital Research Institute
Primary Subject Heading:	Patient-centred medicine
Secondary Subject Heading:	Communication, Health policy, Patient-centred medicine
Keywords:	HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Patient Experience, Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Patient experience

Impact of patient characteristics on the Canadian Patient Experiences Survey – Inpatient Care survey- analysis from an academic tertiary care centre

Rubens FD[1], Rothwell DM[2], Al Zayadi A[2], Sundaresan S[1], Ramsay T[2], Forster A[2,3]

1- Department of Surgery, University of Ottawa

2- Clinical Epidemiology, Ottawa Hospital Research Institute

3- Department of Medicine, University of Ottawa

Corresponding author:

Fraser Rubens MD MSc FACS FRCSC

Professor of Surgery

Division of Cardiac Surgery

University of Ottawa Heart Institute

40 Ruskin St.

Ottawa, Ontario

Canada

K1Y 4W7

Fax: 613 696 7303

frubens@ottawaheart.ca

Total word count (including references, tables, legends, limitations and strengths): 6522

Abstract word count: 246

Running title: Patient experience covariates

Abstract:
Objective: To determine the role of patient demographics, care domains and self-perceived health status in the analysis and interpretation of global results from the Canadian Patient Experience Survey-Inpatient Care (CPES-IC).

Design: Cross-sectional survey

Setting: Single large Canadian two campus tertiary care academic centre

Participants: Random sampling of hospital patients post-discharge

Intervention and Main Outcome Measures: Logistic regression models were developed to analyze topbox scoring on four questions of global care (rate experience, recommend hospital, rate hospital, overall helped). Means of each composite domain were correlated to the four overall scores at the patient level to determine Spearman's rank correlation coefficients which were plotted against the overall (hospital) domain score for the key driver analysis.

Results: Topbox scoring was decreased with worse degrees of perceived physical and mental health in all four global questions ($p<0.05$). Female gender and higher levels of education were associated with worse scoring on rate experience, recommend hospital and rate hospital ($p<0.05$). Whereas there was a significant difference between hospital departments in unadjusted measures, these differences were no longer evident after adjustment with patient covariates. Key driver analysis identified person-centred care, care transition and the domain related to emergency admission as areas of highest potential for improvement.

Conclusions: Global measures of overall care are influenced by patient-perceived physical and mental health. Caution should be exercised in using patient-satisfaction surveys to compare performance between different health-care provision entities, as

apparent differences could be explained by variation in patient mix rather than variation in performance.

Strengths and Limitations of Study:

1) This study involves the novel linkage of a clinical database to individual survey results to allow the accurate analysis of the role of patient characteristics and demographics on survey response.
2) The study provides a validated process by which covariates could be used to adjust patient experience survey outcomes to facilitate inter-unit and inter-institution comparisons.
3) The analysis has been completed on data from a single institution and thus the generalizability is not known.
4) This study is limited by survey non-responders as well as the random nature of survey participants amongst the total discharge population from the hospital.

Introduction

Patient experience is now recognized as a critical component of modern health care delivery[1]. Aside from the clear rationale to routinely provide compassionate care, there exists a strong ethical basis for physicians to support excellence in this area as it is of vital interest to patients and governments as a foundation of patient-centred medicine [2]. There is also supportive evidence that improved patient experience may positively impact outcomes[1 3] particularly through better compliance to evidence-based guidelines, such as in areas of chronic disease management[4].

There are many different processes by which inpatient patient experience has been measured internationally[5-8]. In the United States, it is measured using the Hospital Consumer Assessment of Health-Care Provider Systems (HCAHPS) survey[9]. Hospital funding from Medicare is partially dependent on the results from this survey and thus health care organizations are deeply committed to improving results. A modification of the HCAHPS survey (Canadian Patient Experience Survey – Inpatient Care, CPES-IC) was developed through collaboration between the Canadian Institute for Health information (CIHI), Accreditation Canada, the Canadian Patient Safety Institute, the Change Foundation and the Inter-Jurisdictional Patient Experience Group and this survey is now routinely administered in four provinces in Canada[10].

Though the HCAHPS and the CPES-IC are very similar, there are subtle differences that reflect the unique nature of the single-payer system in Canada. The CPES-IC survey includes 22 questions taken directly from the HCAHPS, but it also includes other questions that “address key areas relevant to the Canadian context”. All of the questions

can be classified in three specific groups. In the first group, the questions can be clustered as they reflect care in particular domains such as doctor communication skills (3 questions) and nursing communication skills (4 questions) amongst others. The Canadian survey also comprises several questions that constitute new domains not addressed in the HCAHPS survey such as admission experience (7 questions), person-centred care (7 questions), discharge and transition (3 questions). Further details regarding differences between the Canadian and American surveys are available on the CIHI web-site (https://www.cihi.ca/en/patient-experience).

The composite questions for each domain can be averaged to provide a mean value which is currently reported at the hospital level for the HCAHPS survey[11]. In the second group there are four questions that reflect overall or global care that are of particular importance at the institutional level to assess the quality of patient experience. One of these questions is also used as a corporate measure of key interest ("Rate your experience?") and it is most commonly used to rank hospitals nationally after adjustment for regional differences[3]. Results from the three other questions related to overall care include; "Would you recommend this hospital to your friends and family?" (recommend hospital) and "Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?" (rate hospital) and "Overall, do you feel you were helped by your hospital stay?) (overall helped). Success in these and other questions are measured by the percent of "topbox" designation by the patients in which they have ranked a 4 on the recommend hospital question (on a scale of 1 to 4) or 9 or 10 out of an ordinal scale of 10 for the remaining

three questions. The "topbox" metric has been validated and accepted as a marker of excellence in patient experience measurement.[12]

The final group of questions found in both surveys consists of inquiries regarding patient-perceived health status as well as demographic topics such as race and education. These questions are referred to a Patient Mix Adjusters (PMA) and they are used in the HCAHPS survey in order to provide risk adjustment, particularly when comparing between geographic regions. The PMA questions for the HCAHPS are re-assessed quarterly by the Centre for Medicare and Medicaid (CMS) after reviewing national results.

There is limited familiarity in the assessment of patient experience in Canada and the use of such surveys. Although it has been demonstrated that patient sociodemographic factors such as age, ethnicity, sex and socioeconomic class have been shown to influence patient experience responses[13], there is also no understanding of the validity of the PMA questions in adjusting the results of the CPES-IC survey and how they may contribute to credibly compare units or departments within a hospital. In summary, it is not clear how patient factors such as self-described characteristics including perception of mental and physical health, patient demographics and co-morbidities impact the results of the Canadian survey on in-hospital patient experience.

The overall objective of this research was to understand the role of the self-described patient characteristics obtained from the survey with covariates obtained from a hospital database, in the development of a statistical model to predict topbox scoring in the four survey questions related to overall care; a) rate your experience b) recommend hospital c)

rate hospital d) overall helped. We also sought to assess how the PMA questions and other data from the hospital database influence patient experience at the hospital and departmental level and to determine how the composite domain measurements influence the four adjusted global measurements.

Methods

This analysis was conducted as a Quality Assurance project. The protocol was reviewed by the Ottawa Health Science Network – Research Ethics Board and individual patient consent was waived. Data was collected from April 1, 2016 to Nov 30, 2016 from the CPES-IC Survey (see appendix 1) administered by National Research Corporation (Markham, Ontario). Surveys were distributed in both official languages.

The data was merged with administrative data collected from The Ottawa Hospital Data Warehouse (TOHDW) which is a relational database that contains administrative and clinical data for all patients seen at The Ottawa Hospital. Deciles of income class were derived using the Postal Code Conversion File Version 6.6 based on data from August 2015 (Statistics Canada). The Elixhauser score was derived using a modification of the Elixhauser comorbidity measure after applying the latter to the hospital data [14]. The occurrence of a patient safety indicator (psi) event (i.e. an in-hospital adverse event) was determined using ICD-10 coding from administrative data [15]. Discharge disposition was divided into three categories: 1) discharged to the patient's home without support services 2) discharged home or to a home-setting with support services (e.g. senior's lodge, attendant care, home care, meals on wheels etc.) 3) discharged to another health care

facility (e.g. continuing care, acute care inpatient) or other (palliative care/hospice, addiction treatment etc.).

The Ottawa Hospital is a large academic tertiary care teaching centre with two inpatient campuses. There are 7 admitting departments (Surgery, Medicine, Obstetrics-Gynecology, ENT, Family Medicine, Ophthalmology and Psychiatry). A different survey was used in Psychiatry and maternity thus these patients were excluded. Ophthalmology and rehabilitation medicine were excluded as they are primarily outpatient services and accounting for less than 1% of admissions. Data from otolaryngology (ENT) was merged with Surgery due to the combined collaborative quality process. Data from one surgical and one medical division was not available due to inability to merge to administrative data.

A key driver analysis was performed to determine which of the composite measures [communication with doctors (questions 5-7), communication with nurses (questions 1-3), responsiveness of staff (questions 4, 11), communication of medications (questions 16, 17), transition of care (37-39), person-centred care (30-36), direct admission (questions 24, 25) and emergency admission (26-29)] were important drivers of the most important global question "Overall Experience". For each composite measure, the mean was calculated for each patient as long as more than 50% of the questions in the domain were reported[16] . Spearman's rank correlation coefficients were determined for the continuous value of each domain and the ordinal global question score and this was plotted against the overall (hospital) domain score for the key driver analysis[17]. A vertical line was drawn at the median value of the domain scores. Points identified in quadrant 1

represent domains with increased potential for improvement due to high correlation with a global score and lower mean value.

Statistical Analyses:

Patient characteristics across department groups were compared using a chi square test. Distribution normality of covariates was tested using the Shapiro-Wilk test.

For categorical variables with equal variances, oneway analysis of variance was used to compare departments, whereas Kruskal-Wallis equality of populations rank test was used for categorical groups with unequal variances.

After dichotomizing each of the four overall care questions [(a) rate experience b) recommend hospital c) rate hospital d) overall helped] based on topbox response (9 or 10) or no topbox (<9), we fit a separate logistic regression model for each question to model the odds of topbox response as a function of the covariates. The association of each covariate was assessed using likelihood ratio chi square testing. Bonferroni correction was used for multiple pairwise comparisons. A p value of < 0.05 was considered significant. Analyses were completed using STATA™ vers. 14.2 (College Station, Tx).

Results

Patient Characteristics

The survey was sent to 6735 patients, and 2896 patients responded (43%) representing hospital admissions under the care of 295 physicians (146 medicine, 110 surgery/ENT, 22 family, 17 obstetrics/gynecology). The institution consists of 918 inhospital beds geographically situated at 2 campuses. Characteristics of the patients from the total group and from each department are presented in Table 1. There were significant differences

between the department groups in terms of physical and mental health, Elixhauser score, admission status, length of stay, age, discharge disposition, marital status and sex.

Topbox Analysis – Overall Measures

The results of the multivariable analyses in the derivation of the model for the overall measures (rate experience, recommend hospital, rate hospital and overall helped) are presented in Tables 2-5. Worse degrees of perceived physical and mental health were associated with lower odds of topbox scoring in all four of the questions. There was a significant relationship with age group in three of four questions with lowest odds ratios in patients between the ages of 18-34 years, rising in mid-age ranges and falling again in the elderly. On pairwise comparison the predicted scores in the youngest group were significantly lower than those in the age groups of 55-64 years and 65-79 years ($p<0.05$). Increased level of education and female sex were associated with worse scoring in rate experience, recommend hospital and rate hospital questions. Covariates from the institutional database that were significant contributors to the models included discharge disposition (recommend and rate hospital), marital status (recommend hospital) and urgent/emergent admission (rate experience). Campus site was found to be a factor as a random effect in rate hospital ($p<0.05$).

Adjusted and unadjusted department-based predicted measures for rate experience, recommend hospital, rate hospital and overall helped are presented in Figures 1 - 4. Unadjusted pairwise comparison of rate experience demonstrated a greater likelihood of topbox scoring with surgery as compared to medicine however this was not statistically significant ($p=0.054$). This difference was not seen after adjustment ($p=0.911$). Unadjusted pairwise comparison of the question rate hospital demonstrated a significant

increase in surgery as compared to family medicine, however this difference was not present in the adjusted model. Unadjusted analysis of the overall helped question demonstrated greater likelihood of topbox scoring in surgery as compared to medicine and family medicine, as well as obstetrics gynecology as compared to family medicine ($p<0.05$) however these comparisons were no longer significant after adjustment for the covariates in the model.

Key Driver Analysis

Key driver analysis of the global question of rate experience is presented in figure 5. Common domains present in quadrant 1 in all four questions include person-centred care, care transition and the domain related to emergency admission processes. Similar patterns were seen with the other three global questions (results not shown).

Discussion

Results from the CPES-IC survey administered to patients discharged from a large Canadian multi-campus health institution were analyzed after merging with a comprehensive administrative database. Two patient-answered demographic questions collected from the survey (patient-perceived overall physical and mental health) were significant covariates predicting topbox recognition in all four of the overall care questions. Increasing level of education and female sex were associated with decreased topbox scoring in rate experience, recommend hospital and rate hospital. Age category was associated with patient experience with the highest topbox scoring in the mid-age ranges, falling off in younger patients and in octagenarians. The only significant contributors to the models from the hospital database included marital status (recommend

hospital), campus (rate experience and rate hospital), discharge necessitating significant assistance at home or at another institution (recommend and rate hospital) and urgent/emergent admission (rate experience). Economic status, in-hospital adverse events and Elixhauser co-morbidity score did not significantly contribute to the models for the four questions related to overall care. After adjustment, there was no significant difference in the predicted measures between the four major departments in any of the four questions that related to the overall patient experience. Finally, key driver analysis using these models, confirmed that the greatest yield for interventions at the hospital level include efforts to improve person-centred care, care transition and the experience for those being admitted through the emergency department.

Patient experience has become a focus of the health care evolution and it has been recognized as a key interest to consumers and patient advocacy groups. The Institute of Healthcare Improvement (IHI) a leader in the transformation of the health care system, has advocated the goal of improving the experience of care within its triple aim of quality [18]. The Affordable Care Act in collaboration with the Centers for Medicare and Medicaid Services (CMS) [12] has emphasized the need to deliver care that provides a quality patient experience. The act has integrated patient experience scores as well as reporting mandates into hospital reimbursement strategies, which further incentivize excellence. Patient experience scores are reported nationally in the US[19] and they may be a source of pride and engagement for health care teams and utilized to compete for patients.

The environment is different in Canada as there is currently no financial benefit and competition between institutions is not a driver for patient services. On the other hand, federal and provincial government health organizations have embraced patient experience

as a priority for health care and they have initiated legislation to support its significance in quality delivery. Future public reporting of CPES-IC results and national benchmarking will motivate quality improvement in this area and patient experience surveying is currently mandatory for hospital accreditation. In Ontario, the Excellent Care for All Act (2010) established that hospitals must develop sustained processes to address and improve the patient experience[20]. Our own Institution has raised the profile of patient experience to the level of a corporate target by integrating it as a foundation of the vision of the hospital with a priority equal to other quality outcomes and efficiency. In order to strategize to bring about improvements in patient experience, it is essential to understand how the current American-based survey applies to Canadian culture and our single-payer system. Specifically it is crucial to appreciate how to adjust for patient demographics within different settings, not just to externally compare with other urban institutions, but also to begin to internally identify factors that may influence overall scoring and interpretation.

The current study is not the first to examine the role of patient and other covariates in the modeling of measures of overall patient experience in Canada[21]. However in the latter work, the analysis involved the HCAHPS survey focusing on the single question of rate experience. The authors did demonstrate a similar relationship with higher level of education, urgent admission status and longer length of stay as predictive of poorer measures of experience rating however they did not include patient-perceived physical and mental health status, both of which were the most consistent and significant predictors of overall care.

It may not be feasible to generalize from the analysis at a single hospital due to the differing contributions of the patient covariates and interactions with the specific domains of patient care at each hospital across the country[22]. For example, race was not found to be a significant factor for most questions unlike in the United States[22]. This finding may only be relevant in the context of our centre (a medium-sized Canadian city), whereas it may not apply to larger metropolitan centers such as Toronto and Montreal, where there may be greater ethnic diversity. On the other hand, the finding that women are less likely to provide a topbox scoring on questions of overall experience is in keeping with previous findings with the HCAHPS survey[23].

