

Factors Affecting Regional Emergency Department Selection: A cross-sectional survey of emergency department patients.

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ABSTRACT

Introduction: Increases in regional emergency department (ED) efficiencies might be garnered by shifting patients to less crowded EDs. This presupposes that patients would be prepared to move around within regions. We sought to determine factors associated with the decision to choose a specific regional ED.

Methods: We employed a cross-sectional face-to-face survey developed using qualitative focus group methodology from 38 recent patient volunteers. The created ED survey was administered only to self-directed Canadian Triage and Acuity Scale (CTAS) 3 – 5 patients aged ≥ 19 years presenting to each of six regional EDs in the Vancouver Coastal Health (VCH) Region from February 25 – April 29, 2010. Surveys were conducted 24/7 with focus on the busiest hours of the day (11:00 – 17:00). Sample size was calculated to reflect differences in annual ED visit volumes to give a 95% confidence interval with a precision of $\pm 4\%$ around the primary outcome questions.

Results: 634 surveys were completed (SPH 186, VGH 147, RH 100, LGH 92, MSJ 56, UBC 53). 34% (217) were CTAS 3. The top factors in the decision to use a specific ED were: distance from ED (25.3%), ED wait times (10.3%), staff courtesy (9.5%), facility reputation (8.3%) and perceived quality of care (8%). 57.7% (95% CI 53.2 – 61.2) of patients felt that knowing an ED had a shorter wait time would influence their choice. Multivariable analysis of factors influencing impact of wait times show that having an orthopedic (painful) complaint ($p = 0.047$ OR 1.42 [1.05 – 1.98]) and age < 60 ($p = 0.049$ OR 1.47 [1.02 – 2.14]) created greater importance to wait times. Multivariable analysis of factors associated with choosing distance as important revealed that ED distance < 10 km ($p = 0.0011$ OR 2.2 [1.45 – 3.33]), age ≥ 60 ($p = 0.041$ OR 1.58 [1.12 – 2.26]), and not choosing a downtown ED ($p = 0.011$ OR 0.65 [0.46 – 0.91]) were significant. 458/584 (78.42%) respondents said that they would access a website (78.4%; 95% CI = 75.1%-81.8%) to obtain wait time and other ED specific information.

Conclusion: Distance from ED is a more important concern than wait time for self-directed patients choosing a particular ED. Dissemination of ED wait times and other educational material may be used to modulate regional ED inputs to create system efficiencies.

PREFACE

This study was conducted as per the Master of Health Administration (MHA) Internship Program within Vancouver Coastal Health Authority (VCHA) and to meet the requirements for the University of British Columbia (UBC), School of Population and Public Health, 590 Course. The completion of this project is required to successfully complete the MHA program.

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INTRODUCTION

The Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation have defined overcrowding as a situation in which the demand for emergency services exceeds the ability of a department to provide quality care within acceptable time frames.¹ ED overcrowding has been identified as a national problem. Despite a range of initiatives and management strategies ED overcrowding in Canada has been escalating resulting in inadequate patient care, prolonged delays in the treatment of pain and suffering, long wait times and patient dissatisfaction, ambulance diversions, decreased nurse/physician satisfaction and negative effect on teaching and research.^{2,3,4}

Using a model of input, throughput and output one can describe the flow of patients through an ED. Some ED health services research and local hospital operational initiatives have focused on the throughput portion of flow as well as the output. Initiatives like extra physicians, a rapid assessment zone and quicker registration and triage help to move the patient through the ED more quickly. Protocols like the “Over-Capacity Protocol” are geared to help with the output of admitted patients in the ED. Lesser work has been done on the input side of this ED flow model. One way to adjust an ED’s input is to redirect patients from a busy to less busy ED, if variability exists.

Evidence suggests that there is some variability in a regional system of EDs. Reviewing hourly data from 2009-2010, there were times when a particular ED in the VCH region had maximal volumes and acuity arrive over a four hour period while the other five regional EDs were not as busy*. Anecdotal review of CareConnect, a regional tool that links the three regional IT systems together and allows the user to view the patient census boards of all regional ED simultaneously, shows that there are times when some EDs are much busier than others. This asymmetric use of EDs at a given moment in time further suggests that there is capacity in the collective regional EDs.

What is not known in the literature and in the urban VCH region, in particular, is how patients decide which ED to utilize when they feel unwell. Parenthetically, this is different than asking “why” a patient went to an ED at all, which has been researched in the past.⁵ This has implications if the modification of the input side of ED flow is desirable. Given that regional ED volumes have gone up overall by about 15% since 2005-2006*, the need to modify ED input as well as throughput and output is essential. It is also important to understand how patients would like to receive information about the status of EDs if in fact there are factors that might influence patient ED choice.

Our hypothesis is that patients place importance on wait times to see a physician and the distance that they need to travel to get to an ED when choosing a specific ED to receive care, and that various factors will be associated with this perception.

* Source: Vancouver Coastal Health Emergency Department Data Cube.

METHODS

Study Population:

We conducted a cross-sectional face-to-face survey among patients aged 19 years or older, with a CTAS level 3-5, who visited one of five EDs or one urgent care centre in the VCH region: Lions Gate Hospital (LGH), Mount Saint Joseph's Hospital (MSJ), Richmond Hospital (RH), Vancouver General Hospital (VGH), University of British Columbia Hospital (UBC) or St. Paul's Hospital (SPH). A convenience sampling methodology was utilized between February 25th and April 29th of 2010. We excluded patients who were transported via ambulance, who did not live or work in the Vancouver or greater Vancouver area, patients unable to provide informed consent, patients that threatened the safety of the surveyor and patients who were not willing to participate in the study.

