

Influence of Clinical-Care Factors on Patient Satisfaction in Out-Patient Urgent-Care Settings

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Abbreviations

AAP	American Academy of Pediatricians
ED	Hospital-based Emergency Care Department
CPT	Current Procedural Terminology (CPT) codes
ICD-9	International Statistical Classification of Disease and Related Health Problems (Revision 9)
NPS	Net Promoter Score
PCP	Primary Care Physician
RBC	Retail-based Clinics
UCC	Urgent Care Center

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Introduction

Quality improvement efforts are at the heart of many initiatives in modern healthcare, generally seeking to better match resources to needs and expectations to deliver “better care.” The present study seeks to identify and measure the clinical-encounter factors (e.g., patient demographics, time of day, process delays) that predict patients’ satisfaction with care received during care encounters in an urgent-care center (UCC) setting. Specifically, it considers which urgent care-center factors—if any—are predictive of patient satisfaction, as measured by Net Promoter Score® (NPS).

The applications of these patient satisfaction insights are threefold:

1. Knowledge of the relationship between factors and satisfaction can allow providers to more effectively deliver satisfying care;
2. As described below, customer satisfaction (i.e., patient satisfaction) is associated with business and earnings growth; and
3. Once established, baselines-predictor values can be leveraged to evaluate the effect on satisfaction of specific changes (e.g., prototype communication tools).

Urgent Care Providers

Urgent care centers seek to occupy the “healthcare space” traditionally occupied by primary-care physicians and, in part, emergency departments. UCCs offer convenience, and are comparatively economical. They are typically staffed by physicians, in combination with registered nurses and

medical assistants. Large and/or busy units may include nurse practitioners and/or physician assistants. Many UCCs include basic imaging and laboratory capabilities.

The urgent care space is dominated by four general types of settings:

- **Primary-Care Physicians (PCPs)** typically operate in clinic settings during limited hours (e.g., 8 am until 5 pm), 5 days per week. These clinics serve as a “medical home” for patients and meet both routine (e.g., scheduled annual physical examinations) and urgent needs (e.g., wound care) of patients. They are equipped and staffed to diagnose and treat many non-traumatic injuries.
- **Traditional Hospital-based Emergency Departments (EDs)** operate around the clock, 7 days per week. These facilities are equipped and staffed to diagnose and treat the full range of traumatic injuries, life-threatening conditions and serious diseases, as well as non-traumatic injuries and routine demands. They are required by U.S federal law to treat any patient, regardless of the patient’s ability to pay for services. While most are physically adjacent to hospitals, some may be operated remotely, with ambulance or helicopter transfer of patients for admission to the hospital.
- **Retail-based Clinics (RBCs)** are frequently located within supermarkets, retail pharmacies, or “big-box retailers”. Typically staffed by nurse practitioners working under the remote supervision of a physician, these facilities are capable of diagnosing and treating common illnesses, and providing some types preventative care (e.g., routine vaccinations) and routine physicals.
- **Urgent Care Centers (UCCs)** provide care on a walk-in basis during traditional primary care office hours, as well as evenings and weekends; few operate 24

hours a day. Typically staffed by physicians (augmented by nurse practitioners, nurses and physician assistants working under the physician's supervision), UCCs also provide occupational medical services, some on-site testing, and sports and school physicals.

Patient Satisfaction

All systematic efforts to improve the “quality” of products or services face the challenge of measurement: What shall be measured? How shall it be measured? In the case of healthcare, metrics have been developed to measure healthcare processes, patient outcomes and patient perceptions. Most seek to qualify some combination of dimensions of effectiveness, efficiency, safety, equitability and timeliness.

Donabedian posited that assessing the quality of medical care demanded that one “first unravel a mystery: the meaning of quality. Any assessment of quality is a judgment whether a specified instance of medical care has this property [i.e., quality], and if so, to what extent.”¹ The multi-faceted nature of medical care has given rise to making judgments (and measures) about persons who provide care, and the settings and systems within which care was provided, rather than the care itself.

The Donabedian framework divided healthcare into two domains:

- **Technical care** is the application of the science and technology of medicine, and of other health sciences, to the management of a personal health problem; and
- **Interpersonal care** is management of the social and psychological interaction between the patient and the practitioner.

In so far as it affects patient satisfaction, the setting of care, including the architectural and tangible features of care, such as a pleasant and clean waiting room, a comfortable bed or a bedside phone, is part of the interpersonal care domain of quality. Patient perceptions of professionalism and courtesy are also elements of the interpersonal domain.

The present study focuses on patient satisfaction as a measure of care quality, and more specifically, used Net Promoter Score® (NPS) as an aggregated, proxy measurement for the combined satisfaction characteristics of patient care encounters. NPS is a metric that seeks to quantify customer loyalty. Introduced by Reichheld, the underlay approach seeks to simplify measurement (and improve response rates) by asking customers (i.e., patient, for the present study) two questions—one that classifies the patient as a “promoter”, a “detractor”, or “neutral user”; and one that solicits details that are the basis of patients’ classification.²

- Promoter Classifier: How likely are you to recommend this provider to friends and business associates?
 - Patients are asked to respond with a numerical value, ranging from zero (“not likely”) to ten (“very likely”).
- Promoter/Detractor Detail:
 - Patients responding with score values between 0 and 6 are asked, “How did we disappoint you and what can we do to make things right?”
 - Patients responding with score values of 7 or 8 are asked, “What could we do to improve?”
 - Patients responding with score values of 9 or 10 are asked, “What do you like about our services?”

Typically (and as practiced by the subject UCC system), the Net Promoter methodology also includes a process to *close the loop*: a team member actively intervenes to change a negative perception and convert a detractor into a promoter, after the fact, by contacting detractors identified by the survey to discuss the encounter's shortcomings and implement corrective action.

Contextual Considerations

The UCC system for the present study comprised more than 40 clinics, primarily located in residential, retail, and commercial locations in the southern United States. The UCCs were staffed by physicians, nurse practitioners, and registered nurses, as well as typical clerical staff. All fit the description (above) of UCCs; none were PCPs, EDs nor RBCs.

Literature Review

Urgent Care Medicine

In addition to non-trauma care, UCCs also provide occupational medical services, some on-site testing, and sports and school physicals. Insurance reimbursements are comparable to primary care office visits—with a 2012 average of \$101 to UCCs, compared to \$103 to PCP offices—and much less than emergency rooms—\$560 during the same period. Likewise, patient co-payments are much less (e.g., \$35 to \$50 per visit) compared to \$100 to \$1000 per emergency room visit.³ Most UCCs are staffed and equipped to treat encounters commonly seen in primary care settings (e.g., upper respiratory complaints, flu, ear and eye infections, lacerations, simple fractures and sprains, and other minor injuries). These clinics are not generally capable of dealing with trauma or resuscitation events, nor directly admit patients to a hospital. During 2012, fewer than 4% of

UCC patients required transfer to a hospital emergency room. The Urgent Care Association of America reported that there were more than 9,000 UCCs in the U.S., as of July 2013: 75% were located in suburban setting; 15% in urban setting; and 10% in rural settings.⁴ It was estimated that between 13.7% and 27.1% of 2010 emergency room visits could have been resolved in an urgent care setting, or similar retail clinic, generating a potential cost savings of approximately \$4.4 billion annually.⁵ Weinick et al. also concluded, “There is some evidence that patients can safely direct themselves to these alternative sites. However, more research is needed to ensure that care of equivalent quality is provided at urgent care centers and retail clinics compared to emergency departments.”

Patient Satisfaction

Tassos et al. investigated patient satisfaction using “an in-depth approach rather than the more common patient survey method,”⁶ which included patient interviews and participant-oriented observations between patients, family members, and medical staff. Using a Donabedian framework to model of quality of care (i.e., technical care, interpersonal care, and amenities of care), the team found that technical interactions were most common, followed by interpersonal interactions, and interactions related to amenities of care. Of the subjects 89% were satisfied with their treatment and quality of care; 10% were dissatisfied.

While examining patients' perceptions of their emergency department team's communication skills, McCarthy et al. found that caregiver-patient communications were an important predictor of highly favorable patient responses, and that patient sex, race, age, wait time, or daily census had little if any impact. Another favorable theme was when patients perceived that the care team was “respectful and allowed them to talk without interruptions.” Interestingly, lower ratings were

given for items “related to actively engaging the patient in decision-making and asking questions.”⁷

Sormekum et al. examined the psychology of wait times and patient satisfaction in emergency department settings, theorizing that the two were related, and in combination are important factors in return patronage, liability, and remuneration.⁸ The study leveraged concepts borrowed from other service industries, and tested whether patients’ perceptions of duration could be modified by changing wait time experience. The study also concluded that staff interpersonal and communication skills impacted perceptions by communicating the staff's dedication, and also greater understanding of their care.

In an Australian study of the determinants of quality in rural healthcare settings using the Donabedian structure/process/outcome framework, researchers concluded that health professionals emphasize “technical aspects of care,” while patients and their families were more focused on “access, interpersonal communication, convenience and cost.”⁹

In a study of the impact of prescriptions on the doctor-patient interaction in department of medicine and urgent care center settings during a two week period, Wartman observed that patients who *did not receive prescriptions* reported greater satisfaction with “the communicative aspects of their visits to physicians” than patients *who did receive prescriptions*. It was suggested that “prescriptions may hinder patient satisfaction with the doctor-patient interaction by substituting for other, more ‘meaningful’ communication between patient and provider.”¹⁰

In evaluating eight physician rating websites in Germany—a practical application of the Promoter, Neutral user, Detractor framework—Emmert et al. concluded that the available information generally gave detailed overviews of the financial, technical and human resources of practices, outcome measures could be problematic to interpret, lacking risk adjustment. In this

sense, they suggested, patient satisfaction may not be appropriate measure of the provider's quality of care.¹¹

In a study that included 15,341 patients surveyed about satisfaction following both initial and return visits to primary care physicians, the mean satisfaction score for the return-visit group was higher than for the first-visit group (p-value < .05), demonstrating that return visits to were associated with higher patient satisfaction compared to the initial visit.¹²

A 2009 systematic review of previously published studies (131 articles culled down to 11) that evaluated questionnaires seeking to measure patient satisfaction with ambulatory anesthesia concluded most trials evaluated “overall satisfaction” and used non-validated questionnaires. Only a few studies used questionnaires with “rigorous psychometric methods to measure patient satisfaction with anesthesia care,” and “there is still no valid or reliable questionnaire for measuring patient satisfaction in ambulatory anesthesia.”¹³

A later systematic review seeking to “identify and compare [survey] instruments, subscales, or items assessing patients' perceptions of patient-centered care in family medicine” conducted in 2011 examined literature covering the period 1980 through April 2009. Of 26 published papers ultimately meeting the inclusion criteria, 13 different survey instruments were reviewed, only 5 articles (2 instruments) were focused on patient-centered care: the Patient Perception of Patient-Centeredness and the Consultation Care Measure.¹⁴

Reichheld NPS® framework seeks to assess customer (i.e., patient) satisfaction through a straightforward, although non-psychometric method. It identifies “Detractors” that may have a negative impact on the firm’s reputation, and readily switch to competitors; “Promoters” that

tend to be more profitable to serve; and “Neutral Users” that may be in either direction by future encounters.¹⁵

Summary and Conclusions of the Literature

Assuming that technical care is adequate (i.e., the reason that the patient elected to visit the care-giver is correctly diagnosed and treated), the published literature suggests that care-giver interpersonal skills are important determinants of patient satisfaction. These skills include both communications and managing the patients’ expectations. Wait times and patient cost are less important, but not insignificant factors. Likewise, whether patients receive prescriptions during their care encounter is relatively less important than communication with the care team. Finally, patients that visit a particular care giver, perhaps including UCCs are more likely to be highly satisfied with the care they expect to receive at the unit.