Patient experience key driver analysis has been utilized to focus attention and initiatives in patient-care areas with high potential to impact on the overall global measures of care. The new CPES-IC survey has been designed to not only include domains currently in the HCAHPS survey, but also domains reflecting patient-centred care, transition of care and the processes of direct or emergency admission. Although these new domains have not been formally validated in the Canadian context, they were all identified as areas of potential high yield in our study in terms of overall contribution to the patient experience. Many of these questions refer to key issues of team communication and the perception of coordination of care; items that could be addressed through team re-structuring, checklists and scheduling. On the other hand, nursing and doctor communication skills, though important, did not support targets of high yield in terms of hospital resources.

There are multiple important implications of this work. The analysis highlights the differences in adjusted and unadjusted rankings between departments, which emphasize the importance of the use of the demographic and other covariates obtained from the

survey such as perception of physical and mental health and education level. The adjusted improved measures in Medicine and Family Medicine underscore that chronic disease and comorbidity must be taken into account in patient experience initiatives. Recognition of adjusted results also enhances engagement of staff who face the challenges of chronic disease care and provides the opportunity to follow for improvements.

The analysis may be limited by unknown and unmeasured covariates. Only a few of the covariates from the administrative database were significant in models describing perceptions of excellence in individual questions of overall care (length of stay, ICU stay, marital status). Further work will be necessary to determine if these administrative database variables are important at model development at the unit or provider level. Although there was no difference between departments in any of the questions, more subtle comparisons such as between divisions and services may be important in understanding how to advance patient experience initiatives. There is some evidence that non-responders to the survey may have different demographic profiles as compared to responders, affecting generalization of the results[24]. Finally, patient care domains were not included as covariates in the derivation of the multivariable models for the global overall questions. We elected not to do this as we felt the domains as covariates would demonstrate significant bias due to their correlation not only to the outcomes but also to many of the other predictors. Therefore, we elected rather to look at their interactions and correlations using key driver analysis.

In summary, this analysis provides a perspective on drivers that must be considered when assessing patients' perceptions on the overall care at a health care institution in Canada.

This understanding will form the basis for a strategy of thoughtful data-driven targeted interventions to improve the patient experience.

Figure Legends:

Figure 1: Unadjusted and adjusted predicted percent topbox of corporate indicator "Rate your experience" by hospital department. Error bars represent 95% CI. Difference between Surgery/ENT and Medicine significant (p=0.05) in Unadjusted, however no differences between departments in Adjusted

Figure 2: Unadjusted and adjusted predicted percent topbox of corporate indicator "Recommend this hospital" by hospital department. Error bars represent 95% CI. No statistically significant difference between groups.

Figure 3: Unadjusted and adjusted predicted percent topbox of corporate indicator "Rate this hospital" by hospital department. Error bars represent 95% CI. Differences between Surgery/ENT and Family Medicine significant ($p<0.05$) in the unadjusted model but not in the adjusted model.

Figure 4: Unadjusted and adjusted predicted percent topbox of corporate indicator "Overall helped" by hospital department. Error bars represent 95% CI. In the unadjusted model, greater predicted measures were seen with surgery as compared to medicine and family medicine, and with obstetrics/gynecology as compared with family medicine ($p<0.05$). The differences were no longer significant in the adjusted model.

Figure 5: Key driver analysis: relationship domain composite measures to the global measure of Overall Experience, direct admission (left) and emergency admission(right). Horizontal black dotted line – mean for all correlation values. Vertical red dotted line – median for all composites. A- Communication doctors, B- Communication nurses, C-Responsiveness staff, D-Care transition, E-Person-centred care, F-Pain management, G-

Communication medications, H – Admission processes emergency, I – Admission processes elective

Contributorship Statement: We certify that all of the authors have fulfilled the following four criteria to justify authorship:

• Substantial contributions to the conception or design of the work (F.D.R, S.S., A.F.); or the acquisition, analysis, or interpretation of data for the work (D.R., A.A.Z., T.R.); AND

• Drafting the work or revising it critically for important intellectual content (F.D.R., D.R., S.S., T.R., A.F.); AND

• Final approval of the version to be published (F.D.R., D.R., A.A.Z., S.S., T. R., A. F.; AND

• Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. (F. D. R., D. R., A. A. Z., S. S. , T. R. , A. F.

Competing Interests: lAl authors have completed the ICMJE uniform disclosure form at *www.icmje.org/coi_disclosure.pdf* and declare: no support from any organisation for the submitted work; no financial relationships with any organisations that might have an interest in the submitted work in the previous three years; no other relationships or activities that could appear to have influenced the submitted work.

Funding: None

Data Sharing: There is no additional unpublished data from the study. The study data is partially de-anonymized and therefore it is kept on a secure server at the Ottawa Hospital.

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	Total (n=2896)	Surgery (n=1699)	Medicine (n=1023)	Family Medicine (n=79)	Obs/Gyn (n=95)	*p*
Physical health, n(%)						<0.001
Excellent	270 (9.3)	210 (12.4)	45 (4.4)	4 (5.1)	11 (11.5)	
Very Good	803 (27.7)	583 (34.3)	166 (16.2)	8 (10.1)	46 (48.4)	
Good	999 (34.5)	612 (36.0)	328 (32.1)	37 (46.8)	22 (23.2)	
Fair	605 (20.9)	243 (14.3)	329 (32.2)	19 (24.1)	14 (14.7)	
Poor	219 (7.6)	51 (3)	155 (15.2)	11 (13.9)	2 (2.1)	
Mental health, n(%)						<0.001
Excellent	697 (24.1)	484 (28.5)	180 (17.5)	10 (12.8)	23 (29.2)	
Very Good	1026 (35.4)	636 (37.5)	323 (31.5)	25 (32.1)	42 (44.2)	
Good	776 (26.8)	411 (24.2)	321 (31.3)	24 (30.8)	20 (21.1)	
Fair	325 (11.2)	141 (8.3)	160 (15.6)	15 (19.2)	9 (9.5)	
Poor	74 (2.6)	26 (1.5)	43 (4.2)	4 (5.1)	1 (1.1)	
Education, n(%)						0.29
8th Grade	180 (6.4)	92 (5.6)	78 (7.8)	8 (10.4)	2 (2.2)	
College/CEGEP	664 (23.5)	417 (25.2)	214 (21.4)	12 (15.6)	21 (22.8)	
Some High School	309 (11.0)	178 (10.8)	109 (10.9)	12 (15.6)	10 (10.9)	
High School	674 (23.9)	370 (22.4)	270 (27.0)	18 (23.4)	16 (17.4)	
Undergraduate	452 (16.0)	265 (11.0)	156 (15.6)	15 (19.5)	16 (17.4)	
Post Graduate	542 (19.2)	331 (20.0)	172 (17.2)	12 (15.6)	27 (29.4)	
Race, n(%)						0.22
White	2555 (89.7)	1518 (90.7)	896 (89.2)	62 (79.5)	79 (84.0)	
Black	53 (1.9)	26 (1.6)	26 (2.6)	1 (1.3)	0	
Arab	43 (1.5)	25 (1.5)	13 (1.3)	2 (2.6)	3 (3.2)	
First Nation	20 (0.7)	13 (0.8)	5 (0.5)	1 (1.3)	1 (1.1)	
Oriental	69 (2.4)	36 (2.2)	30 (3.0)	3 (3.9)	0	
Indian	54 (1.9)	24 (1.4)	22 (22.2)	4 (5.1)	4 (4.3)	
Other	55 (1.9)	31 (1.9)	12 (1.2)	5 (6.4)	7 (7.5)	
Elixscore, median(IQR)	0(0,4)	0(0,4)	4(0,9)	0(0,5)	0(0,4)	<0.001
Admit, n(%)						<0.001
Elective	1037 (35.2)	896 (52.1)	79 (7.5)	0	62 (65.3)	
Emergent	1911 (64.8)	824 (47.9)	973 (92.5)	81 (100)	33 (34.7)	
Age group, n(%)						<0.001
18-34	134 (4.6)	90 (5.2)	39 (3.7)	2 (2.5)	3 (3.2)	
35-44	152 (5.2)	89 (5.2)	46 (4.4)	3 (3.7)	14 (14.7)	
45-54	313 (10.6)	219 (12.7)	80 (7.6)	0	14 (14.7)	
55-64	622 (21.1)	383 (22.3)	202 (19.2)	10 (12.4)	27 (28.4)	
65-79	1136 (38.6)	687 (39.9)	394 (37.5)	25 (30.9)	30 (31.6)	
>79	590 (20.0)	252 (14.7)	290 (27.6)	41 (50.6)	7 (7.4)	

Any psi, n(%)	321 (10.9)	205 (11.9)	96 (9.1)	10 (12.4)	10 (10.5)	0.15
LOS (days), median(IQR)	4 (2, 7)	3 (2, 6)	5 (3, 8)	5 (3, 9)	3 (2, 4)	<0.001
Income decile, median(IQR)	8 (5, 9)	8 (5, 9)	8 (5, 9)	8 (5, 9)	8 (6, 9)	0.62
ICU, n(%)	102 (3.5)	60 (3.5)	41 (3.9)	1 (1.2)	0	0.91
Married/ partner, n(%)	1904 (64.6)	1153 (67.0)	650 (61.8)	42 (51.9)	59 (62.1)	0.003
Sex female, n(%)	1435 (48.7)	794 (41.2)	502 (47.7)	45 (55.6)	100	<0.001
Campus A, n(%)	1308 (43.8)	834 (48.5)	423 (40.2)	51 (63.0)	0	<0.001
ED visit within 7 days, n(%)	226 (7.6)	144 (8.4)	68 (6.5)	8 (9.9)	5 (5.3)	0.20
Discharge disposition, n(%)						<0.001
Home	1875 (63.7)	1220 (71.1)	548 (52.2)	35 (43.2)	72 (75.8)	
Home-setting	850 (28.9)	367 (21.4)	425 (40.5)	37 (45.7)	21 (22.1)	
Another health facility	217 (7.4)	130 (7.6)	76 (7.2)	9 (11.1)	2 (2.1)	

Table 1: Characteristics of patients answering patient experience survey. In some groups, due to missing data (<0.1%), the totals by summation does not equal the number stated in the first row. Abbreviations: Elixscore – Elixhauser score, psi – patient safety indicator event, LOS – length of stay, ALC – alternate level of care at discharge, ICU – intensive care unit stay.

	Univariable Analysis	*p*	*Multivariable Analysis*	*p*	**LR test (*p*)**
Department					0.60
Surgery/ENT	reference		reference		
Medicine	0.80(0.67, 0.94)	0.008	1.11 (0.89, 1.39)	0.34	
Family	0.55(0.35, 0.88)	0.012	0.92 (0.54, 1.55)	0.75	
Obs/Gyn	0.91(0.58, 1.42)	0.67	0.84 (0.51, 1.39)	0.50	
Physical Health					0.001
Excellent	reference		reference		
Very Good	0.68(0.47, 0.97)	0.034	0.74(0.50, 1.09)	0.12	
Good	0.41(0.29, 0.58)	<0.001	0.51(0.35, 0.76)	0.001	
Fair	0.36(0.25, 0.52)	<0.001	0.51(0.33, 0.78)	0.002	
Poor	0.27(0.18, 0.41)	<0.001	0.42(0.25, 0.71)	0.001	
Mental Health					<0.001
Excellent	reference		reference		
Very Good	0.72(0.57, 0.91)	0.005	0.77(0.59, 0.99)	0.042	
Good	0.49(0.39, 0.62)	<0.001	0.58(0.43, 0.76)	<0.001	
Fair	0.34(0.25, 0.45)	<0.001	0.43(0.30, 0.61)	<0.001	
Poor	0.25(0.15, 0.42)	<0.001	0.39(0.21, 0.72)	0.002	
Education					<0.001
8th Grade	reference		reference		
Some High School	1.10(0.71, 1.69)	0.67	1.04(0.65, 1.66)	0.87	
High School	0.82(0.56, 1.19)	0.30	0.68(0.45, 1.04)	0.07	
College/CEGEP	0.72(0.50, 1.05)	0.09	0.56(0.37, 0.85)	0.007	
Undergraduate	0.65(0.44, 0.96)	0.032	0.44(0.28, 0.68)	<0.001	
Post Graduate	0.66(0.45, 0.97)	0.033	0.42(0.27, 0.65)	<0.001	
Admit-Urgent	0.64(0.54, 0.76)	<0.001	0.83(0.67, 1.03)	0.016	0.016
Sex Male	1.21(1.03, 1.42)	0.021	1.20(1.00, 1.44)	0.024	0.024
Race					0.21
White	reference		reference		
Black	1.19(0.64, 2.20)	0.59	1.42(0.71, 2.84)	0.32	
Arab	0.98(0.50, 1.89)	0.94	0.98(0.49, 1.97)	0.96	
First Nation	0.69(0.27, 1.78)	0.44	0.57(0.19, 1.73)	0.32	
Oriental	1.05(0.62, 1.78)	0.86	1.45(0.82, 2.58)	0.20	
Indian	0.78(0.44, 1.38)	0.40	1.12(0.59, 2.10)	0.73	
Other	0.57(0.33, 0.99)	0.045	0.52(0.28, 0.95)	0.034	
Elixscore*	0.88(0.73, 1.06)	0.18	0.96(0.77, 1.19)	0.69	0.69
Age Group					0.006
18-34	reference		reference		
35-44	1.46(0.90, 2.36)	0.126	1.69(1.00, 2.86)	0.049	
45-54	1.54(1.01, 2.33)	0.044	1.77(1.13, 2.79)	0.013	
55-64	1.97(1.34, 2.90)	0.001	2.32(1.52, 3.56)	<0.001	

65-79	1.85(1.28, 2.66)	0.001	2.10(1.39, 3.17)	<0.001	
≥80	1.45(0.98, 2.13)	0.060	1.93(1.25, 3.00)	0.003	
Any psi	0.80(0.62, 1.02)	0.076	0.97(0.72, 1.30)	0.99	0.98
LOS (>3 days)	0.70(0.59, 0.82)	<0.001	0.87(0.70, 1.06)	0.13	0.13
Income decile	1.00(0.97, 1.03)	0.932	1.01(0.98, 1.04)	0.54	0.54
ICU	0.99(0.64, 1.53)	0.949	1.22(0.74, 2.01)	0.39	0.39
Married/Partner	1.06(0.90, 1.25)	0.498	0.92(0.76, 1.12)	0.39	0.39
Emergency visit within 7 days post d/c	0.74(0.56, 0.99)	0.045	0.77(0.56, 1.06)	0.10	0.11
Discharge					0.11
Home	reference		reference		
Home setting	0.70(0.59, 0.84)	<0.001	0.90(0.72, 1.12)	0.35	
Another facility	0.55(0.41, 0.74)	<0.001	0.68(0.48, 0.97)	0.035	
Campus	1.21(1.03, 1.42)	0.018	1.22(1.02, 1.47)	0.031	0.031

Table 2: Analysis of covariates associated with topbox designation of the corporate measure of "Rate experience". *Elixscore log-transformed. Abbreviations: Elixscore – Elixhauser score, psi – patient safety indicator event, LOS – length of stay, ICU – intensive care unit stay, LR – likelihood ratio