Survey Development:

Prior to developing this survey, we used a qualitative focus group methodology to enhance VCH's understanding of why patients and their family members choose a specific ED. We sought to explore whether their choice is flexible, to ask what information or conditions could modify their choice of ED and to ask how this information would be best delivered. In the focus group, seven discussion groups were conducted (five in English, one in Mandarin and one in Cantonese), with a total 38 participants. Participants were chosen based on their response to mail solicitation to participate after a recent ED visit. They identified several factors impacting their choice of ED, placing highest priority on their previous experience at (or reputation of) the ED, defined as perceived quality of clinical skill, staff courtesy and perceived staff morale. Other priorities elicited included proximity to the ED (for convenience to self as well as family and friends), perception of the hospital as appropriate to their specific health issue and perception of wait times. Participants demonstrated a sophisticated understanding of factors influencing ED wait times, clarifying that the amount of time they would be willing to wait would depend on their injury/illness, where their specialist is located and ED hours. It was also understood and acknowledged that choosing an ED based on 'guessing' possible wait times may be ineffective, as wait times can change very quickly in the ED setting. Lastly, it was identified that patients would like to be provided with specific information before their ED visit to help them make an informed decision regarding which ED they choose and identified multiple modes to disseminate this information.

A literature review was performed and no psychometrically tested questionnaires exploring the objectives of this study were identified. Using the identified expectations from Phase I, question wording and approaches to scaling were developed with several phases of input and review by an expert panel that included Department Heads at all ED sites surveyed, the Regional Emergency Services Council, ED physicians and nurses, the qualitative researcher from Phase 1 and survey experts with extensive experience or a Masters or PhD degree in a relevant field. Closed-ended questions with pre-coded response options were utilized with an "other" response if the patient did not identify with any of the pre-coded options. The survey was tested on a pilot sample of members of the target population and questions were revised as necessary. See Appendix II for complete survey. The methodology of this investigation was approved through the Clinical Research Ethics Board of the University of British Columbia and the Providence Health Care and Vancouver Coastal Health Research Institutes.

Data Collection:

Trained and monitored research assistants conducted the structured face-to-face interviews with patients. All consecutive patients were surveyed after their triage assessment was complete while the patient was in the waiting room. If there were no patients in the waiting room those patients with the shortest length of stay who were in a specific patient care area were surveyed. Research assistants began by determining patients' CTAS level and age from either an ED census board or ED staff with access to patient information. If the patients' CTAS level was 3, 4 or 5 and the patient was over the age of 19 the patient was approached and information on the cover sheet of the survey was communicated (See Appendix I). The cover letter described the nature and goals of the study, requested the patient's involvement in the study and informed them that their participation was voluntary and confidential. Informed consent was implied if the patient agreed to participate in the survey. Exclusion criteria was then identified as the research assistant determined if the patient lives or works within the Vancouver or greater Vancouver area and if the patient arrived by ambulance (first 2 questions on the survey, see Appendix II). When available, patient visitors were used as translators if the patient was unable to communicate in English. If patients refused to participate they were not approached again. Patients were not asked to participate more than once and research assistants ensured that no one patient was surveyed more than once on a particular ED visit. Please see ED Survey Instructions (Appendix III), which outlines the general instructions utilized to train the research assistants. A more specific outline was developed for each ED. Research assistants recorded all survey data on paper. This data was then double entered into a Microsoft Excel file for analysis.

Further to this, presenting complaints were categorized into Complaint Oriented Triage (COT) descriptors based on the Canadian Triage and Acuity Score. Respondents were retrospectively classified as having a painful condition based on their COT descriptor. A single emergency physician, blinded to outcome, classified each respondent's COT descriptor as potentially "painful" or "not painful". This is the only predictor that was not obtained directly from the patient or their medical record.

Sample size:

Sample size was calculated based on regional ED volumes (Table 1). There are six sites. Two have large volumes (>60,000 visits/year). Two are medium sized (40 – 50,000 visits/year) and two are small hospitals with annual ED visits of around 20,000 visits/year. We surveyed all sites and tried to get a sample size that reflected the annual ED visits to each site. We aimed to obtain 150 surveys from the larger sites, 100 surveys from the medium sites and 50 surveys from the smaller sites for a sample size of 625. This would allow for a 95% confidence interval around a proportion of respondents who answer yes/no to the particular primary outcome question, with precision of plus/minus 4%.

Site	No. and (%) of total regional ED patients	
LGH	49,447	(18.07%)
SPH	63,989	(23.38%)
MSJ	20,797	(7.60%)
VGH	75,450	(27.57%)
UBC	18,650	(6.81%)
RH	45,360	(16.57%)

Data Analysis:

The two main outcomes of interest for this paper are importance of wait times and importance of distance travelled to get to an ED. Descriptive statistics (proportions for dichotomous variables and means with standard deviations for continuous variables) were calculated for each variable. Demographic characteristics of the sample are arrayed in Table 2.

Characteristics	No. (and %) of patients	
Gender		
Female	324	(51.10)
Male	305	(48.11)
Age		
19-21	156	(24.61)
30-39	106	(16.72)
40-49	121	(19.09)
50-59	94	(14.83)
60-69	81	(12.78)
70-79	45	(7.10)
80-89	24	(3.79)
≥90	4	(0.63)
Hospital		
LGH	92	(14.51)
MSJ	56	(8.83)
RH	100	(15.77)
VGH	147	(23.19)
UBC	53	(8.36)
SPH	186	(29.34)
Mode of arrival		
Car	389	(61.36)
Taxi	64	(10.09)
Walking	104	(16.40)
Bus (public transport)	66	(10.41)
Distance travelled to ED		
<5km	346	(54.57)
5-10km	176	(27.76)
10-20km	76	(11.99)
20-30km	18	(2.84)

* Source: Vancouver Coastal Health Emergency Department Data Cube.