While many instruments have been proposed for measuring care quality, in general and patient satisfaction in particular, none have been widely accepted across different care specialties.

Reichheld’s NPS® framework, while not specifically designed for patient satisfaction use, has been adopted in a number of commercial applications.

Design and Methodology

This study is a retrospective cohort study of patients visiting system UCCs between July 1, 2013 and March 11, 2014. Encounters can be classified by business line, such as Urgent Care, Occupational Medicine, Workers' Compensation, etc. Typical encounters, irrespective of business line, are depicted in Figure 1.

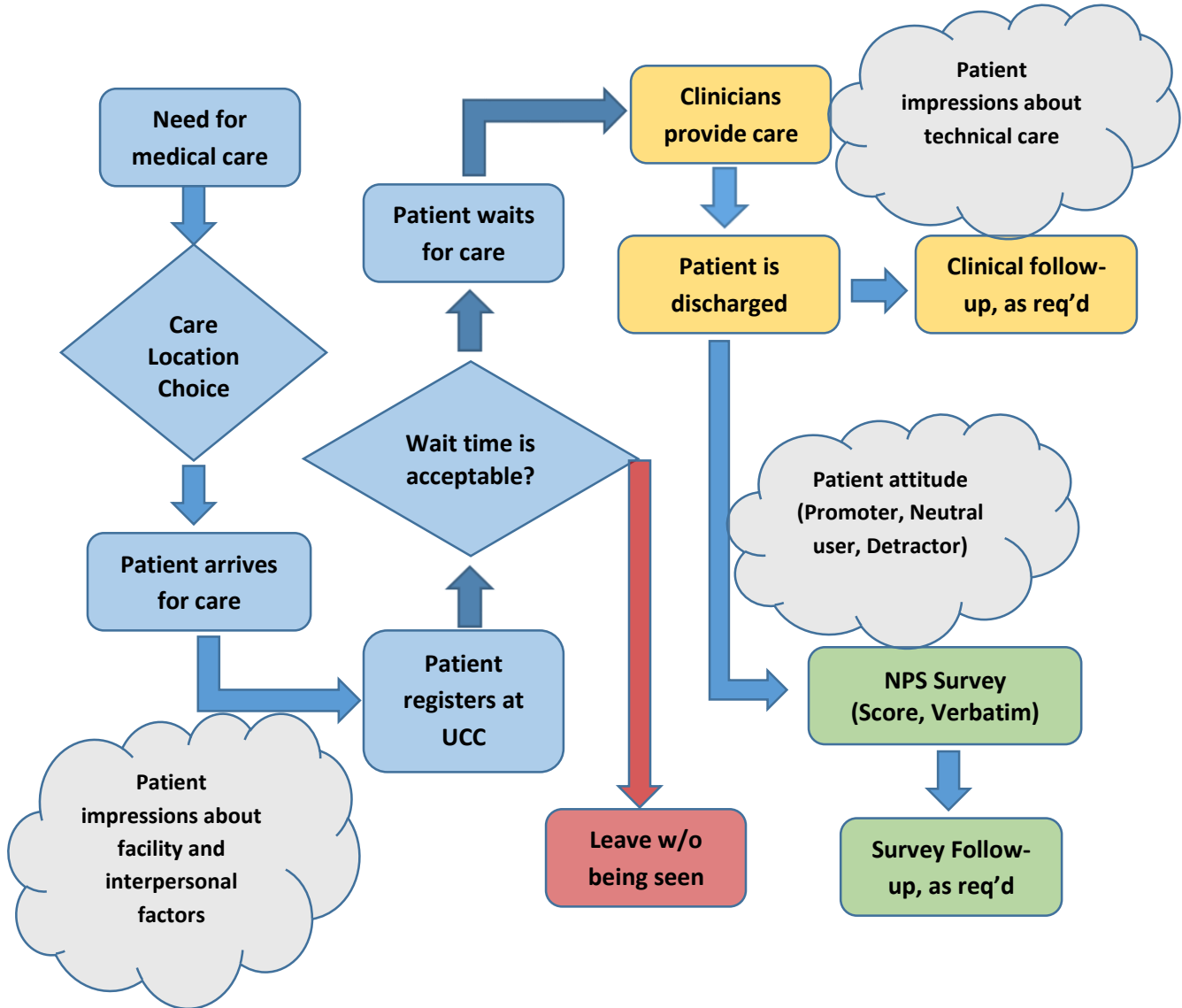


Figure 1: Conceptual model of the study

Data Collection, Analysis, and Results

Data Collection

Electronic medical, billing and survey records were queried for study data elements. For all three data groups—patient demographics, encounter records and satisfaction surveys—record tables were prepared by the study host’s information services team. Records were de-identified by the host’s team; multiple encounters by a specific patient used a consistent patient identifier.

Data elements included:

- Patient demographics and characteristics
- Encounter records
 - Diagnosis/complaint
 - Care activities
 - Elapsed time segments
 - Prescriptions/recommendations/follow-up
- NPS Survey
 - Scores
 - Verbatim comments

Encounter records were matched to corresponding satisfaction survey conducted by an independent third party. Multiple encounters on a single day (e.g., patients receiving a sport physical and also an influenza vaccination) were assigned the same, single survey result.

Records were consolidated and arranged in Microsoft Excel® 2010 format, and delivered to the investigator.

Analysis

Descriptive summaries of patient characteristics were prepared using Excel® pivot tables.

Likewise, dichotomous indicator variables were calculated, tested, and added to the data file.

Current Procedural Terminology (CPT) codes, which describe medical, surgical, and diagnostic services were reviewed and categorized for the types of cases (e.g., upper respiratory infections, sinusitis complaints, bone and joint complaints, etc.) that appeared most commonly in the data set. Survey verbatim comments were similarly categorized by included keywords (e.g., professional or unprofessional; organized or dis/unorganized; friendly or unfriendly).

SAS 9.3 (SAS Institute Inc., Cary, NC) was used to develop and test multi-variable linear regression models (i.e., PROC REG and PROC GLM types), seeking to predict survey scores (dependent variable) with patient and encounter characteristics, and comment categories (independent variables). Specifically, regression models were developed and evaluated for magnitude, direction, operational relevance and statistical strength.

A general linear model (i.e., PROC GLM type) was developed and evaluate, treating both care center and care giver as “CLASS” to control for these factors, while predict survey scores (dependent variable) with patient and encounter characteristics, and comment categories (independent variables).

Logistic regressions models to predict whether a subject would be a Detractor, Neutral User, or Promoter were considered, with little improvement in model strength. As a result, the simpler linear model was chosen, given its greater ease to communicate with clinicians.

Finally, multi-variable linear regression models (i.e., PROC REG type) were developed and evaluated seeking to predict Net Promoter Scores® at the care-center and care-giver levels (dependent variable) with mean patient and mean encounter characteristics, and mean comment categories (independent variables).

The final set of data elements are described in Appendix 1.

Results

Patient demographics are summarized in Table 1, which includes descriptive statistic summarizing (1) all patients receiving care treatment at the subject UCCs during the study period, and (2) the subset of all patient that responded to satisfaction survey. Total study encounters (n = 27,561) represented patients (n = 24,269), some of whom had multiple encounters during the study. Likewise, some patients had multiple encounters on single days (e.g., a “walk-out” during the morning, and a care encounter during the afternoon) with a single subsequent satisfaction survey. In such cases, the same survey results we assigned to each same-day encounter. The selection of study records is depicted in Figure 2. Study encounters are summarized in Table 2, Table 3 and Table 4.

Table 1: Demographics of Patients

	All Encounters (A)	A During Study Period (B)	B with Surveys (C)	C with Duration > 0
Total	346,777	343,287	35,100	24,269
Male	183,386	181,591	21,732	15,340
Female	163,391	161,696	13,368	8,929
Mean Age (St Dev)	36.6 (18.5)	35.4 (18.5)	41.6 (19.0)	40.4 (19.1)
Male	36.0 (18.3)	34.7 (18.2)	41.9 (18.3)	39.7 (20.0)
Female	37.1 (18.7)	36.0 (18.7)	41.1 (20.0)	40.8 (18.6)
Count by Age Category (%)				
0 to 17	51,515 (15.6%)	28,717 (15.7%)	5,572 (15.9%)	3,836 (15.8%)
18 to 30	84,417 (25.6%)	46,734 (25.6%)	8,831 (25.2%)	6,232 (25.7%)
31 to 50	114,535 (34.7%)	63,315 (34.6%)	12,180 (34.7%)	8,371 (34.5%)
51 to 64	55,965 (16.9%)	30,974 (16.9%)	5,943 (16.9%)	4,043 (16.7%)
65+	23,782 (7.2%)	13,064 (7.1%)	2,574 (7.3%)	1,787 (7.4%)

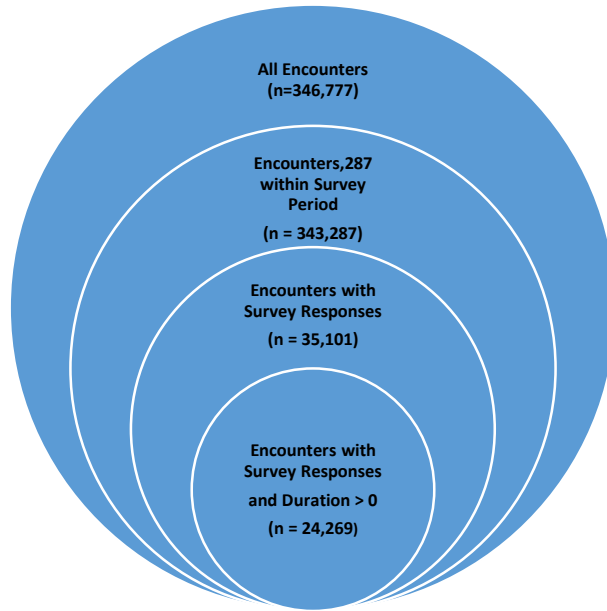


Figure 2: Count of Survey Responses (11.3% of encounters during the period)

Table 2: Summary of Care Encounters

CPT Code Category	Urgent Care	Occupation Medicine	Workers Comp	Physical	Misc.	Grand Total
Respiratory/Pneum/Flu	5,023		9	3	4	5,039
Other	4,382	145	230	11	132	4,900
Sinus	2,922				0	2,922
Joint/Bone	1,330		717		52	2,099
Exam-Physical	72	1,492	8	226	48	1,846
Contusion/Wound	1,259		456		17	1,732
Ear/Eye	1,718		9		2	1,729
Sore/Throat	1,603				1	1,604
Urinary	1,463	1			1	1,465
Skin	1,345		23		2	1,370
Pain	562	1	114		11	688
No/CPT	278	141	43	13	32	507
Digestive	132				0	132
Vaccine	9	3			111	123
Neuro/Mental	53		7		0	60
Walk Out	50		1	2	3	56
Grand Total	22,201	1,783	1,617	255	416	26,272*

Notes:* Some subjects had used two (2) business lines on the same encounter day.