	Univariable Analysis	*p*	Multivariable Analysis	*p*	LR test (*p*)
Department					0.89
Surgery/ENT	reference		reference		
Medicine	0.86(0.72, 1.02)	0.09	1.08(0.85, 1.36)	0.53	
Family	0.63(0.39, 1.02)	0.06	0.92(0.53, 1.59)	0.77	
Obs/Gyn	0.88(0.55, 1.41)	0.59	0.98(0.58, 1.65)	0.94	
Physical Health					0.026
Excellent	reference		reference		
Very Good	0.72(0.49, 1.04)	0.08	0.77(0.51, 1.16)	0.21	
Good	0.48(0.34, 0.69)	<0.001	0.56(0.37, 0.84)	0.006	
Fair	0.43(0.30, 0.63)	<0.001	0.58(0.37, 0.91)	0.019	
Poor	0.36(0.23, 0.56)	<0.001	0.58(0.34, 0.99)	0.048	
Mental Health					<0.001
Excellent	reference		reference		
Very Good	0.82(0.65, 1.05)	0.12	0.89(0.68, 1.17)	0.40	
Good	0.51(0.40, 0.65)	<0.001	0.63(0.47, 0.84)	0.002	
Fair	0.44(0.32, 0.59)	<0.001	0.55(0.38, 0.80)	0.002	
Poor	0.28(0.17, 0.46)	<0.001	0.39(0.22, 0.72)	0.002	
Education					<0.001
8th Grade	reference		reference		
Some High School	1.21(0.78, 1.89)	0.39	1.06(0.66, 1.70)	0.82	
High School	1.08(0.73, 1.59)	0.70	0.95(0.62, 1.45)	0.80	
College/CEGEP	0.86(0.58, 1.26)	0.43	0.68(0.44, 1.04)	0.07	
Undergraduate	0.79(0.53, 1.18)	0.25	0.57(0.36, 0.89)	0.014	
Post Graduate	0.94(0.63, 1.39)	0..76	0.64(0.41, 0.99)	0.046	
Race					<0.001
White	reference		reference		
Black	5.69(1.77, 18.31)	0.004	5.55(1.70, 18.19)	0.005	
Arab	1.49(0.69, 3.24)	0.31	1.57(0.70, 3.49)	0.27	
First Nation	0.42(0.17, 1.01)	0.053	0.38(0.13, 1.09)	0.07	
Oriental	1.77(0.92, 3.40)	0.09	2.07(1.06, 4.05)	0.034	
Indian	1.20(0.63, 2.28)	0.59	1.60(0.79, 3.23)	0.19	
Other	0.58(0.33, 1.02)	0.057	0.49(0.27, 0.90)	0.021	
Elixscore*	0.90(0.74, 1.10)	0.30	0.97(0.77, 1.22)	0.80	0.80
Admit Urgent	0.83(0.69, 0.99)	0.036	1.00(0.80, 1.25)	0.99	0.99
Age Group					0.045
18-34	reference		reference		
35-44	1.04(0.62, 1.74)	0.89	1.19(0.68, 2.07)	0.54	
45-54	1.40(0.88, 2.22)	0.15	1.87(1.13, 3.07)	0.014	
55-64	1.32(0.87, 2.01)	0.19	1.85(1.17, 2.93)	0.009	
65-79	1.23(0.82, 1.83)	0.31	1.57(1.01, 2.44)	0.045	

>79	0.93(0.62, 1.42)	0.75	1.39(0.87, 2.21)	0.17	
Any psi	0.87(0.67, 1.13)	0.31	1.11(0.81, 1.52)	0.50	0.50
LOS > 3 days	0.76(0.64, 0.89)	0.001	0.87(0.70, 1.08)	0.22	0.22
Income decile	0.98(0.95, 1.01)	0.26	0.99(0.95, 1.03)	0.56	0.56
ICU	1.28(0.79, 2.09)	0.32	1.67(0.95, 2.96)	0.08	0.07
Married/Partner	0.93(0.78, 1.11)	0.41	0.80(0.66, 0.98)	0.036	0.035
Sex male	1.34(1.13, 1.58)	0.001	1.39(1.15, 1.69)	0.001	<0.001
Emergency visit within 7 days post d/c	0.73(0.54, 0.98)	0.038	0.75(0.54, 1.04)	0.08	0.08
Discharge					0.028
Home	reference		reference		
Home setting	0.62(0.51, 0.74)	<0.001	0.76(0.61, 0.95)	0.015	
Another facility	0.63(0.46, 0.86)	0.004	0.71(0.48, 1.02)	0.06	
Campus	1.18(1.00, 1.39)	0.057	1.13(0.93, 1.37)	0.21	0.21

Table 3: Analysis of covariates associated with topbox measure of "Recommend this hospital". *Elixscore log-transformed. Abbreviations: Elixscore – Elixhauser score, psi – patient safety indicator event, LOS – length of stay, ICU – intensive care unit stay

	Univariable Analysis	*p*	Multivariable Analysis	*p*	LR test (*p*)
Department					0.81
Surgery/ENT	reference		reference		
Medicine	0.84(0.72, 0.98)	0.031	0.99(0.80, 1.22)	0.93	
Family	0.55(0.35, 0.87)	0.010	0.78(0.47, 1.31)	0.35	
Obs/Gyn	1.07(0.70, 1.65)	0.75	1.08(0.67, 1.75)	0.74	
Physical Health					<0.001
Excellent	reference		reference		
Very Good	0.66(0.48, 0.90)	0.009	0.73(0.52, 1.03)	0.08	
Good	0.43(0.32, 0.59)	<0.001	0.51(0.36, 0.73)	<0.001	
Fair	0.49(0.36, 0.68)	<0.001	0.65(0.44, 0.96)	0.029	
Poor	0.48(0.32, 0.70)	<0.001	0.71(0.44, 1.15)	0.109	
Mental Health					<0.001
Excellent	reference		reference		
Very Good	0.70(0.57, 0.86)	0.001	0.73(0.58, 0.93)	0.010	
Good	0.51(0.42, 0.64)	<0.001	0.58(0.45, 0.76)	<0.001	
Fair	0.47(0.36, 0.62)	<0.001	0.52(0.37, 0.73)	<0.001	
Poor	0.44(0.27, 0.72)	0.001	0.51(0.28, 0.92)	0.025	
Education					<0.001
8th Grade	reference		reference		
Some High School	1.27(0.86, 1.90)	0.23	1.17(0.76, 1.79)	0.48	
High School	0.99(0.70, 1.40)	0.95	0.90(0.61, 1.31)	0.57	
College/CEGEP	0.73(0.52, 1.04)	0.08	0.61(0.42, 0.89)	0.011	
Undergraduate	0.60(0.42, 0.86)	0.006	0.46(0.32, 0.72)	<0.001	
Post Graduate	0.64(045, 0.91)	0.014	0.49(0.31, 0.69)	<0.001	
Race					0.40
White	reference		reference		
Black	1.34(0.75, 2.40)	0.33	1.65(0.86, 3.19)	0.14	
Arab	0.90(0.49, 1.66)	0.74	0.93(0.49, 1.78)	0.83	
First Nation	0.79(0.33, 1.92)	0.62	0.68(0.23, 1.97)	0.48	
Oriental	0.94(0.57, 1.54)	0.80	1.28(0.75, 2.18)	0.37	
Indian	0.89(0.51, 1.54)	0.67	1.18(0.64, 2.17)	0.59	
Other	0.75(0.44, 1.29)	0.30	0.64(0.36, 1.16)	0.15	
Admit Urgent	0.75(0.64, 0.88)	<0.001	0.83(0.68, 1.02)	0.07	0.07
Sex Male	1.26(1.08, 1.46)	0.003	1.31(1.11, 1.56)	0.002	0.002
Elixscore	0.99(0.83, 1.18)	0.93	0.96(0.78, 1.19)	0.73	0.73
Age Group					0.001
18-34	reference		reference		
35-44	1.40(0.88, 2.24)	0.16	1.54(0.93, 2.56)	0.10	
45-54	1.87(1.24, 2.82)	0.003	2.20(1.41, 3.43)	0.001	

55-64	2.07(1.42, 3.01)	<0.001	2.45(1.61, 3.73)	<0.001	
65-79	1.88(1.31, 2.70)	0.001	2.14(1.43, 3.21)	<0.001	
>79	1.57(1.07, 2.29)	0.020	2.07(1.35, 3.19)	0.001	
Any psi	0.90(0.71, 1.14)	0.39	0.94(0.70, 1.25)	0.66	0.66
LOS > 3 days	0.83(0.71, 0.96)	0.013	0.96(0.79, 1.16)	0.66	0.66
Income decile	0.97(0.94, 0.99)	0.015	0.98(0.95, 1.02)	0.31	0.31
ICU	1.61(1.04, 2.50)	0.034	1.97(1.20, 3.24)	0.008	0.006
Married/Partner	1.00(0.85, 1.16)	0.96	0.88(0.74, 1.06)	0.18	0.18
Emergency visit within 7 days post d/c	0.74(0.56, 0.98)	0.035	0.76(0.56, 1.03)	0.08	0.08
Discharge					0.028
Home	reference		reference		
Home setting	0.75(0.63, 0.89)	0.001	0.79(0.64, 0.97)	0.023	
Another facility	0.67(0.50, 0.90)	0.007	0.70(0.49, 0.99)	0.041	
Campus	1.30(1.12, 1.51)	0.001	1.34(1.13, 1.60)	0.001	<0.001

Table 4: Analysis of covariates associated with topbox measure of "Rate this hospital". *Elixscore log-transformed. Abbreviations: Elixscore – Elixhauser class, psi – patient safety indicator event, LOS – length of stay, ICU – intensive care unit stay

	Univariable Analysis	*p*	Multivariable Analysis	*p*	LR test (*p*)
Department					0.19
Surgery/ENT	reference		reference		
Medicine	0.06(0.50, 0.71)	<0.001	0.82(0.65, 1.03)	0.09	
Family	0.37(0.23, 0.58)	<0.001	0.64(0.38, 1.07)	0.09	
Obs/Gyn	0.99(0.59, 1.64)	0.97	0.82(0.47, 1.44)	0.50	
Physical Health					<0.001
Excellent	reference		reference		
Very Good	0.74(0.50, 1.11)	0.14	0.92(0.60, 1.42)	0.72	
Good	0.40(0.27, 0.58)	<0.001	0.61(0.40, 0.93)	0.021	
Fair	0.33(0.22, 0.48)	<0.001	0.59(0.37, 0.94)	0.026	
Poor	0.20(0.13, 0.31)	<0.001	0.41(0.24, 0.70)	0.001	
Mental Health					<0.001
Excellent	reference		reference		
Very Good	0.64(0.49, 0.82)	0.001	0.71(0.53, 0.94)	0.017	
Good	0.39(0.30, 0.51)	<0.001	0.53(0.39, 0.72)	<0.001	
Fair	0.28(0.21, 0.38)	<0.001	0.44(0.30, 0.64)	<0.001	
Poor	0.21(0.13, 0.36)	<0.001	0.43(0.22, 0.79)	0.008	
Education					0.09
8th Grade	reference		reference		
Some High School	1.19(0.78, 1.82)	0.42	1.06(0.67, 1.68)	0.81	
High School	1.06(0.73, 1.55)	0.74	0.87(0.58, 1.32)	0.51	
College/CEGEP	1.14(0.78, 1.65)	0.51	0.82(0.54, 1.25)	0.35	
Undergraduate	0.94(0.64, 1.39)	0.75	0.63(0.40, 0.97)	0.038	
Post Graduate	1.20(0.82, 1.77)	0.35	0.79(0.51, 1.22)	0.29	
Race					0.46
White	reference		reference		
Black	1.39(0.69, 2.78)	0.36	1.76(0.80, 3.89)	0.16	
Arab	0.85(0.44, 1.67)	0.65	0.84(0.41, 1.69)	0.62	
First Nation	0.93(0.33, 2.58)	0.88	0.93(0.28, 3.09)	0.90	
Oriental	0.99(0.57, 1.73)	0.98	1.18(0.65, 2.14)	0.58	
Indian	0.72(0.40, 1.29)	0.27	1.00(0.52, 1.90)	0.99	
Other	0.61(0.35, 1.07)	0.08	0.58(0.31, 1.08)	0.09	
Admit Urgent	0.57(0.47, 0.69)	<0.001	0.84(0.67, 1.07)	0.16	0.16
Sex Male	1.08(0.91, 1.28)	0.37	1.02(0.84, 1.24)	0.84	0.84
Elixscore	0.81(0.66, 0.98)	0.032	1.07(0.85, 1.36)	0.55	0.55
Age Group					0.07
18-34	reference		reference		
35-44	1.02(0.62, 1.70)	0.93	1.13(0.53, 1.96)	0.67	

45-54	1.66(1.05, 2.63)	0.031	1.88(1.14, 3.09)	0.014	
55-64	1.50(0.99, 2.27)	0.057	1.78(1.13, 2.82)	0.014	
65-79	1.35(0.91, 2.01)	0.14	1.60(1.03, 2.48)	0.036	
>79	0.93(0.61, 1.40)	0.71	1.50(0.95, 2.39)	0.09	
Any psi	0.87(0.66, 1.13)	0.29	1.15(0.84, 1.59)	0.39	0.38
LOS > 3 days	0.68(0.57, 0.80)	<0.001	0.89(0.72, 1.11)	0.31	0.31
Income decile	0.99(0.96, 1.02)	0.67	0.99(0.96, 1.03)	0.64	0.64
ICU	1.12(0.69, 1.79)	0.65	1.30(0.76, 2.24)	0.34	0.33
Married/Partner	1.04(0.88, 1.24)	0.62	0.92(0.75, 1.13)	0.43	0.43
Emergency visit within 7 days post d/c	0.73(0.54, 0.99)	0.042	0.76(0.55, 1.06)	0.11	0.12
Discharge					0.06
Home	reference		reference		
Home setting	0.58(0.48, 0.70)	<0.001	0.82(0.65, 1.03)	0.09	
Another facility	0.47(0.35, 0.64)	<0.001	0.67(0.46, 0.97)	0.032	
Campus	1.20(1.02, 1.42)	0.032	1.19(0.98, 1.44)	0.08	0.08

Table 5: Analysis of covariates associated with topbox measure of "Overall helped". *Elixscore log-transformed. Abbreviations: Elixscore – Elixhauser score, psi – patient safety indicator event, LOS – length of stay, ICU – intensive care unit stay

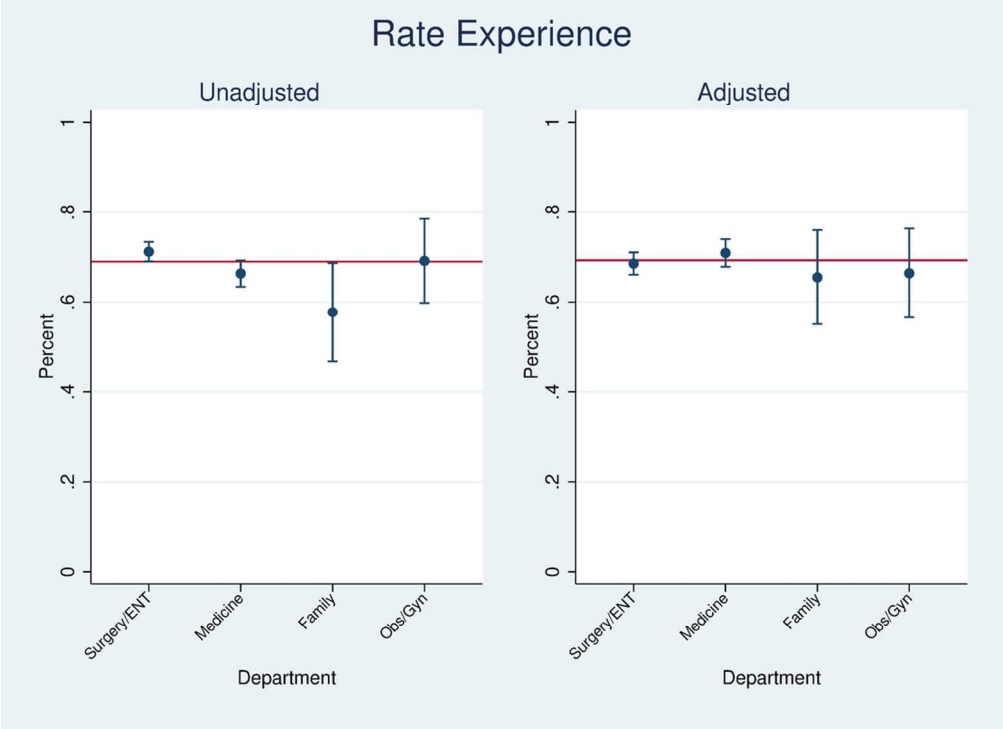

Figure 1: Unadjusted and adjusted predicted percent topbox of corporate indicator "Rate your experience" by hospital department. Error bars represent 95% CI. Difference between Surgery/ENT and Medicine significant (p=0.05) in Unadjusted, however no differences between departments in Adjusted