>30km	18	(2.84)
Complaint descriptor		
Cardiovascular	43	(6.78)
Gastrointestinal	127	(20.03)
General and minor	81	(12.78)
Neurologic	41	(6.47)
Orthopedic	140	(22.08)
Skin	77	(12.15)
Other	119	(18.77)
CTAS level		
III	217	(34.23)
IV	336	(53.00)
V	59	(9.31)
Wait time importance		
Extremely important	171	(26.97)
Very important	243	(38.33)
Moderately important	140	(22.08)
Slightly important	25	(3.94)
Not important	53	(8.36)
Distance importance		
Extremely important	144	(22.71)
Very important	240	(37.85)
Moderately important	167	(26.34)
Slightly important	35	(5.52)
Not important	47	(7.41)

In order to assess factors associated with patient perceptions of the importance of wait times and distance travelled to hospital, these two factors were dichotomized. If patients rated these factors as “extremely important” or “very important”, their ratings were classified as “very important”; if they rated these factors in one of the other three categories, their ratings were classified as “less important”. This was done separately to dichotomize each outcome (distance travelled and wait times).

For each of the two outcomes of interest, the importance of wait times and the importance of distance travelled to hospital, we compared the proportion of respondents rating these as very important by various predictor variables. For the dichotomous predictor variables we used chi-square with one degree of freedom. For predictor variables with more than two groups (CTAS level and hospital) we used Kruskal-Wallis Analysis of Variance (ANOVA). STATISTICA™ software was used for these analyses.

In order to establish the relative contribution of each independent variable associated with importance of each outcome multiple logistic regression was used. Model development was based on a univariable p-value of each predictor of 0.2 or less with the outcome of interest. These variables were then assessed using a backwards stepwise procedure (p-to-remove > 0.15). EGRET™ software was used for these analyses. Two-way interactions were investigated, but none were significant, so are not reported further. Odds ratios and 95% confidence intervals are reported for each variable as it is associated with rating the outcome as extremely or very important.

RESULTS

Survey details:

Overall, 634 surveys were completed 92 at LGH, 56 at MSJ, 100 at RH, 147 at VGH, 53 at UBC and 186 at SPH. Approximately 757 patients were approached in total, meaning 123 patients were found not eligible to participate after being approached, did not wish to participate or did not fully complete the survey. Patients were surveyed at various times throughout the day. 461 (72.71%) patients were surveyed between 11:00 and 17:00. A translator was used for 30 (4.73%) surveys. 327 (51.58%) patients were surveyed in a care space, 270 (42.59%) in a waiting room and 3 (0.47%) in both areas. 377 (59.46%) of patients were surveyed within 20 to 80 minutes of their arrival to the ED.

Factors affecting patient ED selection:

Patients were asked to rank the top 3 factors that influence their usual choice of hospital ED from a list of 14 factors including an “other” response. 105 (16.56%) patients indicated that this was their first visit to an ED. These patients were asked to rank the top 3 factors that they felt were most important when choosing a hospital ED. Unfortunately, 94 (14.83%) respondents did not use a ranking mechanism for this question. Of those respondents who did use a ranking mechanism, 279 (44.01%) patients indicated that distance was the number one factor affecting ED selection. 59 (9.31%) patients indicated that anticipated wait times were the most influential factor and 52 (8.20%) usually choose the location in which their specialist is located. Overall, without considering ranking, distance to the ED (25.28%), wait times (10.25%), courteousness of staff (9.51%), facility reputation (8.31%) and perceived quality of care (8.03%) were identified as top factors that influence usual choice of hospital ED. These results are depicted in Figure 1.