Table 3: Summary of Care Encounters (Percent)

CPT Code Category	Urgent Care	Occupation Medicine	Workers Comp	Physical	Misc.	Grand Total
Respiratory/Pneum/Flu	19.1%	0.0%	0.0%	0.0%	0.0%	19.2%
Other	16.7%	0.6%	0.9%	0.0%	0.5%	18.7%
Sinus	11.1%	0.0%	0.0%	0.0%	0.0%	11.1%
Joint/Bone	5.1%	0.0%	2.7%	0.0%	0.2%	8.0%
Exam-Physical	0.3%	5.7%	0.0%	0.9%	0.2%	7.0%
Contusion/Wound	4.8%	0.0%	1.7%	0.0%	0.1%	6.6%
Ear/Eye	6.5%	0.0%	0.0%	0.0%	0.0%	6.6%
Sore/Throat	6.1%	0.0%	0.0%	0.0%	0.0%	6.1%
Urinary	5.6%	0.0%	0.0%	0.0%	0.0%	5.6%
Skin	5.1%	0.0%	0.1%	0.0%	0.0%	5.2%
Pain	2.1%	0.0%	0.4%	0.0%	0.0%	2.6%
No/CPT	1.1%	0.5%	0.2%	0.0%	0.1%	1.9%
Digestive	0.5%	0.0%	0.0%	0.0%	0.0%	0.5%
Vaccine	0.0%	0.0%	0.0%	0.0%	0.4%	0.5%
Neuro/Mental	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%
Walk Out	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%
Grand Total	84.5%	6.8%	6.2%	1.0%	1.6%	100.0%

Table 4: Summary of Clinical Factors

	Urgent Care	Occupational Medicine	Workers Comp	Physical	Misc.	Grand Total
Encounters	23,303	1,871	1,696	263	428	27,561
<i>Percent of Encounters</i>	<i>84.6%</i>	<i>6.8%</i>	<i>6.2%</i>	<i>1.0%</i>	<i>1.6%</i>	<i>100.0%</i>
Mean Score	8.8	8.5	8.2	8.8	8.7	8.8
Mean Duration	61.8	33.2	71.0	52.4	42.8	60.0
0 to 15 min	0.4%	26.2%	0.8%	6.5%	18.9%	2.5%
16 min to 30 min	12.6%	35.0%	9.6%	22.8%	25.5%	14.2%
31 min to 45 min	25.9%	18.9%	19.3%	24.7%	17.1%	24.8%
46 min to 60 min	21.6%	8.0%	18.6%	15.6%	15.9%	20.3%
61 min to 90 min	23.4%	6.8%	26.9%	17.9%	14.7%	22.3%
91 min to 120 min	9.5%	2.7%	14.3%	7.6%	4.9%	9.2%
More than 120 min	6.8%	2.5%	10.6%	4.9%	3.0%	6.6%
Medical History Taken	97.3%	0.7%	91.5%	26.2%	30.1%	88.7%
Height Weight Measured	99.2%	0.7%	98.5%	35.0%	31.3%	90.8%
Referral Given	13.2%	0.5%	84.6%	2.7%	11.9%	16.6%
Prescription Given	90.7%	0.1%	55.9%	7.2%	25.7%	80.6%
Pain Med	17.7%	0.1%	30.3%	0.8%	16.4%	17.1%
Antibiotic Med	58.8%	0.0%	6.3%	0.8%	4.0%	50.2%
Other Med	76.7%	0.1%	44.8%	7.2%	21.0%	68.0%
Mean Co-Pay Amount	\$19.79	\$0.01	\$0.04	\$1.84	\$1.20	\$16.77

The most common encounters were Urgent Care (84.5% of encounters), Occupational Medicine (6.8%) and Workers Compensation episodes (6.2%). A medical history was taken in 88.7% of encounters (n = 24,435), height and weight recorded in 90.8% of encounters (n = 25,037), referrals given in 16.6% of encounters (n = 4,568) and prescriptions given in 80.6% of encounters (n = 22,206). For Urgent Care encounters respiratory/pneumonia/flu diagnoses were most common, comprising 19.1% of cases; sinus-related diagnoses represented 11.1% of cases.

Table 5: Summary of Encounter Categories by Durations

CPT Code Category	Urgent Care	Occupation Medicine	Workers Comp	Physical	Misc.	Grand Total
0 to 10 min	18	259	3	6	35	321
11 to 20 min	387	448	45	23	86	989
21 to 30 min	2,281	374	119	44	62	2,880
31 to 40 min	3,577	258	188	47	50	4,120
41 to 50 min	3,309	134	216	27	38	3,724
51 to 60 min	2,785	82	195	24	33	3,119
61 to 90 min	4,709	124	432	44	51	5,360
91 to 100 min	800	21	105	10	4	940
101 to 120 min	1,081	29	122	7	12	1,251
> 120 min	1,334	41	170	13	9	1,567
Total of Count	20,281	1,770	1,595	245	380	24,271*
Mean	61.3	33.2	71.1	52.1	59.2	59.5
St Dev	34.6	30.4	39.5	35.5	35.6	35.6
Median	52.0	25.0	62.0	41.0	51.0	51.0
Maximum	240.0	231.0	238.0	211.0	240.0	240.0
Minimum	3.0	1.0	5.0	7.0	1.0	1.0

Notes:* Some subjects had used two (2) business lines on the same encounter day.

Encounter durations are summarized in Table 5. Mean duration for all encounters was 59.5 minutes (standard deviation = 35.6 minutes), with a median value of 51.0 minutes. A summary by day-of-the-week is presented in Table 6, which shows that encounters were spread fairly evenly throughout the week. Clinical activities by CPT diagnosis are presented in Table 7, which show that nearly one-third (29.3%) of cases receiving prescriptions for CPT diagnoses were related to respiratory or sinus cases.

Table 6: Summary of Encounter Categories by Day of the Week

	Urgent Care	Occupation Medicine	Workers Comp	Physical	Misc.	Grand Total
Sunday	3,415	28	65	27	20	3,555 (13.5%)
Monday	3,493	360	322	39	70	4,284 (16.3%)
Tuesday	2,960	345	262	37	85	3,689 (14.0%)
Wednesday	2,795	305	259	37	62	3,458 (13.2%)
Thursday	2,967	303	279	41	64	3,654 (13.9%)
Friday	3,059	338	312	44	73	3,826 (14.6%)
Saturday	3,512	104	118	30	42	3,806 (14.5%)
Total of Counts	22,201	1,783	1,617	255	416	26,272*

Notes:* Some subjects had used two (2) business lines on the same encounter day.

Table 7: Summary of Care Encounters and Clinical Activities

	Prescription	Medical History	Height/Weight	Referral
Respiratory/Pneum/Flu	18.3%	18.7%	19.1%	2.1%
Other	15.2%	17.1%	17.5%	3.1%
Sinus	11.0%	10.9%	11.1%	0.4%
Ear/Eye	6.2%	6.4%	6.6%	0.2%
Joint/Bone	5.6%	7.7%	8.0%	4.3%
Sore Throat	5.6%	6.0%	6.1%	0.7%
Urinary	5.4%	5.4%	5.5%	1.4%
Skin	4.8%	5.0%	5.2%	0.4%
Contusion/Wound	4.4%	6.3%	6.5%	2.4%
Pain	2.1%	2.5%	2.6%	1.0%
No CPT	1.0%	1.2%	1.2%	0.3%
Digestive	0.5%	0.5%	0.5%	0.1%
Exam-Physical	0.2%	0.4%	0.5%	0.1%
Neuro/Mental	0.2%	0.2%	0.2%	0.0%
Walk Out	0.1%	0.2%	0.2%	0.0%
Vaccine	0.0%	0.0%	0.0%	0.0%
Grand Total	80.5%	88.6%	90.8%	16.6%

The distribution of survey values (0 through 10) scores are presented in Tables 8 and 9, and illustrated in Figure 3. For the entire population of surveys, the mean of scores was 8.7, with a standard deviation of 2.4, and a median value of 10. For subjects that had more than 1 encounter during the study period (n = 6,907), the mean of scores was 9.12, with a standard deviation of

1.96, and a median value of 10. These patients provided a mean value of 2.40 surveys per subject.

Table 8: Summary of Survey Scores by Business Line

Survey Value	Urgent Care	Occupation Medicine	Workers Comp	Physical	Misc.	<i>Grand Total</i>
0	632	73	107	9	11	832
1	200	24	17	1	2	244
2	226	19	23	1	5	274
3	223	26	35	3	8	295
4	236	28	19	2	5	290
5	491	67	64	5	10	637
6	398	38	39	5	8	488
7	819	88	80	7	19	1,013
8	1,652	149	165	11	29	2,006
9	3,031	235	266	41	45	3,618
10	13,387	1,110	858	168	250	15,773
Grand Total	21,295	1,857	1,673	253	392	25,470*
Mean	8.8	8.5	8.2	8.9	8.7	8.7
St Dev	2.4	2.6	2.9	2.3	2.4	2.4
Median	10	10	10	10	10	10
Max	10	10	10	10	10	10
Min	0	0	0	0	0	0

Notes:* Some subjects had used two (2) business lines on the same encounter day; survey was assigned to each business line.