101x73mm (300 x 300 DPI)

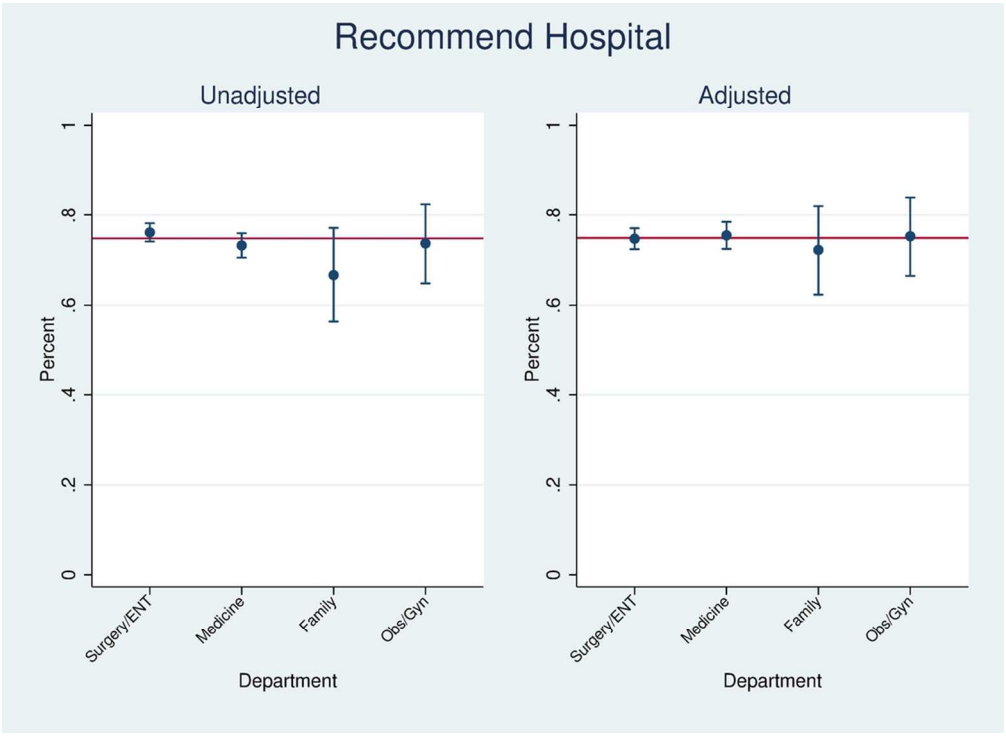

Figure 2: Unadjusted and adjusted predicted percent topbox of corporate indicator "Recommend this hospital" by hospital department. Error bars represent 95% CI. No statistically significant difference between groups.

101x73mm (300 x 300 DPI)

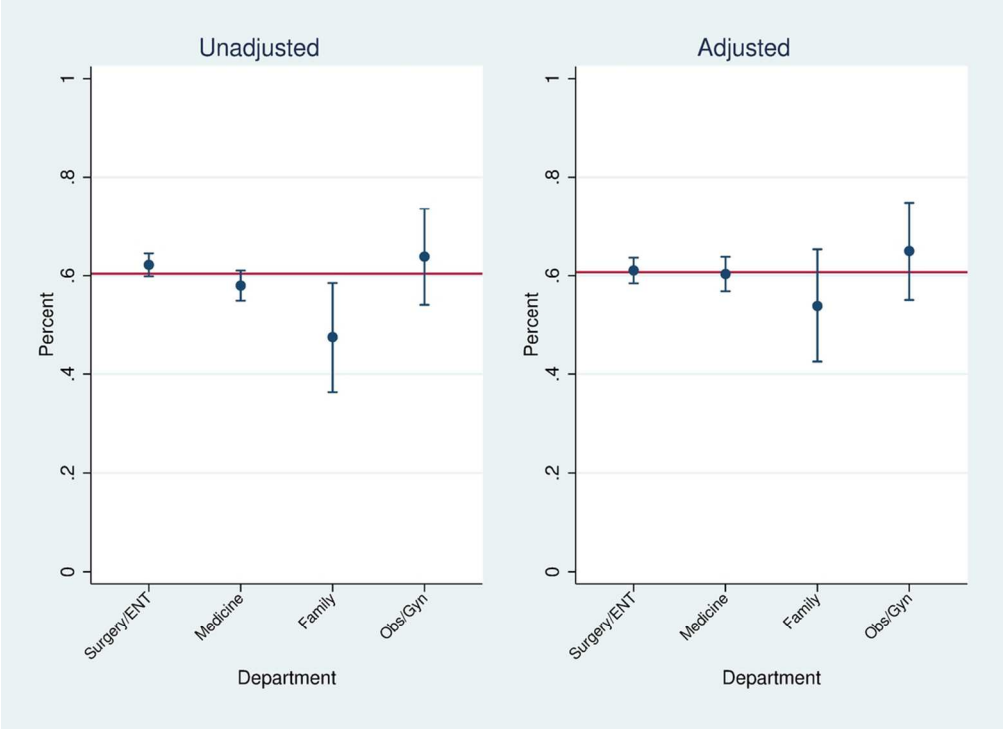

Figure 3: Unadjusted and adjusted predicted percent topbox of corporate indicator "Rate this hospital" by hospital department. Error bars represent 95% CI. Differences between Surgery/ENT and Family Medicine significant ($p<0.05$) in the unadjusted model but not in the adjusted model.

101x73mm (300 x 300 DPI)

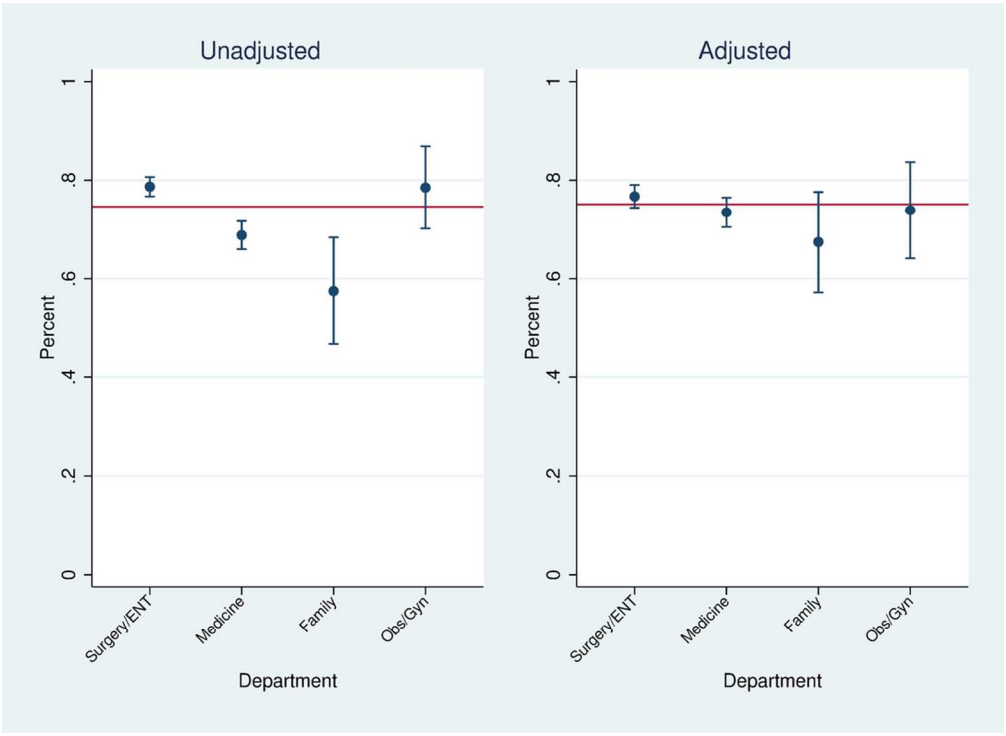

Figure 4: Unadjusted and adjusted predicted percent topbox of corporate indicator "Overall helped" by hospital department. Error bars represent 95% CI. In the unadjusted model, greater predicted measures were seen with surgery as compared to medicine and family medicine, and with obstetrics/gynecology as compared with family medicine ($p<0.05$). The differences were no longer significant in the adjusted model.

101x73mm (300 x 300 DPI)

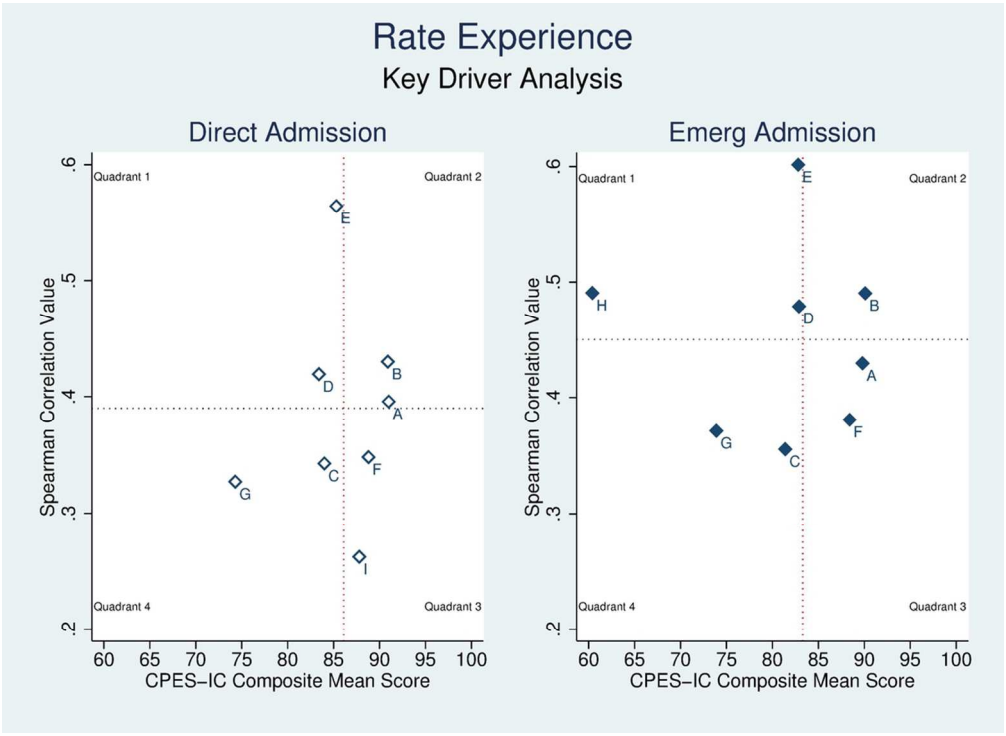

Figure 5: Key driver analysis: relationship domain composite measures to the global measure of Overall Experience, direct admission (left) and emergency admission(right). Horizontal black dotted line – mean for all correlation values. Vertical red dotted line – median for all composites. A- Communication doctors, B- Communication nurses, C- Responsiveness staff, D-Care transition, E-Person-centred care, F-Pain management, G-Communication medications, H – Admission processes emergency, I – Admission processes elective

101x73mm (300 x 300 DPI)

Canadian Patient Experiences Survey—Inpatient Care

Survey Instructions

- You should fill out this questionnaire only if you were the patient named on the envelope. You may need to get help from a family member or friend to answer the questions. That's okay.
- Answer all the questions by checking the box to the left of your answer.
- Your response to this survey is voluntary but will provide us with important information.
- You are sometimes told to skip over some questions in this survey. When this happens, you will see an arrow with a note that tells you what question to answer next, like this:

☐ Yes

☑ No ➔ **If No, go to Question 1**

Placeholder for jurisdiction comments.

Please answer the questions about your recent stay at the hospital named on the cover letter. Do not include any other hospital stays in your answers.

YOUR CARE FROM NURSES

1. During this hospital stay, how often did nurses treat you with courtesy and respect?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

2. During this hospital stay, how often did nurses listen carefully to you?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

3. During this hospital stay, how often did nurses explain things in a way you could understand?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

4. During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it?

☐ Never
☐ Sometimes
☐ Usually
☐ Always
☐ I never pressed the call button

YOUR CARE FROM DOCTORS

5. During this hospital stay, how often did doctors treat you with courtesy and respect?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

6. During this hospital stay, how often did doctors listen carefully to you?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

7. During this hospital stay, how often did doctors explain things in a way you could understand?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

THE HOSPITAL ENVIRONMENT

8. During this hospital stay, how often were your room and bathroom kept clean?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

9. During this hospital stay, how often was the area around your room quiet at night?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

YOUR EXPERIENCES IN THIS HOSPITAL

10. During this hospital stay, did you need help from nurses or other hospital staff in getting to the bathroom or in using a bedpan?

- ☐ Yes
- ☐ No ➔ **If No, go to Question 12**

11. How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

12. During this hospital stay, did you need medicine for pain?

- ☐ Yes
- ☐ No ➔ **If No, go to Question 15**

13. During this hospital stay, how often was your pain well controlled?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

14. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

15. During this hospital stay, were you given any medicine that you had not taken before?

☐ Yes
☐ No ➔ **If No, go to Question 18**

16. Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

17. Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

WHEN YOU LEFT THE HOSPITAL

18. After you left the hospital, did you go directly to your own home, to someone else's home or to another health facility?

☐ Own home
☐ Someone else's home
☐ Another health facility ➔ **If Another health facility, go to Question 21**

19. During this hospital stay, did doctors, nurses or other hospital staff talk with you about whether you would have the help you needed when you left the hospital?

☐ Yes
☐ No

20. During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?

☐ Yes
☐ No

OVERALL RATING OF HOSPITAL

Please answer the following questions about your stay at the hospital named on the cover letter. Do not include any other hospital stays in your answers.

21. Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?

☐ 0 Worst hospital possible
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10 Best hospital possible

22. Would you recommend this hospital to your friends and family?

- ☐ Definitely no
- ☐ Probably no
- ☐ Probably yes
- ☐ Definitely yes

In this next section, we ask several more questions about your stay at the hospital.

YOUR ARRIVAL AT THE HOSPITAL

23. When you arrived at the hospital, did you go to the emergency department?

- ☐ Yes ➔ **If Yes, go to Question 26**
- ☐ No ➔ **If No, please continue below**

24. Before coming to the hospital, did you have enough information about what was going to happen during the admission process?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely

25. Was your admission into the hospital organized?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely

Go to Question 30

Answer questions 26 to 29 only if you were admitted through the emergency department.

26. When you were in the emergency department, did you get enough information about your condition and treatment?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely

27. Were you given enough information about what was going to happen during your admission to the hospital?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely

28. After you knew that you needed to be admitted to a hospital bed, did you have to wait too long before getting there?

- ☐ Yes
- ☐ No

29. Was your transfer from the emergency department into a hospital bed organized?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely

Continue with Question 30

DURING YOUR HOSPITAL STAY

30. Do you feel that there was good communication about your care between doctors, nurses and other hospital staff?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

31. How often did doctors, nurses and other hospital staff seem informed and up-to-date about your hospital care?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

32. How often were tests and procedures done when you were told they would be done?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always
- ☐ I did not have any tests or procedures

33. During this hospital stay, did you get all the information you needed about your condition and treatment?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

34. Did you get the support you needed to help you with any anxieties, fears or worries you had during this hospital stay?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always
- ☐ Not applicable

35. Were you involved as much as you wanted to be in decisions about your care and treatment?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

36. Were your family or friends involved as much as you wanted in decisions about your care and treatment?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always
- ☐ I did not want them to be involved
- ☐ I did not have family or friends to be involved

LEAVING THE HOSPITAL

37. Before you left the hospital, did you have a clear understanding about all of your prescribed medications, including those you were taking before your hospital stay?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely
- ☐ Not applicable

38. Did you receive enough information from hospital staff about what to do if you were worried about your condition or treatment after you left the hospital?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely

39. When you left the hospital, did you have a better understanding of your condition than when you entered?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely

YOUR OVERALL RATINGS

40. Overall, do you feel you were helped by your hospital stay? Please answer on a scale where 0 is "not helped at all" and 10 is "helped completely."