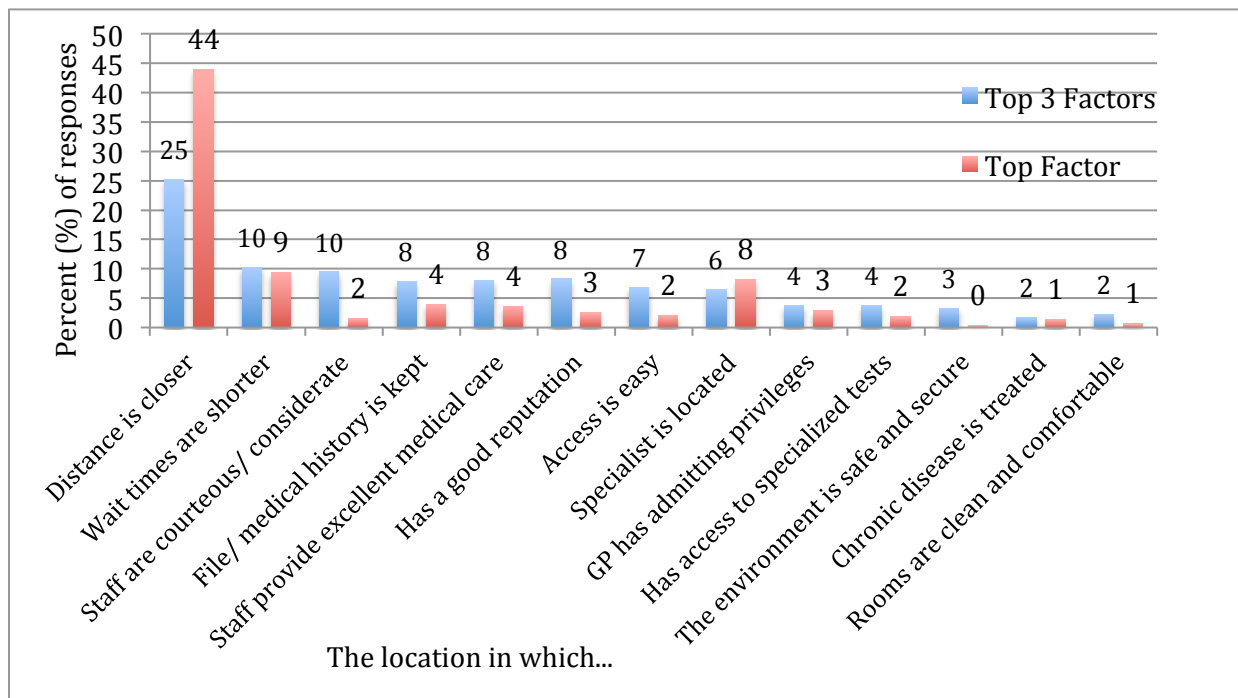


Fig. 1 Factors that influence usual choice of hospital ED. Without considering ranking, N= 634 patients and all responses were tabulated. N= 540 patients who did use a ranking mechanism and top factors were tabulated.

Usual hospital ED and reasons for choosing an alternative location:

Other than the 105 (16.56%) patients who were seeking ED care for the first time, 137 (25.90%) patients reported that their usual hospital ED was a location other than the one in which they were currently seeking care. Although “multiple sites” was not a pre-coded option, 22 (3.47%) patients overall indicated “multiple sites” as an “other” option. These patients were included with the 137 count of patients seeking care at a location other than their usual ED. When investigating why patients chose an alternative location rather than their usual ED, 60 (43.80%) patients reported choosing a location in which the distance was closer, 21 (15.33%) chose the location in which their specialist was located and 7 (5.11%) chose the location in which they felt wait times would be shorter.

Health services contacted prior to ED visit:

122 (19.24%) patients waited less than one hour from the time they became ill or injured to the time they came to the ED, 78 (12.30%) waited between 12 and 24 hours and 263 (41.48%) waited 24 hours or longer. 296 (46.69%) patients contacted another health service before seeking ED care. All patients who contacted their GP, a walk-in clinic or another ED regardless of whether or not they were seen by a physician were included in this count. 153 (24.13%) patients contacted their GP and 62 (9.78%) contacted a walk-in clinic. Less than 5% of patients contacted the BC Nurse Line, the BC Health Guide Handbook, another ED or “other”. 29 (4.57%) patients contacted more than one other health service. Of the patients who did contact another health service, 225 (70.13%) patients were advised to come to the ED. 120 (53.33%) patients were advised by their GP and 41 (18.22%) by a walk-in clinic. 126 (30.07%) patients who did not contact their GP or a walk-in clinic reported that they did not do so as their problem was too serious. 44 (10.50%) patients reported that their GP or walk-in clinics were not opened, 43 (10.25%) patients thought that it would take too long to be seen by their GP and 35 (8.35%) were not as confident in the services provided. 40 (9.55%) patients chose multiple options and 74 (17.66%) reported “other” reasons with the most common theme among these reasons being the anticipated need for a specialized test or an X-ray.

Wait time importance:

When patients were asked if wait times would influence their choice of ED if they had a choice between where they usually go and a place where there was a shorter wait time, 366 (57.73%) respondents stated that wait time would influence their choice of ED (95% CI 53.2%-61.2%). To assess the internal validity of the survey, patients were asked to rank the importance of wait times on a Likert scale and 414 (65.30%) respondents felt that wait times were extremely important or very important (95% CI = 61.8% - 69.4%). Patients were further asked how long they would be willing to wait for ED treatment at their preferred ED in two different scenarios; first, a twisted ankle with associated swelling and difficulty weight-bearing and secondly, abdominal pain for six hours with associated nausea. In the twisted ankle scenario 294 (80.32%) patients were willing to wait up to four hours for care. In the abdominal pain scenario 281 (76.78%) patients were willing to wait up to two hours. This distribution is depicted in Figure 2.