Table 9: Summary of Survey Scores (Percent)

Survey Value	Urgent Care	Occupation Medicine	Workers Comp	Physical	Misc.	Grand Total
<i>Percent by Business Line</i>						
0	3.0%	3.9%	6.4%	3.6%	2.8%	3.3%
1	0.9%	1.3%	1.0%	0.4%	0.5%	1.0%
2	1.1%	1.0%	1.4%	0.4%	1.3%	1.1%
3	1.0%	1.4%	2.1%	1.2%	2.0%	1.2%
4	1.1%	1.5%	1.1%	0.8%	1.3%	1.1%
5	2.3%	3.6%	3.8%	2.0%	2.6%	2.5%
6	1.9%	2.0%	2.3%	2.0%	2.0%	1.9%
7	3.8%	4.7%	4.8%	2.8%	4.8%	4.0%
8	7.8%	8.0%	9.9%	4.3%	7.4%	7.9%
9	14.2%	12.7%	15.9%	16.2%	11.5%	14.2%
10	62.9%	59.8%	51.3%	66.4%	63.8%	61.9%
<i>Percent by Score</i>						
0	76.0%	8.8%	12.9%	1.1%	1.3%	
1	82.0%	9.8%	7.0%	0.4%	0.8%	
2	82.5%	6.9%	8.4%	0.4%	1.8%	
3	75.6%	8.8%	11.9%	1.0%	2.7%	
4	81.4%	9.7%	6.6%	0.7%	1.7%	
5	77.1%	10.5%	10.0%	0.8%	1.6%	
6	81.6%	7.8%	8.0%	1.0%	1.6%	
7	80.8%	8.7%	7.9%	0.7%	1.9%	
8	82.4%	7.4%	8.2%	0.5%	1.4%	
9	83.8%	6.5%	7.4%	1.1%	1.2%	
10	84.9%	7.0%	5.4%	1.1%	1.6%	
Grand Total	83.6%	7.3%	6.6%	1.0%	1.5%	

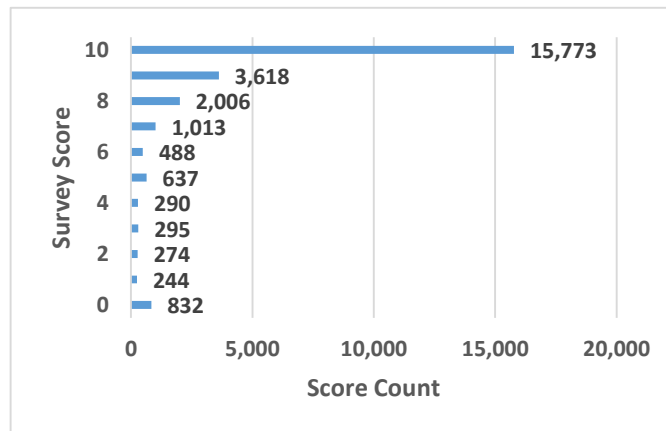


Figure 3: Summary of Survey Scores

The distribution of verbatim comment categories by survey score are presented in Tables 10A (Detractors), 10B (Neutral Users) and 10C (Promoters). While the most common comment category amongst Detractors (survey scores 0 through 6) characterized the staff as professional (17.85%), the most common unfavorable categories were related to long waits (13.06%) and impolite or rude staff (4.08%). For Neutral Users (survey scores 7 or 8), 9.00% similarly found the staff to be professional; the most common unfavorable categories were related to long waits (6.54%). For Promoters, the most common categories related to friendliness (27.90%), professionalism (19.05%) and quick service (15.25%).

Table 10A: Summary of Detractor Verbatim Comments

Comment Category	Net Promoter Survey Score							Total	Rank
	0	1	2	3	4	5	6		
Unfriendly	0.09%	0.03%	0.03%	0.09%	0.00%	0.03%	0.06%	0.34%	14
Friendly	1.67%	0.40%	0.37%	0.46%	0.56%	1.02%	1.05%	5.54%	3
Long Wait	2.01%	0.93%	1.18%	1.58%	1.30%	3.65%	2.41%	13.06%	2
Short Wait	0.34%	0.12%	0.00%	0.15%	0.12%	0.28%	0.12%	1.14%	10
Slow	0.65%	0.09%	0.22%	0.09%	0.09%	0.34%	0.28%	1.76%	7
Quick or Fast	0.77%	0.15%	0.40%	0.25%	0.22%	0.43%	0.37%	2.60%	5
Disorganized	0.09%	0.06%	0.00%	0.06%	0.00%	0.12%	0.00%	0.34%	13
Organized	0.06%	0.09%	0.03%	0.00%	0.03%	0.03%	0.09%	0.34%	14
Messy or Unclean	0.15%	0.00%	0.03%	0.00%	0.00%	0.06%	0.00%	0.25%	16
Clean	0.43%	0.03%	0.22%	0.09%	0.09%	0.28%	0.25%	1.39%	9
Impolite or Rude	2.20%	0.25%	0.37%	0.19%	0.34%	0.31%	0.43%	4.08%	4
Polite or Courteous	0.37%	0.06%	0.06%	0.19%	0.31%	0.25%	0.19%	1.42%	8
Professional	5.94%	1.67%	1.36%	2.10%	1.42%	3.25%	2.10%	17.85%	1
Unprofessional	1.08%	0.19%	0.12%	0.03%	0.06%	0.31%	0.22%	2.01%	6
Convenient	0.03%	0.03%	0.06%	0.09%	0.03%	0.12%	0.09%	0.46%	11
Inconvenient	0.19%	0.09%	0.03%	0.06%	0.00%	0.09%	0.00%	0.46%	11
Grand Total	16.09%	4.21%	4.49%	5.45%	4.58%	10.58%	7.67%	53.06%	
Detractor/Neutral/Promoter Count	3,232								

Table 10B: Summary of Neutral Verbatim Comments

Comment Category	Net Promoter Survey Score		Total	Rank
	7	8		
Unfriendly	0.00%	0.00%	0.00%	15
Friendly	1.15%	2.40%	3.55%	3
Long Wait	2.99%	3.55%	6.54%	2
Short Wait	0.40%	1.34%	1.74%	4
Slow	0.34%	0.53%	0.87%	7
Quick or Fast	0.40%	1.18%	1.59%	5
Disorganized	0.03%	0.03%	0.06%	13
Organized	0.06%	0.09%	0.16%	12
Messy or Unclean	0.00%	0.03%	0.03%	14
Clean	0.19%	0.72%	0.90%	6
Impolite or Rude	0.09%	0.31%	0.40%	9
Polite or Courteous	0.19%	0.40%	0.59%	8
Professional	3.49%	5.51%	9.00%	1
Unprofessional	0.19%	0.09%	0.28%	11
Convenient	0.09%	0.25%	0.34%	10
Inconvenient	0.00%	0.00%	0.00%	15
Grand Total	9.63%	16.45%	26.07%	
Detractor/Neutral/Promoter				
Count	3,210			

Table 10C: Summary of Promoter Verbatim Comments

Comment Category	Net Promoter Survey Score		Total	Rank
	9	10		
Unfriendly	0.00%	0.00%	0.00%	14
Friendly	4.56%	23.33%	27.90%	1
Long Wait	0.61%	2.55%	3.16%	7
Short Wait	0.33%	1.34%	1.68%	8
Slow	0.03%	0.04%	0.07%	10
Quick or Fast	2.83%	12.42%	15.25%	3
Disorganized	0.00%	0.00%	0.00%	14
Organized	0.04%	0.48%	0.53%	9
Messy or Unclean	0.00%	0.00%	0.00%	14
Clean	1.45%	6.98%	8.43%	4
Impolite or Rude	0.01%	0.04%	0.05%	11
Polite or Courteous	0.63%	4.42%	5.05%	6
Professional	2.61%	16.44%	19.05%	2
Unprofessional	0.00%	0.01%	0.01%	12
Convenient	1.28%	4.69%	5.97%	5
Inconvenient	0.00%	0.00%	0.00%	13
Grand Total	14.40%	72.75%	87.15%	
Detractor/Neutral/Promoter				
Count	21,119			

Those variables that were statistically significant ($p\text{-value} \leq 0.05$) and operationally important (i.e., with a parameter absolute value greater than 0.075 survey units) were retained in the final model. The final model ($R^2 = 0.1583$) was heavily dependent on the verbatim comment categories ($R^2 = 0.1374$ without inclusion of clinical factor variables). Fit statistics are summarized in Table 11; parameter estimates and related model statistics are summarized in Table 12.

Table 11: SAS Model Metrics (PROC REG)

SAS System: REG Procedure					
Number of Observations Read: 27,561					
Number of Observations Used: 27,561					
Dependent Variable: Survey Score					
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	33	24891	754.26596	156.92	<.0001
Error	27527	132318	4.80683		
Corrected Total	27560	157208			
Root MSE	2.19245		R-Square	0.1583	
Dependent Mean	8.76075		Adj R-Sq	0.1573	
Coeff Var	25.02581				

Table 12: Linear Regression for Survey Score (PROC REG)

Parameter Estimates (n = 27,561; R ² = 0.1583)								
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t	95% Confidence Limits	
Intercept	Intercept	1	8.87420	0.16320	54.38	<.0001	8.55433	9.19407
Workers Comp	Workers_Comp	1	-0.28852	0.05950	-4.85	<.0001	-0.40515	-0.17190
Repeat Patient	Repeat	1	0.37876	0.03643	10.40	<.0001	0.30736	0.45016
Verbatim: Unfriendly	Unfriendly	1	-3.87057	0.66354	-5.83	<.0001	-5.17114	-2.57000
Verbatim: Friendly	Friendly	1	0.90292	0.03218	28.06	<.0001	0.83985	0.96599
Verbatim: Long Wait	Long_Wait	1	-1.20923	0.06271	-19.28	<.0001	-1.33214	-1.08632
Verbatim: Slow	Slow	1	-3.09251	0.22006	-14.05	<.0001	-3.52384	-2.66119
Verbatim: Quick or Fast	Quick_Fast	1	0.67117	0.04087	16.42	<.0001	0.59106	0.75127
Verbatim: Disorganized	Disorganized	1	-4.03357	0.61142	-6.60	<.0001	-5.23197	-2.83516
Verbatim: Messy or Unclean	Messy_Unclean	1	-4.02227	0.73675	-5.46	<.0001	-5.46634	-2.57820
Verbatim: Clean	Clean	1	0.55449	0.05355	10.35	<.0001	0.44953	0.65945
Verbatim: Impolite or Rude	Im_Unpolite_Rude	1	-4.98054	0.17804	-27.97	<.0001	-5.32950	-4.63158
Verbatim: Polite Courteous	Polite_Courteous	1	0.69592	0.06742	10.32	<.0001	0.56377	0.82807
Verbatim: Professional	Professional	1	-0.10392	0.03542	-2.93	0.0033	-0.17334	-0.03450
Verbatim: Unprofessional	Unprofessional	1	-4.61047	0.25439	-18.12	<.0001	-5.10909	-4.11185
Age: 0 to 17	AGE_17	1	-0.14786	0.05640	-2.62	0.0088	-0.25841	-0.03732
Age: 18 to 30	AGE_30	1	-0.69100	0.05367	-12.88	<.0001	-0.79619	-0.58581
Age: 31 to 50	AGE_50	1	-0.35233	0.04668	-7.55	<.0001	-0.44383	-0.26083
Age: 51 to 64	AGE_64	1	-0.10757	0.04716	-2.28	0.0226	-0.20002	-0.01513
Monday	Monday	1	-0.12140	0.03584	-3.39	0.0007	-0.19165	-0.05114
CPT Category: Sore Throat	Sore_Throat	1	-0.16733	0.05659	-2.96	0.0031	-0.27824	-0.05641
Prescription: Antibiotic	P_Antibiotic	1	0.16782	0.02827	5.94	<.0001	0.11240	0.22323
Prescription: Other	P_Other	1	0.08927	0.03123	2.86	0.0043	0.02806	0.15048
Encounter Duration > 14 min	M_15	1	-0.33497	0.09877	-3.39	0.0007	-0.52857	-0.14137
Encounter Duration > 29 min	M_30	1	-0.13502	0.04571	-2.95	0.0031	-0.22462	-0.04542
Encounter Duration > 44 min	M_45	1	-0.10605	0.03935	-2.70	0.0070	-0.18318	-0.02893
Encounter Duration > 59 min	M_60	1	-0.15208	0.03999	-3.80	0.0001	-0.23046	-0.07369
Encounter Duration > 89 min	M_90	1	-0.17738	0.05126	-3.46	0.0005	-0.27784	-0.07691
Encounter Duration > 119 min	M_120	1	-0.38461	0.06639	-5.79	<.0001	-0.51473	-0.25448
Copay = \$0	COPAY_0	1	0.30627	0.12716	2.41	0.0160	0.05703	0.55551
Copay to \$25	COPAY_to_25	1	0.57744	0.13066	4.42	<.0001	0.32134	0.83353
Copay \$26 to \$100	COPAY_26_to_100	1	0.38231	0.12772	2.99	0.0028	0.13199	0.63264

It should be noted that the study data did not include an element distinguishing the care-giver type (e.g., physician, nurse practitioner, registered nurse). That challenge notwithstanding, controlling for specific center and specific care giver (i.e., SAS’s PROC GLM procedure with Center and Care Giver as classes) had little impact on predictor strength ($R^2 = 0.1584$), as shown in Table 13. More clinical factors were statistically significant (e.g., some prescriptions, more encounter duration categories, some CPT Codes, etc.), but negative survey comment categories remained an order of magnitude larger in their impact than both clinical factors and positive comment categories (Table 14).