Overall . . . (Please circle a number)

Not helped at all — Helped completely

0 1 2 3 4 5 6 7 8 9 10

41. Overall . . . (Please circle a number)

I had a very poor experience — I had a very good experience

0 1 2 3 4 5 6 7 8 9 10

ABOUT YOU

42. In general, how would you rate your overall physical health?

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

43. In general, how would you rate your overall mental or emotional health?

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

44. What is the highest grade or level of school that you have completed?

- ☐ 8th grade or less
- ☐ Some high school, but did not graduate
- ☐ High school or high school equivalency certificate
- ☐ College, CEGEP or other non-university certificate or diploma
- ☐ Undergraduate degree or some university
- ☐ Post-graduate degree or professional designation

45. What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other

46. What is your year of birth?

(Please write in; for example, "1934.")

_____

47. Was your most recent stay at this hospital for a childbirth experience?

☐ Yes
☐ No

48. The following question will help us to better understand the communities that we serve. Do you consider yourself to be . . .

(Check all that apply)

☐ White
☐ Chinese
☐ First Nation, Métis, Inuk or mixed (others may say Aboriginal or Indigenous)
☐ South Asian (East Indian, Pakistani, Sri Lankan, etc.)
☐ Black
☐ Filipino
☐ Latin American
☐ Southeast Asian (Vietnamese, Cambodian, Malaysian, Laotian, etc.)
☐ Arab
☐ West Asian (Iranian, Afghan, etc.)
☐ Korean
☐ Japanese
☐ Other

49. Is there anything else you would like to share about your hospital stay?

Questions 1 to 22 and 43 are adapted from the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) questionnaire.

Questions 23 to 49 (excluding question 43) were adapted and/or developed by the Canadian Institute for Health Information in consultation with an interjurisdictional committee of experts.

Reporting Checklist for Submitted Manuscript: Impact of patient characteristics on the Canadian Patient Experiences Survey – Inpatient Care survey- analysis from an academic tertiary care centre
Rubens FD et al.
BMJ Open 2018

Based upon: Proposed Reporting Guidelines: Burns KE et al 2008. A guide for the design and conduct of self-administered surveys for clinicians. CMAJ 179;245-252

Paper Section	Question	Identified in Text
Abstract	Is the objective clearly stated?	Page 2
	Is the design of the study stated?	Page 2
	Is the study setting well-described?	Page 2
	Is the survey population described?	Page 2
	Is the response rate reported?	No – not available
	Are the outcome measures identified?	Page 2
	Are the main results clearly reported?	Page 2
	Are the conclusions appropriate?	Page 2
Introduction	Is the problem clearly stated?	Pages 5-7
	Is the pertinent literature cited and critically appraised?	Pages 5-7
	Is the relevance of the research question explained?	Pages 5-7
	Is the objective clearly stated?	Pages 7-8
Methods	Is the study design appropriate to the objective?	Pages 8-9
	Is the setting clearly described?	Page 8
	Are the methods described clearly enough to permit other researchers to duplicate the study?	Pages 8-10
	Is the survey sample likely to be representative of the population?	Page 8
	Is the questionnaire described adequately?	Appendix
	Have the validity and reliability of the questionnaire been established?	Not applicable – survey developed elsewhere and validated by CIHI
	Was the questionnaire administered in a satisfactory way?	Page 8
	Are the statistical methods used appropriately?	Pages 9-10
Results	Do the results address the objective?	Pages 10-12
	Are all the respondents accounted for?	Pages 10-12
	Are the results clearly and logically	Pages 10-12,

	presented?	Figures 1-5, Tables
	Are the tables and figures appropriate?	Figures 1-5, Tables
	Are the numbers consistent in the text and the tables?	Pages 10-12
Discussion	Are the results succinctly summarized?	Page 12
	Are the implications of the results stated?	Pages 14-15
	Are other interpretations considered and refuted?	Pages 15-16
	Are the limitations of the study and its results explained?	Pages 15-16
	Are appropriate conclusions drawn?	Page 16

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No.	Recommendation	Page No.	Relevant text from manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1	lines 3-5
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2	
Introduction				
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-7	
Objectives	3	State specific objectives, including any prespecified hypotheses	7-8	48-55 & 3-11
Methods				
Study design	4	Present key elements of study design early in the paper	8-10	
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	8	
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	8	
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case		
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8-10	
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8-10	
Bias	9	Describe any efforts to address potential sources of bias	10	
Study size	10	Explain how the study size was arrived at	N/A	

Continued on next page

Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8-10
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	10
		(*b*) Describe any methods used to examine subgroups and interactions	10
		(*c*) Explain how missing data were addressed	10
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	10
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	10
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	~~10~~
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary measures	10-12 ; Tables 2-5
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Tables 2-5
		(*b*) Report category boundaries when continuous variables were categorized	10
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A

Continued on next page

Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	12
Discussion			
Key results	18	Summarise key results with reference to study objectives	12-13
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-17
Generalisability	21	Discuss the generalisability (external validity) of the study results	12-17
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	No funding source Indicated on the

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

BMJ Open

Impact of patient characteristics on the Canadian Patient Experiences Survey – Inpatient Care survey- analysis from an academic tertiary care centre

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2018-021575.R2
Article Type:	Research
Date Submitted by the Author:	26-Jun-2018
Complete List of Authors:	Rubens, F; University of Ottawa Heart Institute, Surgery Rothwell, Diana; Ottawa Hospital Research Institute Al Zayadi, Amal; Ottawa Hospital Research Institute Sundaresan, Sudhir; The Ottawa Hospital Ramsay, Tim; The Ottawa Health Research Institute, Forster, Alan; Ottawa Hospital Research Institute
Primary Subject Heading:	Patient-centred medicine
Secondary Subject Heading:	Communication, Health policy, Patient-centred medicine
Keywords:	HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Patient Experience, Organisation of health services < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, Patient experience

Impact of patient characteristics on the Canadian Patient Experiences Survey – Inpatient Care survey- analysis from an academic tertiary care centre

Rubens FD[1], Rothwell DM[2], Al Zayadi A[2], Sundaresan S[1], Ramsay T[2], Forster A[2,3]

1- Department of Surgery, University of Ottawa

2- Clinical Epidemiology, Ottawa Hospital Research Institute

3- Department of Medicine, University of Ottawa

Corresponding author:

Fraser Rubens MD MSc FACS FRCSC

Professor of Surgery

Division of Cardiac Surgery

University of Ottawa Heart Institute

40 Ruskin St.

Ottawa, Ontario

Canada

K1Y 4W7

Fax: 613 696 7303

frubens@ottawaheart.ca

Total word count (figures): 5967

Abstract word count: 245

Running title: Patient experience covariates

Abstract:

Objective: To determine the role of patient demographics, care domains and self-perceived health status in the analysis and interpretation of results from the Canadian Patient Experience Survey-Inpatient Care (CPES-IC).

Design: Cross-sectional survey

Setting: Single large Canadian two campus tertiary care academic centre

Participants: Random sampling of hospital patients post-discharge

Intervention and Main Outcome Measures: Logistic regression models were developed to analyze topbox scoring on four questions of global care (rate experience, recommend hospital, rate hospital, overall helped). Means of each composite domain were correlated to the four overall scores at the patient level to determine Spearman's rank correlation coefficients which were plotted against the overall (hospital) domain score for the key driver analysis.

Results: Topbox scoring was decreased with worse degrees of perceived physical and mental health in all four global questions ($p<0.05$). Female gender and higher levels of education were associated with worse scoring on rate experience, recommend hospital and rate hospital ($p<0.001$). Whereas there was a significant difference between hospital departments in unadjusted measures, these differences were no longer evident after adjustment with patient covariates. Key driver analysis identified person-centred care, care transition and the domain related to emergency admission as areas of highest potential for improvement.

Conclusions: Global measures of overall care are influenced by patient-perceived physical and mental health. Caution should be exercised in using patient-satisfaction surveys to compare performance between different health-care provision entities, as

apparent differences could be explained by variation in patient mix rather than variation in performance.

Strengths and Limitations of Study:

1) This study involves the novel linkage of a clinical database to individual survey results to allow the accurate analysis of the role of patient characteristics and demographics on survey response.
2) The study provides a validated process by which covariates could be used to adjust patient experience survey outcomes to facilitate inter-unit and inter-institution comparisons.
3) The analysis has been completed on data from a single institution and thus the generalizability is not known.
4) This study is limited by survey non-responders as well as the random nature of survey participants amongst the total discharge population from the hospital.

Introduction

Patient experience is now recognized as a critical component of modern health care delivery[1]. Aside from the clear rationale to routinely provide compassionate care, there exists a strong ethical basis for physicians to support excellence in this area as it is of vital interest to patients and governments as a foundation of patient-centred medicine [2]. There is also supportive evidence that improved patient experience may positively impact outcomes[1 3] particularly through better compliance to evidence-based guidelines, such as in areas of chronic disease management[4].

There are many different processes by which inpatient patient experience has been measured internationally[5-8]. In the United States, it is measured using the Hospital Consumer Assessment of Health-Care Provider Systems (HCAHPS) survey[9]. Hospital funding from Medicare is partially dependent on the results from this survey and thus health care organizations are deeply committed to improving results. A modification of the HCAHPS survey (Canadian Patient Experience Survey – Inpatient Care, CPES-IC) was developed through collaboration between the Canadian Institute for Health information (CIHI), Accreditation Canada, the Canadian Patient Safety Institute, the Change Foundation and the Inter-Jurisdictional Patient Experience Group and this survey is now routinely administered in four provinces in Canada[10].

Though the HCAHPS and the CPES-IC are very similar, there are subtle differences that reflect the unique nature of the single-payer system in Canada. The CPES-IC survey consists of 22 questions derived from the HCAHPS as well as other questions that "address key areas relevant to the Canadian context". The questions can be classified in

three specific groups. In the first group, individual questions can be clustered as they reflect care in particular domains such as doctor communication skills (3 questions) and nursing communication skills (3 questions) amongst others. The Canadian survey includes the same domains as the HCAHPS, but also comprises several questions that constitute new domains not addressed in the HCAHPS survey such as admission experience, person-centred care, discharge and transition. Further details regarding differences between the Canadian and American surveys are available on the CIHI web-site (https://www.cihi.ca/en/patient-experience).

The composite questions for each domain can be averaged to provide a mean value which is currently reported at the hospital level for the HCAHPS survey[11]. In the second group there are four questions that reflect overall care that are of particular importance at the institutional level to assess the quality of patient experience. One of these questions is also used as a corporate measure of key interest ("Rate your experience?") and it is most commonly used to rank hospitals nationally after adjustment for regional differences[3]. Results from the three other questions related to overall care include; "Would you recommend this hospital to your friends and family?" (recommend hospital) and "Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?" (rate hospital) and "Overall, do you feel you were helped by your hospital stay?) (overall helped). Success in these and other questions are measured by the percent of "topbox" designation by the patients in which they have ranked a 4 on the recommend hospital question (on a scale of 1 to 4) or 9 or 10 out of an ordinal scale of 10 for the remaining

three questions. The "topbox" metric has been validated and accepted as a marker of excellence in patient experience measurement.[12]

The final group of questions found in both surveys consists of inquiries regarding patient-perceived health status as well as demographic topics such as race and education. These questions are referred to a Patient Mix Adjusters (PMA) and they are used in the HCAHPS survey in order to provide risk adjustment, particularly when comparing between geographic regions. The PMA questions for the HCAHPS are re-assessed quarterly by the Centre for Medicare and Medicaid (CMS) after reviewing national results.

There is limited familiarity in the assessment of patient experience in Canada and the use of such surveys. Although it has been demonstrated that patient sociodemographic factors such as age, ethnicity, sex and socioeconomic class have been shown to influence patient experience responses[13], there is also no understanding of the validity of the PMA questions in adjusting the results of the CPES-IC survey and how they may contribute to credibly compare units or departments within a hospital. In summary, it is not clear how patient factors such as self-described characteristics including perception of mental and physical health, patient demographics and co-morbidities impact the results of the Canadian survey on in-hospital patient experience.

The overall objective of this research was to compare the value of the self-described patient characteristics obtained from the survey with covariates obtained from a hospital database, in the development of a statistical model to predict topbox scoring in the four survey questions related to overall care; a) rate your experience b) recommend hospital c)

rate hospital d) overall helped. We also sought to assess how the PMA questions and other data from the hospital database influence patient experience at the hospital and departmental level and to determine how the composite domain measurements influence the four adjusted global measurements.

Methods

This analysis was conducted as a Quality Assurance project. The protocol was reviewed by the Ottawa Health Science Network – Research Ethics Board and individual patient consent was waived. Data was collected from April 1, 2016 to Nov 30, 2016 from the CPES-IC Survey (see appendix 1) administered by National Research Corporation (NRC, Markham, Ontario). Surveys were distributed in both official languages.

Patient and Public Involvement

There was no patient or public involvement in this research in terms of development, design or analysis.

The data was merged with administrative data collected from The Ottawa Hospital Data Warehouse (TOHDW) which is a relational database that contains administrative and clinical data for all patients seen at The Ottawa Hospital. Deciles of income class were derived using the Postal Code Conversion File Version 6.6 based on data from August 2015 (Statistics Canada). The Elixhauser class was derived using a modification of the Elixhauser comorbidity measure after applying the latter to the hospital data (ref van Walraven Med Care 2009). The occurrence of a patient safety indicator (psi) event (i.e.

an in-hospital adverse event) was determined using ICD-10 coding from administrative data [14].

The Ottawa Hospital is a large academic tertiary care teaching centre with two inpatient campuses. There are 6 admitting departments (Surgery/ENT, Medicine, Obstetrics-Gynecology, Family Medicine, Ophthalmology and Psychiatry). A different survey was used in Psychiatry and Obstetrics thus these patients were excluded. Ophthalmology was excluded as it is primarily an outpatient service and accounts for less than 1% of admissions. Data from one surgical (cardiac surgery) and one medical division (cardiology) was not available as administrative data was not linkable to the patient experience data from NRC due to a differing collection and analysis process. Patients who died prior to discharge were excluded from analysis.

Composite domains were identified as follows: communication with doctors (questions 5-7), communication with nurses (questions 1-3), responsiveness of staff (questions 4, 11), communication of medications (questions 16, 17), transition of care (37-39), person-centred care (30-36), direct admission (questions 24, 25) and emergency admission (26-29). The mean was calculated for each patient for each domain as long as more than 50% of the questions in the domain were reported[15] . Spearman's rank correlation coefficients were determined for the continuous value of each domain and the ordinal global question score and this was plotted against the overall (hospital) domain score for the key driver analysis[16]. The median value of the domain scores was used for the vertical separation of the quadrants due to skewness. Points identified in quadrant 1 represent domains with increased potential for improvement due to high correlation with a global score and lower mean value.

Statistical Analyses:

Patient characteristics across department groups were compared using a chi square test. Distribution normality of covariates was tested using the Shapiro-Wilk test.

For categorical variables with equal variances, oneway analysis of variance was used to compare departments, whereas Kruskal-Wallis equality of populations rank test was used for categorical groups with unequal variances.

Multivariable logistic models were developed to test the primary outcomes from the overall care questions (a) rate experience b) recommend hospital c) rate hospital d) overall helped) reported as dichotomous outcomes representing "topbox" response (9 or 10) or no topbox (<9). The association of each covariate was assessed using likelihood ratio tests by testing the model with and without the variable. Marginal means were determined for each department using the derived model with all of the covariates, as well as with no covariates (unadjusted). In order to compare departments, a Bonferroni correction was used for multiple pairwise comparisons. A p value of < 0.05 was considered significant. Analyses were completed using STATA™ vers. 14.2 (College Station, Tx).

Results

Patient Characteristics

There were 2989 patients who responded to the survey representing hospital admissions under the care of 295 physicians (146 medicine, 110 surgery/ENT, 22 family, 17 obstetrics/gynecology.). The institution consists of 918 inhospital beds geographically

situated at 2 campuses. Characteristics of the patients from the total group and from each department are presented in Table 1. There were significant differences between the department groups in terms of physical and mental health, Elixhauser class, admission status, length of stay, age, discharge disposition, marital status and sex.