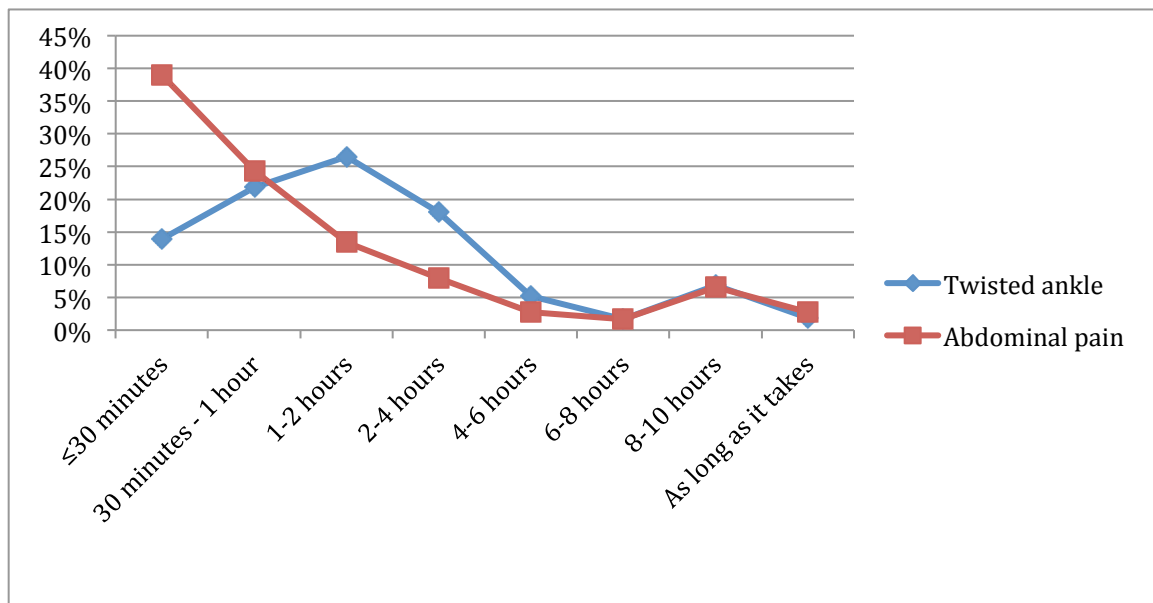


Fig. 2. Length of time survey respondents were willing to wait for treatment at their preferred ED before they would consider going elsewhere. N=344 patients who stated that wait time would influence their choice of ED.

Association of various factors with wait time importance:

Table 3. Proportion of survey respondents in select variable categories who chose "extremely" or "very" important for query on wait time importance. Univariable analysis.

Variable	N	%	Statistic value*	P-value
Gender			1.50	0.22
Female	324	218 (67.28%)		
Male	305	191 (62.62%)		
Age			5.28	0.022
<60	477	324 (67.92%)		
≥60	154	89 (57.79%)		
Ortho complaint			0.60	0.44
Yes	140	88 (62.86%)		
No	488	324 (66.39%)		
Pain complaint			2.98	0.08
Yes	340	233 (68.5%)		
No	292	181 (61.9%)		
Location surveyed			0.05	0.82
Care Space	327	216 (66.06%)		
Waiting Room	270	176 (65.18%)		
Advised to go to ED			0.03	0.85
Yes	225	148 (65.78%)		
No	409	259 (63.33%)		
Hospital			3.2	0.66
LGH	92	62 (67.39%)		
MSJ	56	35 (62.50%)		
RH	100	71 (71.00%)		
VGH	147	90 (61.22%)		
UBC	53	32 (60.38%)		
SPH	186	124 (66.67%)		
Distance travelled			0.82	0.37
<5km-10km	522	345 (66.09%)		
10km->30km	112	69 (61.61%)		
Hospital location			0.33	0.56
Downtown+	333	214 (64.26%)		
All Others	301	200 (66.45%)		
CTAS level			0.78	0.49
III	217	145 (66.82%)		
IV	336	219 (65.18%)		
V	59	33 (55.93%)		
Time elapsed prior to survey			1.36	0.24
>1 hour	336	217 (64.58%)		
≤1 hour	288	192 (66.67%)		

* Statistic = Chi-square with 1 degree of freedom (DF) for all dichotomous variables; Kruskal-Wallis H test for variables with > 2 groups (CTAS [DF=2] and Hospital [DF=6])

+ Downtown: Vancouver General Hospital and St Paul's Hospital. Not Downtown: Richmond Hospital, Lion's Gate Hospital, Mount Saint Joseph's Hospital, and University of British Columbia

Table 4. Outcome = Importance of wait times, multivariable analysis.

Candidate variables	Odds Ratio	95% CI	p-value
Pain (referent = no pain)	1.42	1.05-1.98	0.047
Age (referent = >60 years)	1.47	1.02-2.14	0.049
Gender – not in model			

Association of various factors with distance:

Patients were asked to rank the importance of distance on a Likert scale and 384 (60.56%) of respondents felt as though distance was extremely important or very important.

Table 5. Proportion of survey respondents in select variable categories who chose "extremely" or "very" important for query on distance importance. Univariable analysis.

Variable	N	%	Statistic value*	P-value
Gender			0.48	0.49
Female	324	200 (61.72%)		
Male	305	180 (59.02%)		
Age			3.58	0.058
<60	476	298 (62.61%)		
≥60	153	83 (54.25%)		
Ortho Complaint			1.73	0.19
Yes	140	78 (55.71%)		
No	488	302 (61.89%)		
Pain Complaint			0.78	0.38
Yes	340	199 (58.53%)		
No	292	181 (61.99%)		
Location Surveyed			0.51	0.47
Care Space	327	202 (61.78%)		
Waiting Room	270	159 (58.89%)		
Advised to go to ED			3.67	0.055
Yes	225	125 (55.2%)		
No	409	259 (63.3%)		
Hospital			17.6	0.0035
LGH	92	62 (67.39%)		
MSJ	56	34 (60.71%)		
RH	100	69 (69.00%)		
VGH	147	69 (46.94%)		
UBC	53	31 (58.49%)		
SPH	186	119 (63.98%)		
Distance Travelled			14.44	<0.001
<5km-10km	522	334 (63.98%)		
10km->30km	112	50 (44.64%)		
Hospital Location			4.96	0.03
Downtown+	333	188 (56.46%)		
All Others	301	196 (65.12%)		
CTAS Level			0.56	0.72
III	217	132 (60.83%)		
IV	336	199 (59.23%)		
V	59	36 (61.02%)		
Time elapsed prior to survey			1.19	0.28
>1 hour	336	198 (58.93%)		
≤1 hour	288	182 (63.19%)		

* Statistic = Chi-square with 1 degree of freedom (DF) for all dichotomous variables; Kruskal-Wallis H test for variables with > 2 groups (CTAS [DF=2] and Hospital [DF=6])

+ Downtown: Vancouver General Hospital and St Paul's Hospital. Not Downtown: Richmond Hospital, Lion's Gate Hospital, Mount Saint Joseph's Hospital, and University of British Columbia