Table 13: SAS Model Metrics (GLM)

SAS System: GLM Procedure					
Number of Observations Read: 27,561					
Number of Observations Used: 27,561					
Dependent Variable: Survey Score					
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	29	24896.6304	858.5045	178.63	<.0001
Error	27531	132311.7477	4.8059		
Corrected Total	27560	157208.3781			
Root MSE	2.192241		R-Square	0.1584	
SURVEY Mean	8.760749				
Coeff Var	25.02344				

Table 14: Linear Regression for Survey Score (PROC GLM)

Parameter Estimates (n = 27,561; R ² = 0.1584)						
Variable	Parameter Estimate	Standard Error	t Value	Pr > t	95% Confidence Limits	
Intercept	9.064715301	0.09263040	97.86	<.0001	8.883155064	9.246275539
P_Antibiotic	0.166218822	0.02828652	5.88	<.0001	0.110775830	0.221661815
P_Other	0.106774077	0.03049246	3.50	0.0005	0.047007331	0.166540822
COPAY	-0.002827898	0.00081436	-3.47	0.0005	-0.004424090	-0.001231706
Workers_Comp	-0.314834748	0.05829852	-5.40	<.0001	-0.429102774	-0.200566721
AGE_30	-0.595062346	0.03987795	-14.92	<.0001	-0.673225130	-0.516899562
AGE_50	-0.258843476	0.03080002	-8.40	<.0001	-0.319213059	-0.198473893
Sore_Throat	-0.176406859	0.05629760	-3.13	0.0017	-0.286752982	-0.066060736
Walk_Out	-1.033147123	0.28875616	-3.58	0.0003	-1.599123684	-0.467170563
M_15	-0.335958113	0.09865938	-3.41	0.0007	-0.529335442	-0.142580783
M_30	-0.135231761	0.04569913	-2.96	0.0031	-0.224804354	-0.045659168
M_45	-0.106518378	0.03934392	-2.71	0.0068	-0.183634440	-0.029402317
M_60	-0.173948040	0.03807717	-4.57	<.0001	-0.248581208	-0.099314871
M_105	-0.278352118	0.07348323	-3.79	0.0002	-0.422382929	-0.134321306
M_120	-0.259744990	0.08562313	-3.03	0.0024	-0.427570621	-0.091919359
COPAY_to_25	0.311107713	0.04448714	6.99	<.0001	0.223910689	0.398304737
COPAY_26_to_100	0.194580683	0.04800375	4.05	<.0001	0.100490921	0.288670445
Repeat	0.415199121	0.03314899	12.53	<.0001	0.350225435	0.480172807
Unfriendly	-3.898270715	0.66350511	-5.88	<.0001	-5.198774003	-2.597767428
Friendly	0.901735742	0.03217020	28.03	<.0001	0.838680531	0.964790953
Long_Wait	-1.212344262	0.06268422	-19.34	<.0001	-1.335208468	-1.089480057
Slow	-3.108859524	0.22000200	-14.13	<.0001	-3.540074482	-2.677644566
Quick_Fast	0.667857880	0.04086311	16.34	<.0001	0.587764129	0.747951631
Disorganized	-4.025561637	0.61132714	-6.58	<.0001	-5.223793495	-2.827329778
Messy_Unclean	-4.103726675	0.73653075	-5.57	<.0001	-5.547363888	-2.660089462
Clean	0.556755228	0.05354045	10.40	<.0001	0.451813252	0.661697204
Im_Unpolite_Rude	-4.964633252	0.17813916	-27.87	<.0001	-5.313794938	-4.615471567
Polite_Courteous	0.696725771	0.06737770	10.34	<.0001	0.564662097	0.828789444
Professional	-0.094514364	0.03527361	-2.68	0.0074	-0.163652405	-0.025376323
Unprofessional	-4.613696989	0.25438526	-18.14	<.0001	-5.112304852	-4.115089125

Aggregating encounter records at the center level (n = 53) allowed evaluation of mean center-level factors (Table 15 and Table 16). While the number of statistically significant variables decreased substantially (6 compared to 31 in the encounter-level PROC REG regression model), predictive strength improved (R² = 0.8510). As in the case of prior models, patient perceptions of long wait and slow service had statistically significant and negative impacts on NPS. At the center level, sinus-related and Neurological/Mental CPT Codes had statistically significant impacts—favorable and unfavorable, respectively.

Table 15: SAS Model Metrics (PROC REG) - Centers

SAS System: REG Procedure					
Number of Observations Read: 53					
Number of Observations Used: 53					
Dependent Variable: NET PROMOTER SCORE (CENTERS)					
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	6	0.62794	0.10466	43.79	<.0001
Error	46	0.10995	0.00239		
Corrected Total	52	0.73788			
Root MSE	0.04889		R-Square	0.8510	
Dependent Mean	0.67714		Adj R-Sq	0.8316	
Coeff Var	7.21988				

Table 16: Linear Regression for Net Promoter Score - Centers

Parameter Estimates (n = 53; R ² = 0.8510)								
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t	95% Confidence Limits	
Intercept	Intercept	1	0.74265	0.04267	17.41	<.0001	0.65676	0.82853
Sinus	Sinus	1	0.58124	0.12753	4.56	<.0001	0.32453	0.83795
Neuro_Mental	Neuro_Mental	1	-8.13728	2.92991	-2.78	0.0079	-14.03487	-2.23968
Long_Wait	Long_Wait	1	-2.93568	0.42881	-6.85	<.0001	-3.79883	-2.07253
Short_Wait	Short_Wait	1	-2.87037	0.78594	-3.65	0.0007	-4.45238	-1.28836
Slow	Slow	1	-9.64602	1.69310	-5.70	<.0001	-13.05405	-6.23800
Quick_Fast	Quick_Fast	1	0.68926	0.24783	2.78	0.0078	0.19040	1.18813

Aggregating encounter records at the care-giver level (n = 187) allowed evaluation of mean factors (Table 17 and Table 18). Again, predictive strength improved (R² = 0.5233), compare to the encounter-level regression models. Several clinical factors were statistically significant (Sinus CPT Codes Low- and Moderate-Complexity, encounter durations of less than 15 minutes, moderate copayments between \$26 and \$100) were statistically significant, but smaller in magnitude than perceptions of long waits and rude or impolite behavior).

Table 17: SAS Model Metrics (PROC REG) – Care-Giver

SAS System: REG Procedure					
Number of Observations Read: 187					
Number of Observations Used: 187					
Dependent Variable: NET PROMOTER SCORE (CARE GIVER)					
Analysis of Variance					
Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	10	3.71649	0.37165	19.32	<.0001
Error	176	3.38550	0.01924		
Corrected Total	186	7.10199			
Root MSE	0.13869		R-Square	0.5233	
Dependent Mean	0.65357		Adj R-Sq	0.4962	
Coeff Var	21.22090				

Table 18: Linear Regression for Net Promoter Score – Care-Giver

Parameter Estimates (n = 187; R ² = 0.5233)								
Variable	Label	DF	Parameter Estimate	Standard Error	t Value	Pr > t	95% Confidence Limits	
Intercept	Intercept	1	-0.35932	0.24114	-1.49	0.1380	-0.83522	0.11658
Sinus	Sinus	1	0.31830	0.10991	2.90	0.0043	0.10138	0.53522
Long_Wait	Long_Wait	1	-1.13357	0.23217	-4.88	<.0001	-1.59176	-0.67537
Low_Complex	Low_Complex	1	0.19585	0.04820	4.06	<.0001	0.10073	0.29097
Moderate	Moderate_Complex	1	0.20121	0.04543	4.43	<.0001	0.11156	0.29086
Exam_Physical	Exam_Physical	1	0.36140	0.08586	4.21	<.0001	0.19196	0.53085
M_15	M_15	1	0.69131	0.24178	2.86	0.0048	0.21415	1.16848
COPAY_26_to_100	COPAY_26_to_100	1	0.32571	0.06934	4.70	<.0001	0.18885	0.46256
Friendly	Friendly	1	0.36328	0.08349	4.35	<.0001	0.19850	0.52805
Clean	Clean	1	0.39710	0.11004	3.61	0.0004	0.17993	0.61427
Im_Unpolite_Rude	Im_Unpolite_Rude	1	-5.51366	1.26308	-4.37	<.0001	-8.00638	-3.02093

Discussion

Survey Scores

Encounter duration was both statistically significant and operationally important as a predictor of survey scores. It should be borne in-mind that the encounter parameters (M_15 through M_120 in Table 14) were constructed to be additive—e.g., a 50-minute long encounter would have a value of one (1) for each of M_15, M_30 and M_45, and the cumulative impact of duration can be estimated by summing the parameter estimates for each of the three independent variables. Figure 4 demonstrates the additive effect on incrementally longer encounters. Similarly, Figure 5 illustrates the impact on the odds ratio that a survey score will qualify as a Promoter (value of 9 or 10) for incrementally longer encounters; Figure 6 illustrates the impact on the odds ratio that a survey score will qualify as a Detractor (value of 0 to 6) for incrementally longer encounters.