Topbox Analysis – Overall Measures

The results of the multivariable analyses in the derivation of the model for the overall measures (rate experience, recommend hospital, rate hospital and overall helped) are presented in Tables 2-5. Decrease in topbox scoring was associated with worse degrees of perceived physical and mental health in all four of the questions. There was a significant relationship with age group in all questions with lowest odds ratios in patients between the ages of 18-34 years. On pairwise comparison the predicted scores in this group were significantly lower than those in the age groups of 55-64 years and 65-79 years ($p<0.05$). Increased level of education and female sex were associated with worse scoring in rate experience, recommend hospital and rate hospital questions. Covariates from the institutional database that were significant contributors to the models included discharge disposition to a facility (recommend and rate hospital), marital status (recommend hospital) and ICU stay (rate hospital). Campus site was found to be a factor in rate hospital ($p<0.05$).

Adjusted and unadjusted department-based predicted measures for rate experience, and recommend hospital are presented in Figures 1 and 2. Unadjusted pairwise comparison of rate experience demonstrated a greater likelihood of topbox scoring with surgery as compared to medicine however this was not significant ($p=0.054$). This difference was not seen after adjustment ($p=0.911$). Unadjusted pairwise comparison of the question rate

hospital demonstrated a significant increase in surgery as compared to family medicine, however this difference was not present in the adjusted model (data not shown). Unadjusted analysis of the overall helped question demonstrated greater likelihood of topbox scoring in surgery as compared to medicine and family medicine, as well as obstetrics gynecology as compared to family medicine ($p<0.05$) however these comparisons were no longer significant after adjustment for the covariates in the model (data not shown).

Key Driver Analysis

Key driver analysis of the global question of rate experience is presented in figure 3. Common domains present in quadrant 1 in all four questions include person-centred care, care transition and the domain related to emergency admission processes. Similar patterns were seen with the other three global questions (results not shown).

Discussion

Results from the CPES-IC survey administered to patients discharged from a large Canadian multi-campus health institution were analyzed after merging with a comprehensive administrative database. Two patient-answered demographic questions collected from the survey (patient-perceived overall physical and mental health) were significant covariates predicting topbox recognition in all four of the overall care questions. Increasing level of education and female sex were associated with decreased topbox scoring in rate experience, recommend hospital and rate hospital. Discharge to a non-home environment was associated with lower topbox scoring on recommend and rate hospital. The only significant contributors to the models from the hospital database

included marital status (recommend hospital), and ICU stay (rate hospital). Economic status, in-hospital adverse events and Elixhauser co-morbidity class did not significantly contribute to the models for the four questions related to overall care. After adjustment, there was no significant difference in the predicted measures between the four major departments in any of the four questions that related to the overall patient experience. Finally, key driver analysis using these models, confirmed that the greatest yield for interventions at the hospital level include efforts to improve person-centred care, care transition and the experience for those being admitted through the emergency department.

Patient experience has become a focus of the health care evolution and it has been recognized as a key interest to consumers and patient advocacy groups. The Institute of Healthcare Improvement (IHI) a leader in the transformation of the health care system, has advocated the goal of improving the experience of care within its triple aim of quality [17]. The Affordable Care Act in collaboration with the Centers for Medicare and Medicaid Services (CMS) [12] has emphasized the need to deliver care that provides a quality patient experience. The act has integrated patient experience scores as well as reporting mandates into hospital reimbursement strategies, which further incentivize excellence. Patient experience scores are reported nationally in the US[18] and they may be a source of pride and engagement for health care teams and utilized to compete for patients.

The environment is different in Canada as there is currently no financial benefit and competition between institutions is not a driver for patient services. On the other hand, federal and provincial government health organizations have embraced patient experience as a priority for health care and they have initiated legislation to support its significance in quality delivery. Future public reporting of CPES-IC results and national

benchmarking will motivate quality improvement in this area and patient experience surveying is currently mandatory for hospital accreditation. In Ontario, the Excellent Care for All Act (2010) established that hospitals must develop sustained processes to address and improve the patient experience[19]. Our own Institution has raised the profile of patient experience to the level of a corporate target by integrating it as a foundation of the vision of the hospital with a priority equal to other quality outcomes and efficiency. In order to strategize to bring about improvements in patient experience, it is essential to understand how the current American-based survey applies to Canadian culture and our single-payer system. Specifically it is crucial to appreciate how to adjust for patient demographics within different settings, not just to externally compare with other urban institutions, but also to begin to internally identify factors that may influence overall scoring and interpretation.

The current study is not the first to examine the role of patient and other covariates in the modeling of measures of overall patient experience in Canada[20]. However in the latter work, the analysis involved the HCAHPS survey focusing on the single question of rate experience. The authors did demonstrate a similar relationship with higher level of education, urgent admission status and longer length of stay as predictive of poorer measures of experience rating however they did not include patient-perceived physical and mental health status, both of which were the most consistent and significant predictors of overall care.

It may not be feasible to generalize from the analysis at a single hospital due to the differing contributions of the patient covariates and interactions with the specific domains of patient care at each hospital across the country[21]. For example, race was not found to

be a significant factor for most questions unlike in the United States[21]. This finding may only be relevant in the context of our centre (a medium-sized Canadian city), whereas it may not apply to larger metropolitan centers such as Toronto and Montreal, where there may be greater ethnic diversity. On the other hand, the finding that women are less likely to provide a topbox scoring on questions of overall experience is in keeping with previous findings with the HCAHPS survey[22].

Patient experience key driver analysis has been utilized to focus attention and initiatives in patient-care areas with high potential to impact on the overall global measures of care. The new CPES-IC survey has been designed to not only include domains currently in the HCAHPS survey, but also domains reflecting patient-centred care, transition of care and the processes of direct or emergency admission. Although these new domains have not been formally validated in the Canadian context, they were all identified as areas of potential high yield in our study in terms of overall contribution to the patient experience. Many of these questions refer to key issues of team communication and the perception of coordination of care; items that could be addressed through team re-structuring, checklists and scheduling. On the other hand, nursing and doctor communication skills, though important, did not support targets of high yield in terms of hospital resources.

There are multiple important implications of this work. The analysis highlights the differences in adjusted and unadjusted rankings between departments, which emphasize the importance of the use of the demographic covariates obtained from the survey such as perception of physical and mental health and education level. The adjusted improved measures in Medicine and Family Medicine underscore that chronic disease and comorbidity must be taken into account in patient experience initiatives. Recognition of

adjusted results also enhances engagement of staff who face the challenges of chronic disease care and provides the opportunity to follow for improvements.

The analysis may be limited by unknown and unmeasured covariates. Only a few of the covariates from the administrative database were significant in models describing perceptions of excellence in individual questions of overall care. Further work will be necessary to determine if these administrative database variables are important at model development at the unit or provider level. Although there was no difference between departments in any of the questions, more subtle comparisons such as between divisions and services may be important in understanding how to advance patient experience initiatives. Finally, patient care domains were not included as covariates in the derivation of the multivariable models for the global overall questions. We elected not to do this as we felt the domains as covariates would demonstrate significant bias due to their correlation not only to the outcomes but also to many of the other predictors. Therefore, we elected rather to look at their interactions and correlations using key driver analysis.

In summary, this analysis provides a perspective on drivers that must be considered when assessing patients' perceptions on the overall care at a health care institution in Canada. Health care institutions must incorporate patient demographics and self-reported aspects of perceived health into the analysis of patient experience data to properly interpret this information particularly when comparing departments and units within the institution. We believe that this understanding will form the basis for a strategy of thoughtful data-driven targeted interventions to improve the patient experience.

Figure Legends:

Figure 1: Unadjusted and adjusted predicted percent topbox of corporate indicator "Rate your experience" by hospital department. Error bars represent 95% CI. Difference between Surgery/ENT and Medicine significant (p=0.05) in Unadjusted, however no differences between departments in Adjusted. Adjustment was completed using all of the variables in the multivariable model.

Figure 2: Unadjusted and adjusted predicted percent topbox of corporate indicator "Recommend this hospital" by hospital department. Error bars represent 95% CI. No statistically significant difference between groups. Adjustment was completed using all of the variables in the multivariable model.

Figure 3: Key driver analysis: relationship domain composite measures to the global measure of Overall Experience, direct admission (left) and emergency admission(right). Horizontal black dotted line – mean for all correlation values. Vertical red dotted line – median for all composites. A- Communication doctors, B- Communication nurses, C-Responsiveness staff, D-Care transition, E-Person-centred care, F-Pain management, G-Communication medications, H – Admission processes emergency, I – Admission processes elective

	Total (n=2989)	Surgery (n=1699)	Medicine (n=1023)	Family Medicine (n=79)	Obs/Gyn (n=95)	*p*
Physical health, n(%)						<0.001
Excellent	272 (9.3)	210 (12.4)	45 (4.4)	4 (5.1)	11 (11.5)	
Very Good	812 (27.7)	583 (34.3)	166 (16.2)	8 (10.1)	46 (48.4)	
Good	1008 (34.3)	612 (36.0)	328 (32.1)	37 (46.8)	22 (23.2)	
Fair	616 (21.0)	243 (14.3)	329 (32.2)	19 (24.1)	14 (14.7)	
Poor	227 (7.7)	51 (3)	155 (15.2)	11 (13.9)	2 (2.1)	
Mental health, n(%)						<0.001
Excellent	705 (24.0)	484 (28.5)	180 (17.5)	10 (12.8)	23 (29.2)	
Very Good	1036 (35.3)	636 (37.5)	323 (31.5)	25 (32.1)	42 (44.2)	
Good	786 (26.8)	411 (24.2)	321 (31.3)	24 (30.8)	20 (21.1)	
Fair	335 (11.4)	141 (83)	160 (15.6)	15 (19.2)	9 (9.5)	
Poor	76 (2.6)	26 (1.5)	43 (4.2)	4 (5.1)	1 (1.1)	
Education, n(%)						0.289
8th Grade	182 (6.4)	92 (5.6)	78 (7.8)	8 (10.4)	2 (2.2)	
College/CEGEP	676 (23.6)	417 (25.2)	214 (21.4)	12 (15.6)	21 (22.8)	
Some High School	315 (11.0)	178 (10.8)	109 (10.9)	12 (15.6)	10 (10.9)	
High School	682 (23.9)	370 (22.4)	270 (27.0)	18 (23.4)	16 (17.4)	
Undergraduate	456 (16.0)	265 (11.0)	156 (15.6)	15 (19.5)	16 (17.4)	
Post Graduate	548 (19.2)	331 (20.0)	172 (17.2)	12 (15.6)	27 (29.4)	
Race, n(%)						0.223
White	2555 (89.7)	1518 (90.7)	896 (89.2)	62 (79.5)	79 (84.0)	
Black	53 (1.9)	26 (1.6)	26 (2.6)	1 (1.3)	0	
Arab	43 (1.5)	25 (1.5)	13 (1.3)	2 (2.6)	3 (3.2)	
First Nation	20 (0.7)	13 (0.8)	5 (0.5)	1 (1.3)	1 (1.1)	
Oriental	69 (2.4)	36 (2.2)	30 (3.0)	3 (3.9)	0	
Indian	54 (1.9)	24 (1.4)	22 (22.2)	4 (5.1)	4 (4.3)	
Other	55 (1.9)	31 (1.9)	12 (1.2)	5 (6.4)	7 (7.5)	
Elixclass, n(%)						<0.001
<0	90 (3.1)	60 (3.5)	28 (2.7)	2 (2.5)	0	
0	1606 (54.5)	1123 (65.3)	403 (38.3)	42 (51.9)	38 (40)	
1 to 5	693 (23.5)	382 (22.2)	245 (23.3)	26 (32.1)	40 (42.1)	
6 to 13	370 (12.6)	86 (5.0)	269 (25.6)	10 (12.4)	5 (5.3)	
>13	189 (6.4)	69 (4.0)	107 (10.2)	1 (1.2)	12 (12.6)	
Admit, n(%)						<0.001
Elective	1037 (35.2)	896 (50.1)	79 (7.5)	0	62 (65.3)	
Emergent	1709 (58.0)	720 (41.9)	880 (83.7)	80 (98.8)	29 (30.5)	
Urgent	202 (6.9)	104 (6.1)	93 (8.8)	1 (1.2)	4 (4.2)	

Age group, n(%)						<0.001
18-34	134 (4.6)	90 (5.2)	39 (3.7)	2 (2.5)	3 (3.2)	
35-44	152 (5.2)	89 (5.2)	46 (4.4)	3 (3.7)	14 (14.7)	
45-54	313 (10.6)	219 (12.7)	80 (7.6)	0	14 (14.7)	
55-64	622 (21.1)	383 (22.3)	202 (19.2)	10 (12.4)	27 (28.4)	
65-79	1136 (38.6)	687 (39.9)	394 (37.5)	25 (30.9)	30 (31.6)	
>79	590 (20.0)	252 (14.7)	290 (27.6)	41 (50.6)	7 (7.4)	
Any psi, n(%)	321 (10.9)	205 (11.9)	96 (9.1)	10 (12.4)	10 (10.5)	0.145
LOS (days), median(IQR)	4 (2, 7)	3 (2, 6)	5 (3, 8)	5 (3, 9)	3 (2, 4)	<0.001
Income decile, median(IQR)	8 (5, 9)	8 (5, 9)	8 (5, 9)	8 (5, 9)	8 (6, 9)	0.449
ICU, n(%)	102 (3.5)	60 (3.5)	41 (3.9)	1 (1.2)	0	0.914
Married/ partner n(%)	1904 (64.6)	1153 (67.0)	650 (61.8)	42 (51.9)	59 (62.1)	0.003
Sex female n(%)	1435 (48.7)	794 (41.2)	502 (47.7)	45 (55.6)	100	<0.001
Campus A n(%)	1308 (43.8)	834 (48.5)	423 (40.2)	51 (63.0)	0	<0.001
ED isit within 7 days n(%)	226 (7.6)	144 (8.4)	68 (6.5)	8 (9.9)	5 (5.3)	0.195
Discharge disposition n(%)						<0.001
Home	1885 (63.2)	1220 (71.1)	548 (52.2)	35 (43.2)	72 (75.8)	
Home-setting	872 (29.2)	367 (21.4)	425 (40.5)	37 (45.7)	21 (22.1)	
Another health facility	226 (7.6)	130 (7.6)	76 (7.2)	9 (11.1)	2 (2.1)	
Topbox Rate Experience n(%)	1963 (69.1)	1191 (71.2)	662 (66.3)	45 (57.7)	65 (69.2)	0.008
Topbox Recommend Hospital n(%)	2168 (74.8)	1294 (76.1)	752 (73.2)	52 (66.7)	70 (73.7)	0.126
Topbox Rate Hospital n(%)	1737 (60.4)	1049 (62.2)	591 (58.0)	37 (47.4)	60 (63.8)	0.014
Topbox Overal Helped n(%)	2145 (74.6)	1325 (78.7)	701 (68.8)	46 (57.5)	73 (78.5)	<0.001

Table 1: Characteristics of patients answering patient experience survey. Abbreviations: Elixclass – Elixhauser class, psi – patient safety indicator event, LOS – length of stay, ALC – alternate level of care at discharge, ICU – intensive care unit stay

	Multivariable Analysis	*p*	LR test (*p*)
Department			0.671
Surgery/ENT	reference		
Medicine	1.08 (0.87, 1.34)	0.502	
Family	0.82 (0.49, 1.39)	0.468	
Obs/Gyn	0.88 (0.54, 1.44)	0.620	
Physical Health			<0.001
Excellent	reference		
Very Good	0.71(0.48, 1.05)	0.083	
Good	0.49(0.33, 0.73)	<0.001	
Fair	0.48(0.31, 0.74)	0.001	
Poor	0.40(0.24, 0.67)	<0.001	
Mental Health			<0.001
Excellent	reference		
Very Good	0.77(0.60, 1.00)	0.051	
Good	0.57(0.43, 0.76)	<0.001	
Fair	0.43(0.30, 0.62)	<0.001	
Poor	0.40(0.22, 0.73)	0.003	
Education			0.007
8th Grade	reference		
Some High School	1.02(0.64, 1.64)	0.924	
High School	0.69(0.45, 1.04)	0.077	
College/CEGEP	0.56(0.37, 0.86)	0.007	
Undergraduate	0.44(0.29, 0.69)	<0.001	
Post Graduate	0.42(0.28, 0.65)	<0.001	
Admit-Urgent	0.86(0.72, 1.02)	0.075	0.075
Sex Male	1.22(1.02, 1.47)	0.030	0.031
Race			0.243
White	reference		
Black	1.45(0.73, 2.91)	0.289	
Arab	0.98(0.49, 1.97)	0.958	
First Nation	0.59(0.20, 1.79)	0.355	
Oriental	1.43(0.80, 2.54)	0.226	
Indian	1.18(0.63, 2.21)	0.611	
Other	0.53(0.29, 0.98)	0.043	
Elixclass			0.064
<0	reference		
0	0.56(0.31, 0.99	0.045	
1 to 5	0.72(0.40, 1.31)	0.282	
6 to 13	0.57(0.30, 1.05)	0.073	
>13	0.61(0.32, 1.20)	0.151	