Table 6. Outcome = Importance of distance, multivariable analysis.			
Candidate variables	Odds Ratio	95% CI	p-value
Downtown (all others)	0.65	0.46-0.91	0.011
Age (referent = >60 years)	1.58	1.12-2.26	0.041
Ortho complaint (referent = not ortho)	0.68	0.46-1.1	0.09
Distance travelled to ED (referent = >10km)	2.2	1.45-3.33	0.0011
Advised to com in (referent = not advised to come in)	0.76	0.54-1.07	0.12

* Downtown: Vancouver General Hospital and St Paul's Hospital. Not Downtown: Richmond Hospital, Lion's Gate Hospital, Mount Saint Joseph's Hospital, and University of British Columbia

ED information for informed decision-making and methods to access such information:

433 (68.30%) patients reported that they would utilize information specific to each hospital's ED services (For example, medical specialists, non-medical services provided, hours of opening, parking and route to ED, hygiene/infection rates). 480 (75.71%) patients reported that they would utilize information on ED wait times and 433 (68.30%) patients reported that they would utilize general information on emergency services (For example, when to go to an ED, options for non-emergency care).

458/584 (78.42%) respondents said that they would access a website (78.4%; 95% CI = 75.1%-81.8%). 426/584 (72.95%) said that they would call a phone line (72.9%; 95% CI = 69.2%-76.6%). 515/584 (88.18%) said that they would use TV banners/an ED monitor/flyers (88.2%; 95% CI 85.5%-90.9%). 44/584 (7.53%) said that they would use "education" (7.5%; 95% CI 5.3-9.7%).

DISCUSSION

The factors affecting patient ED selection in a regional hospital system are not well described. A literature review of the PubMed database was performed and no similar investigations were found. Reported are the results of a large regional survey to investigate factors affecting patient ED selection in a regional hospital system. As hypothesized, there are in fact factors that influence patient choice of ED. Results indicate that distance travelled to the ED and wait times are valued most by patients when choosing a hospital ED.

This survey reveals that the distance a patient needs to travel to get to an ED is the most important factor in their decision about which regional ED to use. This was even more important than factors related to overall care. This likely reflects the public perception of the relative parity of emergency care provided in the region. Wait times were the second most important factor in choosing an ED and was cited by 10% of the respondents. This suggests that while wait time is important it is not currently a huge driver to move patients around in the system.

Further revealing is the expectation of wait times by patients. When patients were asked how long they would be willing to wait for ED treatment at their preferred ED in two different scenarios, most patients (75 - 80%) stated they would be willing to wait up to four hours for an ankle sprain and up to two hours for abdominal pain (Figure 2). This suggests that wait times are a relatively inelastic driver of patient behaviour. There would likely need to be significant delays between sites in order for patients to change their ED preference.

Closer evaluation of wait times using univariable analysis examining the association of various factors with wait time importance indicates that those patients under the age of 60 years value wait times more so than those 60 years and over (p-value <0.05). Although the association between a "painful" COT descriptor and wait time importance was not statistically significant, results do trend toward significant (p-value 0.08). Intuitively, those patients with a "painful" COT descriptor seem to value wait times more so than those without a "painful" COT descriptor. These associations were still present in the multivariable analysis. Patients placed more value on wait times if they had a "painful" COT descriptor and were under the age of 60 years.

The relationship between living close to a hospital and the use of that hospital by patients was shown in both the univariable and multivariable analysis examining the association of various factors with the importance of distance travelled to the ED. Patients living close to an ED (<10 km away) tended to use that hospital (p-value <0.05). Interestingly, this was less important in downtown Vancouver where there is close proximity of the two larger urban centres, VGH and SPH. Patients placed more value on distance travelled to the ED if they were not surveyed at VGH or at SPH, the two large downtown hospitals in the region (p-value <0.05). This suggests that attempts to shift patients within the region may not be as effective for peripheral or isolated hospitals that serve a specific community as on the North Shore (LGH) or in Richmond (RH).

In the multivariable analysis, younger patients <60 years of age placed more value on distance travelled. Also, in the univariable analysis there was trending to suggest that those patients advised to go to the ED seem to value distance travelled to the ED more so than those who were not advised to go to the ED (p-value 0.055). This did not come out in the multivariable

analysis and interpretation of these relationships requires further investigation.

The ability to shift even a small volume of patients around would help create overall ED efficiency and help relieve ED overcrowding. The management of ED overcrowding has been the subject of many papers and surveys. Results from a national survey completed in 2005 illustrate that there are differences in the frequency of overcrowding within and across regions. More specifically, the results indicate that major or severe overcrowding is much more likely to occur in EDs with >50,000 visits per year, communities with a population of at least 150,000, university-affiliated hospitals, trauma centres, and EDs with 30 or more treatment spaces.⁴ In addition to this, the National Ambulatory Care Reporting System (NACRS) data indicates that wait times to see a physician in 2003-2004 varied not only by patient severity but also by the volume of patients in EDs at the time of the visit and by ED type. Patients with less severe health conditions visiting low and medium volume EDs had shorter waiting times to see a physician as opposed to high volume EDs and teaching hospital EDs⁺. Overall, the longest wait times were associated with EDs located in teaching hospitals.⁶ This demonstrates that asymmetrical regional ED utilization does exist leading to wait time variability between sites and ED overcrowding.

Overall, only 12% of ED patients arrived by ambulance in 2003-2004 according to the NACRS data.⁶ With such a large proportion of patients utilizing self-transportation and self-selection mechanisms, it seems appropriate to develop tools to help patients make an informed decision regarding the ED they choose. In our survey, patients indicated that they would utilize information specific to each ED's services, ED wait times and general information on emergency services. Patients were most interested in having this information distributed via a website (78%) or a phone line (73%). With respect to information on ED wait times, a database that displays real-time ED wait times would not only allow patients to choose a hospital ED with a shorter wait time, it would also help match regional ED inflow with site capacity to maximize overall regional capacity.