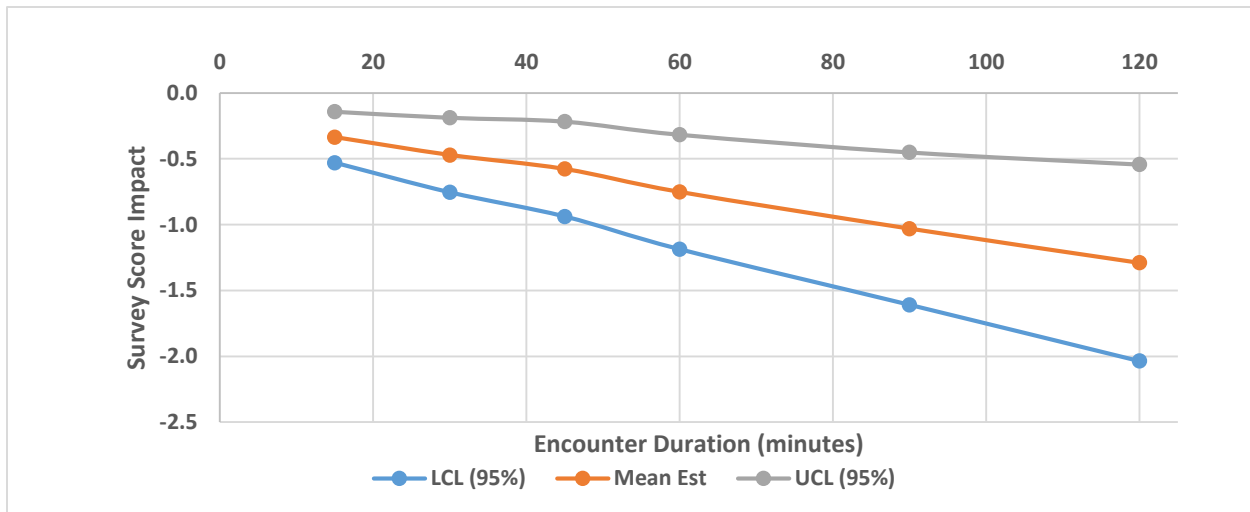


Figure 1: Impact of Encounter Duration on Survey Score

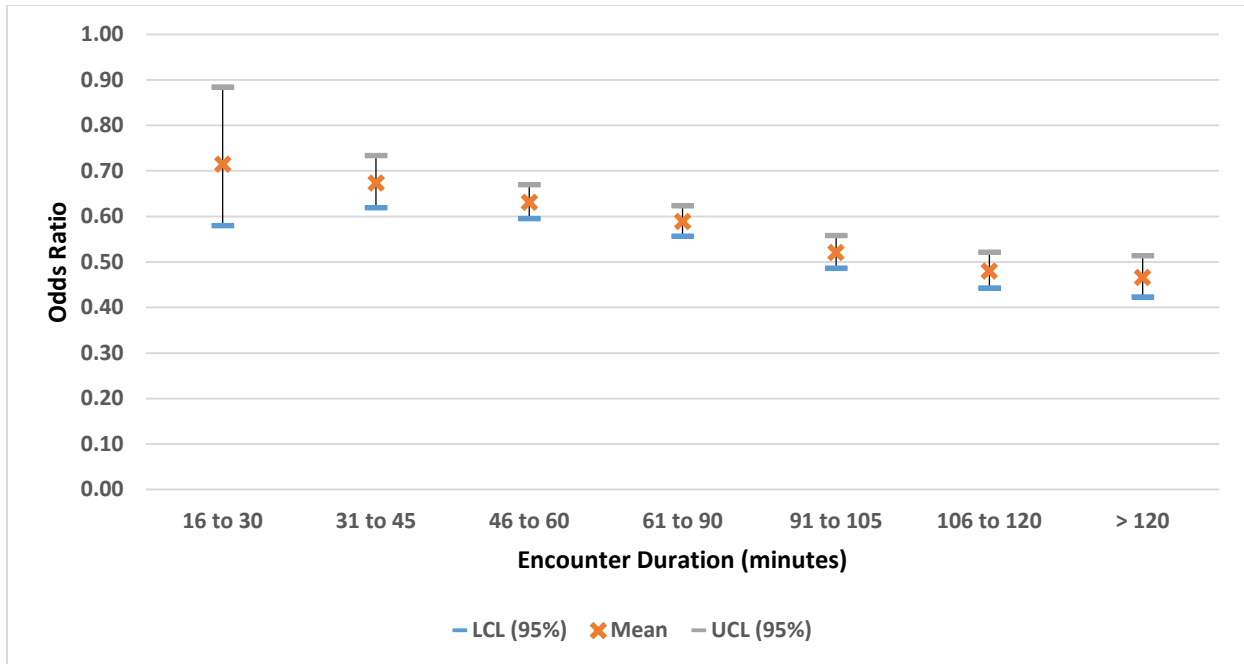


Figure 5: Odds Ratio; Encounter Duration as a Predictor of Promoter (Urgent Care)

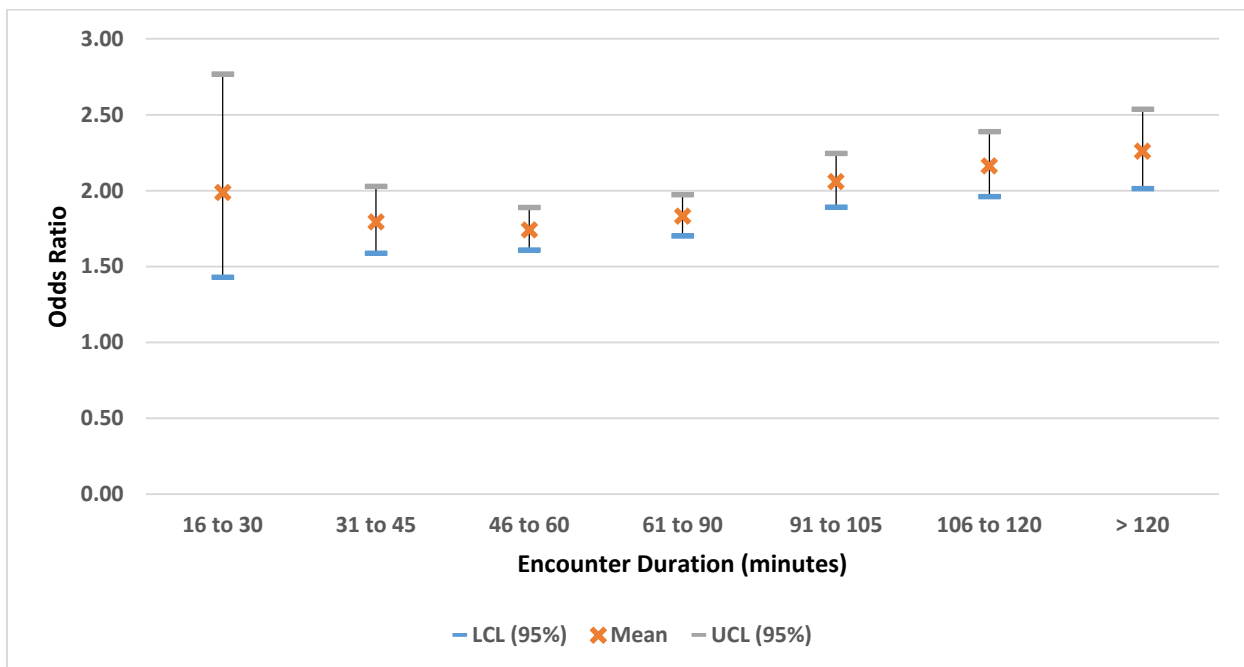


Figure 6: Odds Ratio; Encounter Duration as a Predictor of Detractor (Urgent Care)

Patients that left without being treated (“Walk Outs”) were associated with survey scores that were 1.033 lower (95% CI -1.599 to -0.467; p-value = 0.0003). Middle-aged patients (ages 30 to 64 years) we also associated with lower survey scores —0.595 lower for ages 18 to 30 years (95% CI -0.673 to -0.516; p-value < 0.0001), and 0.259 lower for ages 31 to 50 years (95% CI -0.319 to -0.194; p-value < 0.0001). Patient co-payments of \$0 to \$25 and \$26 to \$100 were associated with higher survey scores.

Several verbatim comment categories were an order of magnitude stronger in their relative impact on to predict survey scores, and negative categories comments were associated with much lower survey scores than the antonym comment categories. This result was consistent with prior published studies. Adequate clinical performance—as measured by activity metrics—was not sufficient to compensate for an unprofessional, impolite behavior, nor unclean conditions, as perceived by patients. These results were also consistent with prior studies of wait times, prescription status, and interpersonal and communication factors.

Unfavorable verbatim comment categories (e.g., unfriendly, slow, messy, etc.) had impacts almost four times larger—and in the opposite direction—as the related antonyms. For example,

- comments that characterized service as “unfriendly” were associated with scores 3.871 lower than comments that did not include the term (95% CI -5.171 to -2.570; p-value < 0.0001), whereas comments that characterized service as “friendly” were associated with scores 0.903 higher than comments that did not include the term (95% CI 0.840 to 0.966; p-value < 0.0001);
- comments that characterized service as “impolite” or “rude” were associated with scores 4.981 lower than comments that did not include the terms (95% CI -5.330

to -4.632; p-value < 0.0001), whereas comments that characterized service as “polite” or “courteous” were associated with scores 0.696 higher than comments that did not include the terms (95% CI 0.564 to 0.828; p-value < 0.0001).

Net Promoter Scores

In considering Net Promoter Scores® (NPS) at the center level (n = 53; $R^2 = 0.8510$), it must be recalled that the regression model predicted Net Promoter Score (0 to 100%). “Slow” service remained statistically and operationally significant factor (-9.646; 95% CI -13.054 to -6.238; p-value < 0.0001). Neurological and mental encounters (primarily related to migraine symptoms) were associated with lower scores. Interestingly, “Long waits” and “Short waits” were associated with similar impacts. For NPSs at the care-giver level, perceptions of long waits and/or rude or impolite behavior by the staff we associated with lower scored—several times the impact of clinical factors.

Generalizability and Confounding Factors

In generalizing the conclusions of this study, it must be borne in mind that the study population was not necessarily representative on the U.S. population, as (1) subjects were not chosen at random, nor (2) were they geographically diverse. Adequate clinical performance and effectiveness were imbedded assumptions in this study. No effort was made to assess the impact of misdiagnosis, nor inappropriate intervention on patient satisfaction, as measured by survey scores. A more complex clinical measurement framework might provide better insight into higher magnitude relationships between clinical factors and patient satisfaction, but it seems clear from the study that more qualitative factors (e.g., professional behavior, courtesy, expedient attention) are the principal influencers of satisfaction.

The study did not control for confounding factors, such as the potential relationship between age and diagnosis, nor whether care was provided by a physician, nurse practitioner, or nurse.

Likewise, cultural nor racial differences between the patient and care giver(s) were not considered. Patients that had multiple encounters on the same day (i.e., the specific patient visited the center more than once on a single day) may have had a small effect of regression results, as the study assumed the day-associate survey applied to all activities on that day.

Finally, in investigating whether clinical-encounter factors (e.g., patient demographics, time of day, process delays) are predictive of patients' satisfaction with care received in an urgent-care center (UCC) setting, the present study determined that several factors are important.

Specifically, duration of the encounter, co-payment more than \$100 and patient ages greater than 64 years were associated with higher survey scores. Much more important to patient satisfaction were qualitative attributes such as a polite, professional staff and a clean organized care setting.