Age Group			0.007
18-34	reference		
35-44	1.64(0.97, 2.77)	0.066	
45-54	1.73(1.09, 2.72)	0.019	
55-64	2.28(1.49, 3.51)	<0.001	
65-79	2.07(1.37, 3.13)	0.001	
>79	1.83(1.18, 2.84)	0.007	
Any psi	0.98(0.73, 1.32)	0.879	0.879
LOS (>3 days)	0.85(0.69, 1.04)	0.122	0.122
Income decile[1]	0.95(0.83, 1.10)	0.521	0.521
ICU	1.24(0.75, 2.04)	0.407	0.402
Married/Partner	0.93(0.76, 1.12)	0.426	0.425
Emergency visit within 7 days post d/c	0.77(0.56, 1.06)	0.107	0.110
Discharge			0.116
Home	reference		
Home setting	0.91(0.74, 1.14)	0.423	
Another facility	0.69(0.48, 0.98)	0.037	
Campus		0.332	

Table 2: Analysis of covariates associated with topbox designation of the corporate measure of "Rate experience". 1 log transformed. Abbreviations: Elixclass – Elixhauser class, psi – patient safety indicator event, LOS – length of stay, ALC – alternate level of care at discharge, ICU – intensive care unit stay, LR – likelihood ratio

	Multivariable Analysis	*p*	LR test (*p*)
Department			0.908
Surgery/ENT	reference		
Medicine	1.06(0.84, 1.34)	0.620	
Family	0.89(0.51, 1.53)	0.669	
Obs/Gyn	1.03(0.62, 1.72)	0.913	
Physical Health			0.018
Excellent	reference		
Very Good	0.74(0.49, 1.12)	0.152	
Good	0.54(0.36, 0.81)	0.003	
Fair	0.56(0.35, 0.88)	0.012	
Poor	0.557(0.323, 0.959)	0.035	
Mental Health			<0.001
Excellent	reference		
Very Good	0.90(0.69, 1.18)	0.435	
Good	0.63(0.47, 0.85)	0.002	
Fair	0.56(0.39, 0.81)	0.002	
Poor	0.39(0.21, 0.71)	0.001	
Education			<0.001
8th Grade	reference		
Some High School	1.07(0.67, 1.73)	0.768	
High School	0.94(0.62, 1.45)	0.793	
College/CEGEP	0.67(0.44, 1.03)	0.069	
Undergraduate	0.57(0.36, 0.89)	0.014	
Post Graduate	0.63(0.41, 0.99)	0.045	
Race			<0.001
White	reference		
Black	5.63(1.72, 18.45)	0.004	
Arab	1.56(0.70, 3.49)	0.273	
First Nation	0.38(0.13, 1.11)	0.078	
Oriental	2.09(1.07, 4.11)	0.032	
Indian	1.64(0.81, 3.33)	0.168	
Other	0.51(0.28, 0.93)	0.028	
Elixclass			0.197
<0	reference		
0	0.48(0.26, 0.93)	0.030	
1 to 5	0.54(0.27, 1.05)	0.068	
6 to 13	0.56(0.28, 1.13)	0.103	
>13	0.51(0.25, 1.07)	0.074	
Admit Urgent	0.98(0.82, 1.17)	0.843	0.843

Age Group			0.048
18-34	reference		
35-44	1.17(0.67, 2.06)	0.566	
45-54	1.82(1.11, 3.00)	0.019	
55-64	1.85(1.16, 2.93)	0.009	
65-79	1.58(1.02, 2.46)	0.042	
>79	1.37(0.86, 2.19)	0.185	
Any psi	1.09(0.79, 1.49)	0.600	0.092
LOS > 3 days	0.88(0.71, 1.09)	0.247	0.248
Income decile[1]	1.01(0.87, 1.17)	0.908	0.908
ICU	1.62(0.92, 2.87)	0.098	0.086
Married/Partner	0.80(0.65, 0.98)	0.031	0.030
Sex male	1.41(1.16, 1.70)	<0.001	<0.001
Emergency visit within 7 days post d/c	0.75(0.54, 1.04)	0.088	0.081
Discharge			0.037
Home	reference		
Home setting	0.76(0.61, 0.96)	0.020	
Another facility	0.71(0.49, 1.03)	0.069	
Campus		1.000	

Table 3: Analysis of covariates associated with topbox measure of "Recommend this hospital". 1 log transformed..Abbreviations: Elixclass – Elixhauser class, psi – patient safety indicator event, LOS – length of stay, ALC – alternate level of care at discharge, ICU – intensive care unit stay

	Multivariable Analysis	*p*	LR test (*p*)
Department			0.496
Surgery/ENT	reference		
Medicine	0.96(0.78, 1.18)	0.676	
Family	0.71(0.43, 1.19)	0.197	
Obs/Gyn	1.20(0.75, 1.93)	0.451	
Physical Health			<0.001
Excellent	reference		
Very Good	0.70(0.50, 0.99)	0.041	
Good	0.49(0.34, 0.69)	<0.001	
Fair	0.61(0.42, 0.91)	0.014	
Poor	0.67(0.41, 1.09)	0.109	
Mental Health			<0.001
Excellent	reference		
Very Good	0.74(0.59, 0.94)	0.013	
Good	0.58(0.45, 0.76)	<0.001	
Fair	0.52(0.37, 0.73)	<0.001	
Poor	0.51(0.28, 0.91)	0.024	
Education			<0.001
8th Grade	reference		
Some High School	1.16(0.75, 1.77)	0.507	
High School	0.90(0.62, 1.32)	0.599	
College/CEGEP	0.61(0.42, 0.90)	0.013	
Undergraduate	0.47(0.32, 0.72)	<0.001	
Post Graduate	0.49(0.32, 0.71)	<0.001	
Race			0.399
White	reference		
Black	1.70(0.88, 3.29)	0.114	
Arab	0.95(0.50, 1.82)	0.879	
First Nation	0.70(0.24, 2.01)	0.503	
Oriental	1.26(0.74, 2.14)	0.403	
Indian	1.23(0.67, 2.26)	0.501	
Other	0.66(0.36, 1.19)	0.166	
Admit Urgent	0.87(0.74, 1.02)		0.093
Sex Male	1.31(1.10, 1.55)	0.002	0.002
Elixclass			0.073
<0	reference		
0	0.56(0.34, 0.93)	0.025	
1 to 5	0.69(0.40, 1.17)	0.169	
6 to 13	0.66(0.38, 1.16)	0.148	
>13	0.59(0.32, 1.07)	0.083	

Age Group			0.001
18-34	reference		
35-44	1.47(0.89, 2.44)	0.136	
45-54	2.03(1.30, 3.17)	0.002	
55-64	2.35(1.54, 3.58)	<0.001	
65-79	2.03(1.35, 3.04)	0.001	
>79	1.82(1.19, 2.80)	0.006	
Any psi	0.92(0.69, 1.22)	0.544	0.544
LOS > 3 days	0.96(0.79, 1.16)	0.668	0.668
Income decile[1]	1.06(0.93, 1.21)	0.395	0.395
ICU	1.93(1.17, 3.19)	0.010	0.008
Married/Partner	0.89(0.74, 1.06)	0.200	0.200
Emergency visit within 7 days post d/c	0.76(0.56, 1.04)	0.083	0.084
Discharge			0.016
Home	reference		
Home setting	0.81(0.66, 1.00)	0.052	
Another facility	0.70(0.50, 0.99)	0.046	
Campus		0.008	

Table 4: Analysis of covariates associated with topbox measure of "Rate this hospital". 1 log transformed..Abbreviations: Elixclass – Elixhauser class, psi – patient safety indicator event, LOS – length of stay, ALC – alternate level of care at discharge, ICU – intensive care unit stay

	Multivariable Analysis	*p*	LR test (*p*)
Department			0.167
Surgery/ENT	reference		
Medicine	0.83(0.66, 1.04)	0.113	
Family	0.60(0.36, 1.01)	0.047	
Obs/Gyn	0.85(0.49, 1.47)	0.558	
Physical Health			<0.001
Excellent	reference		
Very Good	0.89(0.58, 1.37)	0.601	
Good	0.59(0.38, 0.90)	0.014	
Fair	0.57(0.36, 0.91)	0.019	
Poor	0.39(0.23, 0.68)	0.001	
Mental Health			<0.001
Excellent	reference		
Very Good	0.70(0.53, 0.94)	0.019	
Good	0.52(0.39, 0.71)	<0.001	
Fair	0.44(0.30, 0.64)	<0.001	
Poor	0.44(0.24, 0.81)	0.008	
Education			0.126
8th Grade	reference		
Some High School	1.03(0.64, 1.63)	0.914	
High School	0.87(0.57, 1.31)	0.500	
College/CEGEP	0.81(0.53, 1.23)	0.319	
Undergraduate	0.63(0.41, 0.98)	0.039	
Post Graduate	0.79(0.51, 1.22)	0.285	
Race			0.505
White	reference		
Black	1.81(0.81, 4.01)	0.146	
Arab	0.83(0.41, 1.69)	0.612	
First Nation	0.94(0.28, 3.12)	0.920	
Oriental	1.17(0.65, 2.12)	0.606	
Indian	1.04(0.55, 2.00)	0.895	
Other	0.61(0.33, 1.14)	0.122	
Admit Urgent	0.86(0.72, 1.03)	0.108	0.109
Sex Male	1.01(0.83, 1.23)	0.906	0.906
Elixclass			0.079
<0	reference		
0	0.70(0.39, 1.28)	0.252	
1 to 5	0.98(0.52, 1.82)	0.938	
6 to 13	0.71(0.37, 1.37)	0.309	
>13	0.81(0.40, 1.62)	0.547	

Age Group			0.042
18-34	reference		
35-44	1.10(0.63, 1.91)	0.739	
45-54	1.82(1.10, 3.00)	0.019	
55-64	1.73(1.10, 2.75)	0.018	
65-79	1.56(1.01, 2.42)	0.047	
>79	1.42(0.89, 2.26)	0.254	
Any psi	1.12(0.81, 1.54)	0.492	0.490
LOS > 3 days	0.91(0.73, 1.13)	0.378	0.379
Income decile[1]	1.01(0.87, 1.17)	0.912	0.912
ICU	1.32(0.76, 2.27)	0.325	0.316
Married/Partner	0.92(0.75, 1.13)	0.418	0.417
Emergency visit within 7 days post d/c	0.76(0.54, 1.06)	0.102	0.107
Discharge			0.088
Home	reference		
Home setting	0.84(0.67, 1.05)	0.128	
Another facility	0.68(0.47, 0.99)	0.043	
Campus		0.999	

Table 5: Analysis of covariates associated with topbox measure of "Overall helped". 1 log transformed..Abbreviations: Elixclass – Elixhauser class, psi – patient safety indicator event, LOS – length of stay, ALC – alternate level of care at discharge, ICU – intensive care unit stay

Contributorship Statement: We certify that all of the authors have fulfilled the following four criteria to justify authorship:

• Substantial contributions to the conception or design of the work (F.D.R, S.S., A.F.); or the acquisition, analysis, or interpretation of data for the work (D.R., A.A.Z., T.R.); AND

• Drafting the work or revising it critically for important intellectual content (F.D.R., D.R., S.S., T.R., A.F.); AND

• Final approval of the version to be published (F.D.R., D.R., A.A.Z., S.S., T. R., A. F.; AND

• Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. (F. D. R., D. R., A. A. Z., S. S. , T. R. , A. F.

Competing Interests for authors: None

Funding: None

Data sharing statement: There is no additional unpublished data from the study. The study data is partially de-anonymized and therefore it is kept on a secure server at the Ottawa Hospital.

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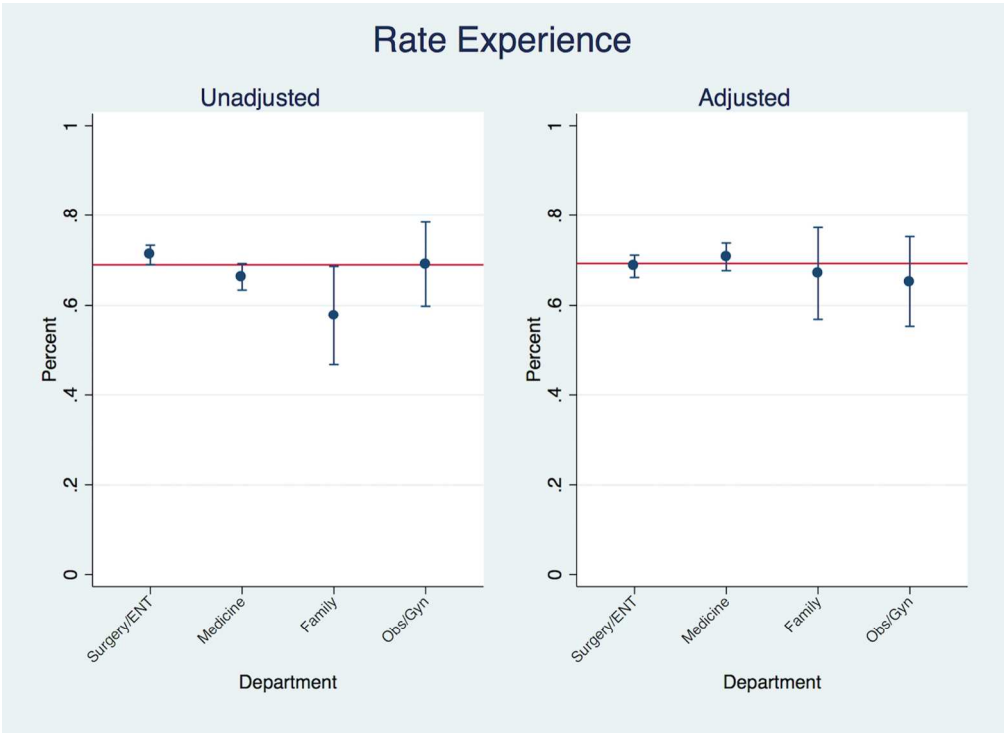

Figure 1: Unadjusted and adjusted predicted percent topbox of corporate indicator "Rate your experience" by hospital department. Error bars represent 95% CI. Difference between Surgery/ENT and Medicine significant (p=0.05) in Unadjusted, however no differences between departments in Adjusted. Adjustment was completed using all of the variables in the multivariable model.