To our knowledge there is no published research investigating the use of real-time ED wait time dashboards for patients. The only study that shows the impact of regional access to real time ED data is from Calgary, Alberta. This dashboard monitors real-time ED census and acuity mix, including expected Emergency Medical Service (EMS) arrivals and patients awaiting admission or consultation. It has been implemented by the regional EMS to prioritize EMS destinations for each patient in order to match regional ED inflow with site capacity. A study comparing periods immediately before and after the implementation of this system concludes that ambulance site avoidance has been reduced and that regional capacity and flow management has been enhanced.⁷

⁺ Low-volume EDs in community hospitals: annual number of ED visits < 15,000.

Medium-volume EDs in community hospitals: annual number of ED visits between 15,000 and 30,000.

High-volume EDs in community hospitals: annual number of ED visits > 30,000.

EDs in teaching hospitals: members of the Council of Academic Hospitals in Ontario.

LIMITATIONS AND FUTURE RESEARCH

Although care was taken to derive a representative sample from all the hospitals in the VCH region, there are several potential sources of bias in this study. Self-reported data was obtained for all survey questions except the time the patient arrived in the ED, the time the patient was surveyed, CTAS level and presenting complaint. Reliance on self-reported data may have limited the validity of some of the results due to recall bias. Face-to-face interviews were utilized to help ensure that the demographic profile of survey respondents reflects that of the sample and to increase response rate. This may have increased the chance of social desirability bias.

A convenience sampling mechanism was used and patients who were surveyed may have been the easiest to recruit and may not accurately reflect the true ED population. As an example, we avoided recruiting patients who had clear evidence of mental health or substance misuse issues. In this survey we interviewed about 11% of patients >70 years of age. Each year the percentage of patients with age >70 seen in VCH EDs is closer to 17-18%*. Perhaps younger patients were more agreeable to participating in this study.

We also tended to recruit patients during daytime hours – from 11:00 – 17:00. This is the busiest time of the day and this may have accentuated the subject matter reported by patients and it may have created a sampling bias. Sampling bias may have also occurred in that only those patients who felt well enough to participate were surveyed and unless a translator was available, only English speaking patients were surveyed. Lastly, only the VCH region was studied, and it is uncertain whether our findings can be generalized to other regions or to other facilities.

* Source: Vancouver Coastal Health Emergency Department Data Cube.

CONCLUSION

In a survey of patients from an urban health region in Vancouver, distance from ED is a more important concern than wait time to see a physician for self-directed patients. However, for younger patients and patients with painful conditions wait time is important. Public dissemination of ED wait times along with other educational material may be an important way to modulate regional ED inputs to create system efficiencies.

REFERENCES

1. Canadian Association of Emergency Physicians and the National Emergency Nurses Affiliation. Joint position statement: Access to acute care in the setting of emergency department overcrowding. *Can J Emerg Med* 2003; 5:81-6.
2. Canadian Association of Emergency Physicians and National Emergency Nurses Affiliation. Joint position statement on emergency department overcrowding. *Can J Emerg Med* 2001; 3:82-4.
3. Canadian Association of Emergency Physicians (CAEP). Position statement on emergency department overcrowding. Ottawa (ON): The Association; 2007. Available: <http://www.caep.ca/template.asp?id=37C951DE051A45979A9BDD0C5715C9FE> (accessed 2010 Nov 6).
4. Rowe B, Bond K, Ospina M, et al. Frequency, determinants, and impact of overcrowding in Canada: [Technology Report No. 67.3]. Ottawa (ON): Canadian Agency for Drugs and Technologies in Health; 2006.
5. Afilalo M, Guttman A, Colacone A, et al. Emergency department use and misuse. *J Emerg Med* 1995; 13:259-64.
6. Canadian Institute for Health Information. Understanding emergency department wait times: who is using the emergency departments and how long are they waiting? Ottawa (ON): The Institute; 2005. Available: http://secure.cihi.ca/cihiweb/products/Wait_times_e.pdf (accessed 2010 Nov 6).
7. McLeod B, Zaver F, Avery C, et al. Matching capacity to demand: A regional dashboard reduces ambulance avoidance and improves accessibility of receiving hospitals. *Acad Emerg Med* 2010; 17:1383-89.

APPENDIX I – SURVEY COVER LETTER**Emergency Department Survey
Exploring Public Selection Factors for Emergency Medical Care**

Dear Patient,

I am inviting you to participate in a research project to study why patients choose specific emergency departments. The title of the project is: “Patient Value Selection Bias in relation to Service Delivery Efficiency of VCHA Hospital Emergency Departments”. Along with this letter is a short questionnaire that asks a variety of questions about factors that you usually use to choose an emergency department, why you chose to come to the emergency department today and what information would help you in this decision.

The potential benefits of this survey may be the development of a tool to help patients like yourself learn more about the emergency departments in the region and how to choose the emergency department that will give you the best or most timely care. There are no risks to you if you decide to participate in this survey. We will not be collecting your name, initials or any other personal identifiers on this survey. The survey will not disrupt your treatment today and you will not lose your place in line.

The survey should take you about 15 minutes to complete. Participation in this survey is voluntary. If you decide not to take part, it will not affect the care you receive in the emergency department or the hospital. Answering the survey questions means you are consenting to take part in this research project. You do not have to answer any questions you find uncomfortable to answer. A research assistant will ask you to look over the questionnaire and, if you choose to do so, he/she will complete the survey with you and will fill in your responses accordingly. At any point during the survey should you wish to withdraw or if you have any questions, please do not hesitate to tell the research assistant.