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Appendix 1 – List of Study Data Available Elements

Variable	Description	Variable	Description
Key	Unique patient-encounter date identifier	P_Pain	Dichotomous indicator that prescription for pain medication was given (YES = 1)
PATIENT_IDENTIFIER	System-generated patient identifier; repeated for repeat patient visits	P_Antibiotic	Dichotomous indicator that prescription for antibiotic medication was given (YES = 1)
PATIENT_CITY	Patient city of residence	P_Other	Dichotomous indicator that prescription for other medication was given (YES = 1)
PATIENT_STATE	Patient state of residence	COPAY	Amount of patient-responsibility copayment at the time of the encounter
PATIENT_ZIP	Patient zip code of residence	SURVEY	Survey Score (integers 0 to 10)
PATIENT_AGE	Patient age (integer years)	Promoter	Dichotomous indicator that SURVEY score was 9 or 10 (YES = 1)
PATIENT_GUARDIAN	Whether patient was accompanied by a guardian (i.e., pediatric patients)	Neutral	Dichotomous indicator that SURVEY score was 7 or 8 (YES = 1)
MALE	Patient sex (Male = 1)	Detractor	Dichotomous indicator that SURVEY score was less than 7 (YES = 1)
CARE_CENTER_IDENTIFIER	Center identifier	Urgent_Care	Dichotomous indicator that the Line of Business was Urgent Care (YES = 1)
CARE_CENTER_CITY	Center City	Occ_Med	Dichotomous indicator that the Line of Business was Occupational Medicine (YES = 1)
CARE_CENTER_STATE	Center State	Workers_Comp	Dichotomous indicator that the Line of Business was Workers Compensation (YES = 1)
CARE_CENTER_ZIP	Center zip code	AGE_17	Dichotomous indicator that the patient age was 17 years or less (YES = 1)
ENCOUNTER_DATE	Date of the care encounter	AGE_30	Dichotomous indicator that the patient age was 18 years to 30 years (YES = 1)
ENCOUNTER_TIME	Time of day at patient sign-in	AGE_50	Dichotomous indicator that the patient age was 31 years to 50 years (YES = 1)
DOOR_TO_DOOR_ENCOUNTER_DURATION	Duration of encounter, from sign-in until exit	AGE_64	Dichotomous indicator that the patient age was 51 years to 64 years (YES = 1)
DOOR_TO_READ_BILL_DURATION	Duration of encounter, from sign-in until ready for billing (duplicates duration, above)	OVER_65	Dichotomous indicator that the patient age was greater than 64 years (YES = 1)
BUSINESS_LINE	Line of care business (e.g., Urgent Care, Workers Comp, Occupational Medicine, etc.)	Subject	Dichotomous indicator that the patient completed a survey and the encounter was within the study timeframe (YES = 1)
ICD9_CODE_PRIMARY	ICD9 code related to primary cause for encounter	Low_Complex	Dichotomous indicator that the Medical Decision Making Response value was Low Complexity (YES = 1)
ICD9_DESCRIPTION_PRIMARY	ICD9-related description for primary cause for encounter	Moderate	Dichotomous indicator that the Medical Decision Making Response value was Moderate Complexity (YES = 1)

Variable	Description	Variable	Description
CPT_CODE_PRIMARY	CPT code related to primary cause for encounter	SF_Complex	Dichotomous indicator that the Medical Decision Making Response value was Straight Forward Complexity (YES = 1)
CPT_DESCRIPTION_PRIMARY	CPT-related description for primary cause for encounter	High_Complex	Dichotomous indicator that the Medical Decision Making Response value was High Complexity (YES = 1)
ICD9_CODE_OTHER	Other ICD9 codes noted during the encounter	In_Period	Dichotomous indicator that the encounter was within the study timeframe (YES = 1)
ICD9_DESCRIPTION_OTHER	Description of other ICD9 codes noted during the encounter	Code_Test	Abbreviation of CPT Code (first 3 characters) to facilitate categorization
CPT_CODE_OTHER	Other CPT codes noted during the encounter	CPT_Category	Study-assigned category of CPT Code (e.g., Sinus, Joint_Bone, etc.)
CPT_DESCRIPTION_OTHER	Description of other CPT codes noted during the encounter	Other	Dichotomous indicator that the encounter CPT Code was within the Other category (YES = 1)
CLINICIAN_ID	Unique numeric clinician identifier	Exam_Physical	Dichotomous indicator that the encounter CPT Code was within the Exam_Physical category (YES = 1)
Medical_Decision_Making_Response	Categorical value that summarizes encounter/patient complexity	Joint_Bone	Dichotomous indicator that the encounter CPT Code was within the Joint_Bone category (YES = 1)
Medical_History_Taken	Dichotomous indicator that medical history was noted (YES = 1)	Sinus	Dichotomous indicator that the encounter CPT Code was within the Sinus category (YES = 1)
Height_Weight_Measured	Dichotomous indicator that height and weight was noted (YES = 1)	Contusion_Wound	Dichotomous indicator that the encounter CPT Code was within the Contusion_Wound category (YES = 1)
Referral_Given	Dichotomous indicator that patient was referred for follow-up (YES = 1)	Ear_Eye	Dichotomous indicator that the encounter CPT Code was within the Ear_Eye category (YES = 1)
Prescription_Given	Dichotomous indicator that a prescription was given (YES = 1)	Skin	Dichotomous indicator that the encounter CPT Code was within the Skin category (YES = 1)
P_Pain	Dichotomous indicator that prescription for pain medication was given (YES = 1)	Sore_Throat	Dichotomous indicator that the encounter CPT Code was within the Sore_Throat category (YES = 1)
P_Antibiotic	Dichotomous indicator that prescription for antibiotic medication was given (YES = 1)	Urinary	Dichotomous indicator that the encounter CPT Code was within the Urinary category (YES = 1)
P_Other	Dichotomous indicator that prescription for other medication was given (YES = 1)	Pain	Dichotomous indicator that the encounter CPT Code was within the Pain category (YES = 1)
Walk_Out	Dichotomous indicator that the encounter CPT Code was within the Walk_Out category (YES = 1)	M_45	Dichotomous indicator that the duration of the encounter was equal to or more than 45 minutes (YES = 1)
Vaccine	Dichotomous indicator that the encounter CPT Code was within the Vaccine category (YES = 1)	M_60	Dichotomous indicator that the duration of the encounter was equal to or more than 60 minutes (YES = 1)
Digestive	Dichotomous indicator that the encounter CPT Code was within the Digestive category (YES = 1)	M_90	Dichotomous indicator that the duration of the encounter was equal to or more than 90 minutes (YES = 1)
Neuro_Mental	Dichotomous indicator that the encounter CPT Code was within the Neuro_Mental category (YES = 1)	M_105	Dichotomous indicator that the duration of the encounter was equal to or more than 105 minutes (YES = 1)

Variable	Description	Variable	Description
No_CPT	Dichotomous indicator that the encounter did not include a CPT Code (YES = 1)	M_120	Dichotomous indicator that the duration of the encounter was equal to or more than 120 minutes (YES = 1)
Sunday	Dichotomous indicator that the encounter occurred on a Sunday (YES = 1)	COPAY_0	Dichotomous indicator that amount of patient-responsibility copayment at the time of the encounter was \$0 (YES = 1)
Monday	Dichotomous indicator that the encounter occurred on a Monday (YES = 1)	COPAY_to_25	Dichotomous indicator that amount of patient-responsibility copayment was greater than \$0 and less than or equal \$25 (YES = 1)
Tuesday	Dichotomous indicator that the encounter occurred on a Tuesday (YES = 1)	COPAY_26_to_100	Dichotomous indicator that amount of patient-responsibility copayment was greater than \$25 and less than or equal \$100 (YES = 1)
Wednesday	Dichotomous indicator that the encounter occurred on a Wednesday (YES = 1)	COPAY_101_to_150	Dichotomous indicator that amount of patient-responsibility copayment was greater than \$100 and less than or equal \$150 (YES = 1)
Thursday	Dichotomous indicator that the encounter occurred on a Thursday (YES = 1)	COPAY_GT150	Dichotomous indicator that amount of patient-responsibility copayment was greater than \$150 (YES = 1)
Friday	Dichotomous indicator that the encounter occurred on a Friday (YES = 1)	Unfriendly	Dichotomous indicator that the encounter-related survey response included the term Unfriendly (YES = 1)
Saturday	Dichotomous indicator that the encounter occurred on a Saturday (YES = 1)	Friendly	Dichotomous indicator that the encounter-related survey response included the term Friendly (YES = 1)
Morning	Dichotomous indicator that the encounter occurred before noon (YES = 1)	Long_Wait	Dichotomous indicator that the encounter-related survey response included the term Long Wait (YES = 1)
Afternoon	Dichotomous indicator that the encounter occurred between noon and 4 pm (YES = 1)	Short_Wait	Dichotomous indicator that the encounter-related survey response included the term Short Wait (YES = 1)
Evening	Dichotomous indicator that the encounter occurred after 4 pm (YES = 1)	Slow	Dichotomous indicator that the encounter-related survey response included the term Slow (YES = 1)
Weekday	Dichotomous indicator that the encounter occurred on a weekday (YES = 1)	Quick_Fast	Dichotomous indicator that the encounter-related survey response included the terms Quick or Fast (YES = 1)
DUR_TO_15	Dichotomous indicator that the duration of the encounter was between 0 and 15 minutes (YES = 1)	Disorganized	Dichotomous indicator that the encounter-related survey response included the term Disorganized (YES = 1)
DUR_TO_30	Dichotomous indicator that the duration of the encounter was more than 15 minutes and up to 30 minutes (YES = 1)	Organized	Dichotomous indicator that the encounter-related survey response included the term Organized (YES = 1)
DUR_TO_45	Dichotomous indicator that the duration of the encounter was more than 30 minutes and up to 45 minutes (YES = 1)	Messy_Unclean	Dichotomous indicator that the encounter-related survey response included the term Messy or Unclean (YES = 1)
DUR_TO_60	Dichotomous indicator that the duration of the encounter was more than 45 minutes and up to 60 minutes (YES = 1)	Clean	Dichotomous indicator that the encounter-related survey response included the term Clean (YES = 1)

Variable	Description	Variable	Description
DUR_TO_90	Dichotomous indicator that the duration of the encounter was more than 60 minutes and up to 90 minutes (YES = 1)	Im_Unpolite_Rude	Dichotomous indicator that the encounter-related survey response included the term Impolite or Rude (YES = 1)
DUR_TO_120	Dichotomous indicator that the duration of the encounter was more than 90 minutes and up to 120 minutes (YES = 1)	Polite_Courteous	Dichotomous indicator that the encounter-related survey response included the term Polite or Courteous (YES = 1)
DUR_OVER_120	Dichotomous indicator that the duration of the encounter was more than 120 minutes (YES = 1)	Professional	Dichotomous indicator that the encounter-related survey response included the term Professional (YES = 1)
M_0	Dichotomous indicator that the duration of the encounter was less than 15 minutes (YES = 1)	Unprofessional	Dichotomous indicator that the encounter-related survey response included the term Unprofessional (YES = 1)
M_15	Dichotomous indicator that the duration of the encounter was equal to or more than 15 minutes (YES = 1)	Repeat	Dichotomous indicator that the patient had more than one encounter during the study period (YES = 1)
M_30	Dichotomous indicator that the duration of the encounter was equal to or more than 30 minutes (YES = 1)		

Appendix 2 – Journal Article

Influence of Clinical-Care Factors on Patient Satisfaction in Out-Patient Urgent-Care Settings

Kirk J Finchem MBA, FJ Campbell MD MBA, Edmund Becker PhD

Abstract

The study identified and measured strength of clinical factors (e.g., patient demographics, time of day, process delays) and patients' characterizations in predicting patients' satisfaction with care received during encounters in an urgent-care center (UCC) setting. Satisfaction was measured by means of a Net Promoter Score® (NPS) survey, and accompanying verbatim comments. Qualitative features of care—professionalism, cleanliness, organization—were important predictors. Less important, but also statistically significant we encounter duration, patient co-payment, and age.