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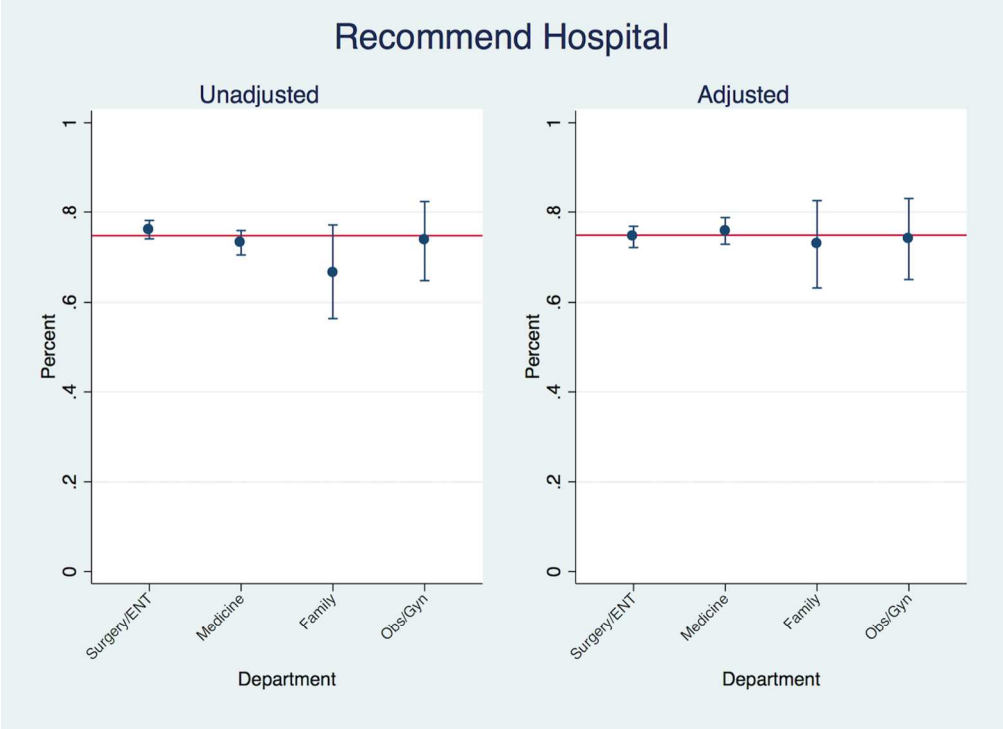

Figure 2: Unadjusted and adjusted predicted percent topbox of corporate indicator "Recommend this hospital" by hospital department. Error bars represent 95% CI. No statistically significant difference between groups. Adjustment was completed using all of the variables in the multivariable model.

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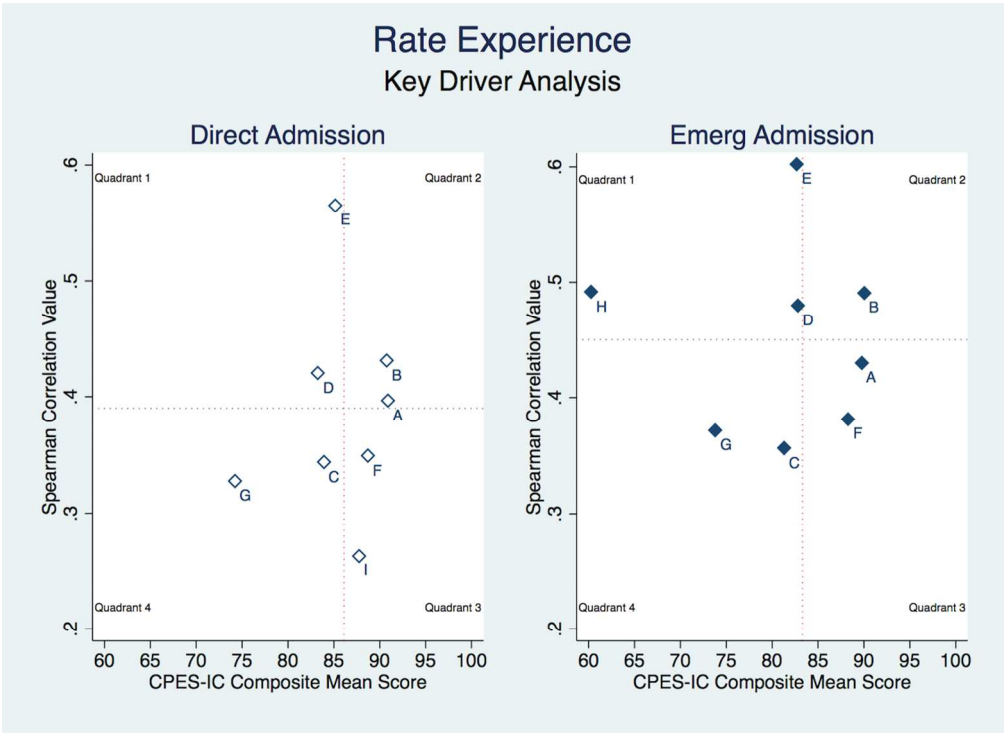

Figure 3: Key driver analysis: relationship domain composite measures to the global measure of Overall Experience, direct admission (left) and emergency admission(right). Horizontal black dotted line – mean for all correlation values. Vertical red dotted line – median for all composites. A- Communication doctors, B- Communication nurses, C- Responsiveness staff, D-Care transition, E-Person-centred care, F-Pain management, G-Communication medications, H – Admission processes emergency, I – Admission processes elective

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Canadian Patient Experiences Survey—Inpatient Care

Survey Instructions

- You should fill out this questionnaire only if you were the patient named on the envelope. You may need to get help from a family member or friend to answer the questions. That's okay.
- Answer all the questions by checking the box to the left of your answer.
- Your response to this survey is voluntary but will provide us with important information.
- You are sometimes told to skip over some questions in this survey. When this happens, you will see an arrow with a note that tells you what question to answer next, like this:

☐ Yes

☑ No ➔ **If No, go to Question 1**

Placeholder for jurisdiction comments.

Please answer the questions about your recent stay at the hospital named on the cover letter. Do not include any other hospital stays in your answers.

YOUR CARE FROM NURSES

1. During this hospital stay, how often did nurses treat you with courtesy and respect?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

2. During this hospital stay, how often did nurses listen carefully to you?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

3. During this hospital stay, how often did nurses explain things in a way you could understand?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

4. During this hospital stay, after you pressed the call button, how often did you get help as soon as you wanted it?

☐ Never
☐ Sometimes
☐ Usually
☐ Always
☐ I never pressed the call button

YOUR CARE FROM DOCTORS

5. During this hospital stay, how often did doctors treat you with courtesy and respect?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

6. During this hospital stay, how often did doctors listen carefully to you?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

7. During this hospital stay, how often did doctors explain things in a way you could understand?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

THE HOSPITAL ENVIRONMENT

8. During this hospital stay, how often were your room and bathroom kept clean?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

9. During this hospital stay, how often was the area around your room quiet at night?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

YOUR EXPERIENCES IN THIS HOSPITAL

10. During this hospital stay, did you need help from nurses or other hospital staff in getting to the bathroom or in using a bedpan?

- ☐ Yes
- ☐ No ➔ **If No, go to Question 12**

11. How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

12. During this hospital stay, did you need medicine for pain?

- ☐ Yes
- ☐ No ➔ **If No, go to Question 15**

13. During this hospital stay, how often was your pain well controlled?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

14. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

15. During this hospital stay, were you given any medicine that you had not taken before?

☐ Yes
☐ No ➔ **If No, go to Question 18**

16. Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

17. Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?

☐ Never
☐ Sometimes
☐ Usually
☐ Always

WHEN YOU LEFT THE HOSPITAL

18. After you left the hospital, did you go directly to your own home, to someone else's home or to another health facility?

☐ Own home
☐ Someone else's home
☐ Another health facility ➔ **If Another health facility, go to Question 21**

19. During this hospital stay, did doctors, nurses or other hospital staff talk with you about whether you would have the help you needed when you left the hospital?

☐ Yes
☐ No

20. During this hospital stay, did you get information in writing about what symptoms or health problems to look out for after you left the hospital?

☐ Yes
☐ No

OVERALL RATING OF HOSPITAL

Please answer the following questions about your stay at the hospital named on the cover letter. Do not include any other hospital stays in your answers.

21. Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?

☐ 0 Worst hospital possible
☐ 1
☐ 2
☐ 3
☐ 4
☐ 5
☐ 6
☐ 7
☐ 8
☐ 9
☐ 10 Best hospital possible

22. Would you recommend this hospital to your friends and family?

☐ Definitely no
☐ Probably no
☐ Probably yes
☐ Definitely yes

In this next section, we ask several more questions about your stay at the hospital.

YOUR ARRIVAL AT THE HOSPITAL

23. When you arrived at the hospital, did you go to the emergency department?

☐ Yes ➔ **If Yes, go to Question 26**
☐ No ➔ **If No, please continue below**

24. Before coming to the hospital, did you have enough information about what was going to happen during the admission process?

☐ Not at all
☐ Partly
☐ Quite a bit
☐ Completely

25. Was your admission into the hospital organized?

☐ Not at all
☐ Partly
☐ Quite a bit
☐ Completely

Go to Question 30

Answer questions 26 to 29 only if you were admitted through the emergency department.

26. When you were in the emergency department, did you get enough information about your condition and treatment?

☐ Not at all
☐ Partly
☐ Quite a bit
☐ Completely

27. Were you given enough information about what was going to happen during your admission to the hospital?

☐ Not at all
☐ Partly
☐ Quite a bit
☐ Completely

28. After you knew that you needed to be admitted to a hospital bed, did you have to wait too long before getting there?

☐ Yes
☐ No

29. Was your transfer from the emergency department into a hospital bed organized?

☐ Not at all
☐ Partly
☐ Quite a bit
☐ Completely

Continue with Question 30

DURING YOUR HOSPITAL STAY

30. Do you feel that there was good communication about your care between doctors, nurses and other hospital staff?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

31. How often did doctors, nurses and other hospital staff seem informed and up-to-date about your hospital care?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

32. How often were tests and procedures done when you were told they would be done?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always
- ☐ I did not have any tests or procedures

33. During this hospital stay, did you get all the information you needed about your condition and treatment?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

34. Did you get the support you needed to help you with any anxieties, fears or worries you had during this hospital stay?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always
- ☐ Not applicable

35. Were you involved as much as you wanted to be in decisions about your care and treatment?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always

36. Were your family or friends involved as much as you wanted in decisions about your care and treatment?

- ☐ Never
- ☐ Sometimes
- ☐ Usually
- ☐ Always
- ☐ I did not want them to be involved
- ☐ I did not have family or friends to be involved

LEAVING THE HOSPITAL

37. Before you left the hospital, did you have a clear understanding about all of your prescribed medications, including those you were taking before your hospital stay?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely
- ☐ Not applicable

38. Did you receive enough information from hospital staff about what to do if you were worried about your condition or treatment after you left the hospital?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely

39. When you left the hospital, did you have a better understanding of your condition than when you entered?

- ☐ Not at all
- ☐ Partly
- ☐ Quite a bit
- ☐ Completely

YOUR OVERALL RATINGS

40. Overall, do you feel you were helped by your hospital stay? Please answer on a scale where 0 is "not helped at all" and 10 is "helped completely."

Overall . . . (Please circle a number)

Not helped at all — Helped completely

0 1 2 3 4 5 6 7 8 9 10

41. Overall . . . (Please circle a number)

I had a very poor experience — I had a very good experience

0 1 2 3 4 5 6 7 8 9 10

ABOUT YOU

42. In general, how would you rate your overall physical health?

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

43. In general, how would you rate your overall mental or emotional health?

- ☐ Excellent
- ☐ Very good
- ☐ Good
- ☐ Fair
- ☐ Poor

44. What is the highest grade or level of school that you have completed?

- ☐ 8th grade or less
- ☐ Some high school, but did not graduate
- ☐ High school or high school equivalency certificate
- ☐ College, CEGEP or other non-university certificate or diploma
- ☐ Undergraduate degree or some university
- ☐ Post-graduate degree or professional designation

45. What is your gender?

- ☐ Male
- ☐ Female
- ☐ Other

46. What is your year of birth?

(Please write in; for example, "1934.")

_____

47. Was your most recent stay at this hospital for a childbirth experience?

☐ Yes
☐ No

48. The following question will help us to better understand the communities that we serve. Do you consider yourself to be . . .

(Check all that apply)

☐ White
☐ Chinese
☐ First Nation, Métis, Inuk or mixed (others may say Aboriginal or Indigenous)
☐ South Asian (East Indian, Pakistani, Sri Lankan, etc.)
☐ Black
☐ Filipino
☐ Latin American
☐ Southeast Asian (Vietnamese, Cambodian, Malaysian, Laotian, etc.)
☐ Arab
☐ West Asian (Iranian, Afghan, etc.)
☐ Korean
☐ Japanese
☐ Other

49. Is there anything else you would like to share about your hospital stay?

Questions 1 to 22 and 43 are adapted from the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) questionnaire.

Questions 23 to 49 (excluding question 43) were adapted and/or developed by the Canadian Institute for Health Information in consultation with an interjurisdictional committee of experts.

Reporting Checklist for Submitted Manuscript: Impact of patient characteristics on the Canadian Patient Experiences Survey – Inpatient Care survey- analysis from an academic tertiary care centre
Rubens FD et al.
BMJ Open 2018

Based upon: Proposed Reporting Guidelines: Burns KE et al 2008. A guide for the design and conduct of self-administered surveys for clinicians. CMAJ 179;245-252

Paper Section	Question	Identified in Text
Abstract	Is the objective clearly stated?	Page 2
	Is the design of the study stated?	Page 2
	Is the study setting well-described?	Page 2
	Is the survey population described?	Page 2
	Is the response rate reported?	No – not available
	Are the outcome measures identified?	Page 2
	Are the main results clearly reported?	Page 2
	Are the conclusions appropriate?	Page 2
Introduction	Is the problem clearly stated?	Pages 5-7
	Is the pertinent literature cited and critically appraised?	Pages 5-7
	Is the relevance of the research question explained?	Pages 5-7
	Is the objective clearly stated?	Pages 7-8
Methods	Is the study design appropriate to the objective?	Pages 8-9
	Is the setting clearly described?	Page 8
	Are the methods described clearly enough to permit other researchers to duplicate the study?	Pages 8-10
	Is the survey sample likely to be representative of the population?	Page 8
	Is the questionnaire described adequately?	Appendix
	Have the validity and reliability of the questionnaire been established?	Not applicable – survey developed elsewhere and validated by CIHI
	Was the questionnaire administered in a satisfactory way?	Page 8
	Are the statistical methods used appropriately?	Pages 9-10
Results	Do the results address the objective?	Pages 10-12
	Are all the respondents accounted for?	Pages 10-12
	Are the results clearly and logically	Pages 10-12,

	presented?	Figures 1-5, Tables
	Are the tables and figures appropriate?	Figures 1-5, Tables
	Are the numbers consistent in the text and the tables?	Pages 10-12
Discussion	Are the results succinctly summarized?	Page 12
	Are the implications of the results stated?	Pages 14-15
	Are other interpretations considered and refuted?	Pages 15-16
	Are the limitations of the study and its results explained?	Pages 15-16
	Are appropriate conclusions drawn?	Page 16

STROBE Statement—checklist of items that should be included in reports of observational studies

	Item No.	Recommendation	Page No.	Relevant text from manuscript
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1	lines 3-5
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2	
Introduction				
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-7	
Objectives	3	State specific objectives, including any prespecified hypotheses	7-8	48-55 & 3-11
Methods				
Study design	4	Present key elements of study design early in the paper	8-10	
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	8	
Participants	6	(*a*) *Cohort study*—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study*—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study*—Give the eligibility criteria, and the sources and methods of selection of participants	8	
		(*b*) *Cohort study*—For matched studies, give matching criteria and number of exposed and unexposed *Case-control study*—For matched studies, give matching criteria and the number of controls per case		
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8-10	
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8-10	
Bias	9	Describe any efforts to address potential sources of bias	10	
Study size	10	Explain how the study size was arrived at	N/A	

Continued on next page

Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	8-10
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	10
		(*b*) Describe any methods used to examine subgroups and interactions	10
		(*c*) Explain how missing data were addressed	10
		(*d*) *Cohort study*—If applicable, explain how loss to follow-up was addressed *Case-control study*—If applicable, explain how matching of cases and controls was addressed *Cross-sectional study*—If applicable, describe analytical methods taking account of sampling strategy	N/A
		(*e*) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	10
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	Table 1
		(b) Indicate number of participants with missing data for each variable of interest	10
		(c) *Cohort study*—Summarise follow-up time (eg, average and total amount)	~~10~~
Outcome data	15*	*Cohort study*—Report numbers of outcome events or summary measures over time	
		Case-control study—Report numbers in each exposure category, or summary measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary measures	10-12 ; Tables 2-5
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	Tables 2-5
		(*b*) Report category boundaries when continuous variables were categorized	10
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	N/A

Continued on next page

Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	12
Discussion			
Key results	18	Summarise key results with reference to study objectives	12-13
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	12-17
Generalisability	21	Discuss the generalisability (external validity) of the study results	12-17
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	No funding source Indicated on the

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.