Sincerely,

Dr. Eric Grafstein,
Head, St. Paul’s Hospital Emergency Department,
Co-Chair, Regional Emergency Services Council

APPENDIX II – SURVEY**Patient Value Selection Bias in relation to Service Delivery Efficiency
of VCHA Hospital Emergency Departments****Patient Survey**

Location: UBC Hospital Vancouver General Hospital Date: _____
 Richmond Hospital Lions Gate Hospital Time: _____
 St. Paul's Hospital Mount St. Joseph's Hospital

Does the patient live or work within the Vancouver or greater Vancouver area? Yes / No

How did the patient arrive? Car Walking
 Taxi Bus
 Other: _____

Demographics:

Time the patient arrived in ED: _____ CTAS level: _____

Presenting complaint: _____

Is the patient being surveyed in the waiting room or in a care space? (circle answer)

Is a translator being used for the survey information? Yes / No

1. Approximately what distance did you travel today to get to the hospital:

<5km 5-10km 10-20km 20-30km >30km

2. Gender: Male Female

3. Age range: 19-29 30-39 40-49 50-59 60-69 70-79 80-89 90 and over

4. Which hospital ED do you usually visit?

Vancouver General Hospital Mount St. Joseph's Hospital Other
 Lions Gate Hospital UBC Hospital This is my first visit to an ED
 Richmond Hospital St. Paul's Hospital

5. Rank the top three factors that influence your usual choice of hospital ED.

(If this is your first time visiting an ED what are the factors you feel are most important in choosing a hospital ED):

The location in which:

___ My specialist is located	___ The staff are courteous/ considerate of my needs
___ My chronic disease is treated	___ The staff provide excellent medical care
___ My file/ medical history is kept	___ Access is easy (parking, transit, finding the entrance)
___ My GP has admitting privileges	___ The waiting room and treatment rooms are clean and comfortable
___ Has access to specialized tests	___ Has a good reputation
___ The wait times are shorter	___ The environment is safe and secure
___ The distance is closer	
Other (please specify): _____	

b) You have had abdominal pain for 6 hours. It has become more severe over the last few hours and you feel as though you may vomit.

How long would you be willing to wait for ED treatment at your preferred hospital?

≤30min 30min-1hr 1-2hrs 2-4hrs 4-6hrs 6-8hrs 8-10hrs

COMMENTS:

14. In the future, what kinds of information will help you make an informed decision regarding the ED you choose?

Information specific to each hospital's ED services (For example, medical specialists, non-medical services provided, hours of opening, parking and route to ED, hygiene/infection rates)

Yes No

Information on ED wait-times

Yes No

General information on emergency services (For example, when to go to an ED, options for non-emergency care)

Yes No

15. In the future, if there were a way to access information about emergency departments, what three methods might you use?

- ___ Website
- ___ Telephone number (i.e. BC nurse line)
- ___ Banner on cable TV
- ___ TV monitors in the ED waiting room
- ___ Public announcements/flyers
- ___ Public education meetings
- ___ Other (please specify): _____

16. How important is wait-time when choosing a hospital ED?

Extremely important Very important Moderately important Slightly important Not important

17. How important is distance travelled with choosing a hospital ED?

Extremely important Very important Moderately important Slightly important Not important

APPENDIX III – ED SURVEY INSTRUCTIONS**ED Survey Instructions**

1. Obtain blank surveys.
2. Introduce yourself to ED staff as appropriate at start of shift.
3. Determine if a triaged patient has a CTAS level 3-5 and is 19 years of age or older (on the ED census board or from an ED staff with access to online patient information). First approach those patients in the waiting room. If there are no patients in the waiting room find those patients with the shortest length of stay who are in the department.
Do not approach patients if a DNA (do not announce) alert has been requested.
4. Introduce yourself to the patient in the waiting room or patient care area and explain the study (see cover letter). If the patient is being interviewed in the waiting room, tell them that you will complete the survey later in their visit should they be called into the department.
5. If the patient verbally consents to participate you may begin the survey. If the patient is being surveyed in the waiting room ask them if they would like to move to a more secluded area. Reiterate to the patient that the nurse knows where you will be and that they will not lose their place in line.
Do not survey:
 - Those patients unable to provide informed consent (i.e. under the influence of drugs or alcohol or in an acute psychiatric state)
 - Those patients that threaten the safety of the surveyor
6. Ensure that the patient has not arrived by ambulance and that they live or work within the Vancouver or greater Vancouver area.
7. Try and make sure that all questions are answered accurately.
Try to come back to questions that the patients miss the first time.
If you start a survey and the patient is moved, approach the bedside nurse and ask when you should come back to complete the survey.
8. If the patient was interviewed in a more secluded area, move them back to the main waiting room. Thank the patient for their participation. At this time record the patient's CTAS level and time of arrival from the ED tracking board or from an ED staff with access to online patient information. Obtain the presenting complaint from an ED staff with access to online patient information.
9. When the survey is completed thank the patient for their participation. escort the patient back to the waiting room if you have moved to an alternate location and thank them for their participation. At this time record the patients CTAS level, time of arrival and presenting complaint from the ED census board or from an ED staff with access to online patient information.
10. Secure completed surveys.
11. At the end of shift sign ED Survey Log (See example below). Remember to list numbers of the surveys that you complete.

Volunteer name	Date	Shift time start	Shift time end	# of surveys completed on shift (record study identifier numbers)	Total # of patients approached