Keywords: patient satisfaction, urgent care center, net promoter score, linear regression

Introduction

Quality improvement efforts are at the heart of many initiatives in modern healthcare, generally seeking to better match resources to needs and expectations to deliver “better care.” The present study seeks to identify and measure the clinical-encounter factors (e.g., patient demographics, time of day, process delays) that predict patients' satisfaction with care received during care encounters in an urgent-care center (UCC) setting. Specifically, it considers which urgent care-center factors—if any—are predictive of patient satisfaction, as measured by Net Promoter Score® (NPS).

The applications of these patient satisfaction insights are threefold:

1. Knowledge of the relationship between factors and satisfaction can allow providers to more effectively deliver satisfying care;
2. As described below, customer satisfaction (i.e., patient satisfaction) is associated with business and earnings growth; and
3. Once established, baselines-predictor values can be leveraged to evaluate the effect on satisfaction of specific changes (e.g., prototype communication tools).

All systematic efforts to improve the “quality” of products or services face the challenge of measurement: What shall be measured? How shall it be measured? In the case of healthcare, metrics have been developed to measure healthcare processes, patient outcomes and patient perceptions. Most seek to qualify some combination of dimensions of effectiveness, efficiency, safety, equitability and timeliness.

Donabedian posited that assessing the quality of medical care demanded that one “first unravel a mystery: the meaning of quality. Any assessment of quality is a judgment whether a specified instance of medical care has this property [i.e., quality], and if so, to what extent.”¹ The multi-faceted nature of medical care has given rise to making judgments (and measures) about persons who provide care, and the settings and systems within which care was provided, rather than the care itself.

The Donabedian framework divided healthcare into two domains:

- **Technical care** is the application of the science and technology of medicine, and of other health sciences, to the management of a personal health problem; and
- **Interpersonal care** is management of the social and psychological interaction between the patient and the practitioner.

In so far as it affects patient satisfaction, the setting of care, including the architectural and tangible features of care, such as a pleasant and clean waiting room, a comfortable bed or a bedside phone, is part of the interpersonal care domain of quality. Patient perceptions of professionalism and courtesy are also elements of the interpersonal domain.

The present study focuses on patient satisfaction as a measure of care quality, and more specifically, used Net Promoter Score® (NPS) as an aggregated, proxy measurement for the combined satisfaction characteristics of patient care encounters. NPS is a metric that seeks to quantify customer loyalty. Introduced by Reichheld, the underlay approach seeks to simplify measurement (and improve response rates) by asking customers (i.e., patient, for the present study) two questions—one that classifies the patient as a “promoter”, a “detractor”, or “neutral user”; and one that solicits details that are the basis of patients’ classification.²

- Promoter Classifier: How likely are you to recommend this provider to friends and business associates?
 - Patients are asked to respond with a numerical value, ranging from zero (“not likely”) to ten (“very likely”).
- Promoter/Detractor Detail:
 - Patients responding with score values between 0 and 6 are asked, “How did we disappoint you and what can we do to make things right?”
 - Patients responding with score values of 7 or 8 are asked, “What could we do to improve?”
 - Patients responding with score values of 9 or 10 are asked, “What do you like about our services?”

Typically (and as practiced by the subject UCC system), the Net Promoter methodology also includes a process to *close the loop*: a team member actively intervenes to change a negative perception and convert a detractor into a promoter, after the fact, by contacting detractors identified by the survey to discuss the encounter’s shortcomings and implement corrective action.

The UCC system for the present study comprised more than 40 clinics, primarily located in residential, retail, and commercial locations in the southern United States. The UCCs were staffed by physicians, nurse practitioners, and registered nurses, as well as typical clerical staff. All fit the description (above) of UCCs; none were PCPs, EDs nor RBCs.

Tassos et al. investigated patient satisfaction using “an in-depth approach rather than the more common patient survey method,”⁶ which included patient interviews and participant-oriented observations between patients, family members, and medical staff. Using a Donabedian framework to model of quality of care (i.e., technical care, interpersonal care, and amenities of care), the team found that technical interactions were most common, followed by interpersonal interactions, and interactions

related to amenities of care. Of the subjects 89% were satisfied with their treatment and quality of care; 10% were dissatisfied.

While examining patients' perceptions of their emergency department team's communication skills, McCarthy et al. found that caregiver-patient communications were an important predictor of highly favorable patient responses, and that patient sex, race, age, wait time, or daily census had little if any impact. Another favorable theme was when patients perceived that the care team was “respectful and allowed them to talk without interruptions.” Interestingly, lower ratings were given for items “related to actively engaging the patient in decision-making and asking questions.”⁷

In an Australian study of the determinants of quality in rural healthcare settings using the Donabedian structure/process/outcome framework, researchers concluded that health professionals emphasize “technical aspects of care,” while patients and their families were more focused on “access, interpersonal communication, convenience and cost.”⁹

In a study of the impact of prescriptions on the doctor-patient interaction in department of medicine and urgent care center settings during a two week period, Wartman observed that patients who *did not receive prescriptions* reported greater satisfaction with “the communicative aspects of their visits to physicians” than patients *who did receive prescriptions*. It was suggested that “prescriptions may hinder patient satisfaction with the doctor-patient interaction by substituting for other, more ‘meaningful’ communication between patient and provider.”¹⁰

Methods

The retrospective cohort study of patients visiting system UCCs between July 1, 2013 and March 11, 2014 included patients seeking care for several purposes—urgent care, occupational medicine, workers’ compensation, etc. Electronic medical, billing and survey records were queried for study data elements. For all three data groups—patient demographics, encounter records and satisfaction surveys—record tables were prepared. Records were de-identified; multiple encounters by a specific patient used a consistent patient identifier. Encounter records were matched to corresponding satisfaction survey conducted by an independent third party. Multiple encounters on a single day (e.g., patients receiving a sport physical and also an influenza vaccination) were assigned the same, single survey result. Records were consolidated and arranged in Microsoft Excel® 2010 format, and delivered to the investigator.

Descriptive summaries of patient characteristics were prepared using Excel® pivot tables. Likewise, dichotomous indicator variables were calculated, tested, and added to the data file. Current Procedural Terminology (CPT) codes, which describe medical, surgical, and diagnostic services reviewed and categorized for the types of cases (e.g., upper respiratory infections, sinusitis complaints, bone and joint complaints, etc.) that appeared most commonly in the data set. Survey verbatim comments were similarly categorized by included keywords (e.g., professional or unprofessional; organized or dis/unorganized; friendly or unfriendly).

SAS 9.3 (SAS Institute Inc., Cary, NC) was used to develop and test multi-variable linear regression models (i.e., PROC REG and PROC GLM types), seeking to predict survey scores (dependent variable) with patient and encounter characteristics, and comment categories (independent variables). Specifically, regression models were developed and evaluated for magnitude, direction, operational relevance and statistical strength.

A general linear model (i.e., PROC GLM type) was developed and evaluate, treating both care center and care giver as “CLASS” to control for these factors, while predict survey scores (dependent variable) with patient and encounter characteristics, and comment categories (independent variables).

Logistic regressions models to predict whether a subject would be a Detractor, Neutral User, or Promoter were considered, with little improvement in model strength. As a result, the simpler linear model was chosen, given its greater ease to communicate with clinicians.

Finally, multi-variable linear regression models (i.e., PROC REG type) were developed and evaluated seeking to predict Net Promoter Scores® at the care-center and care-giver levels (dependent variable) with mean patient and mean encounter characteristics, and mean comment categories (independent variables).

Results

Patient demographics are summarized in Table 1, which includes descriptive statistic summarizing (1) all patients receiving care treatment at the subject UCCs during the study period, and (2) the subset of all patients that responded to satisfaction survey. Total study encounters (n = 27,561) represented patients (n = 24,269) some of whom had multiple encounters during the study. Likewise, some patients had multiple encounters on the day (e.g., a “walk-out” during the morning, and a care encounter during the afternoon) with a single subsequent satisfaction survey. In such cases, the same survey results we assigned to each same-day encounter. Study encounters are summarized in Table 3.

Table 1: Demographics of Patients

	All Encounters (A)	A During Study Period (B)	B with Surveys (C)	C with Duration > 0
Total	346,777	343,287	35,100	24,269
Male	183,386	181,591	21,732	15,340
Female	163,391	161,696	13,368	8,929
Mean Age (St Dev)	36.6 (18.5)	35.4 (18.5)	41.6 (19.0)	40.4 (19.1)
Male	36.0 (18.3)	34.7 (18.2)	41.9 (18.3)	39.7 (20.0)
Female	37.1 (18.7)	36.0 (18.7)	41.1 (20.0)	40.8 (18.6)
Count by Age Category (%)				
0 to 17	51,515 (15.6%)	28,717 (15.7%)	5,572 (15.9%)	3,836 (15.8%)
18 to 30	84,417 (25.6%)	46,734 (25.6%)	8,831 (25.2%)	6,232 (25.7%)
31 to 50	114,535 (34.7%)	63,315 (34.6%)	12,180 (34.7%)	8,371 (34.5%)
51 to 64	55,965 (16.9)	30,974 (16.9%)	5,943 (16.9%)	4,043 (16.7%)
65+	23,782 (7.2%)	13,064 (7.1%)	2,574 (7.3%)	1,787 (7.4%)

Table 2: Summary of Care Encounters (Percent)

CPT Code Category	Urgent Care	Occupation Medicine	Workers Comp	Physical	Misc.	Grand Total
Respiratory/Pneum/Flu	19.1%	0.0%	0.0%	0.0%	0.0%	19.2%
Other	16.7%	0.6%	0.9%	0.0%	0.5%	18.7%
Sinus	11.1%	0.0%	0.0%	0.0%	0.0%	11.1%
Joint/Bone	5.1%	0.0%	2.7%	0.0%	0.2%	8.0%
Exam-Physical	0.3%	5.7%	0.0%	0.9%	0.2%	7.0%
Contusion/Wound	4.8%	0.0%	1.7%	0.0%	0.1%	6.6%
Ear/Eye	6.5%	0.0%	0.0%	0.0%	0.0%	6.6%
Sore/Throat	6.1%	0.0%	0.0%	0.0%	0.0%	6.1%
Urinary	5.6%	0.0%	0.0%	0.0%	0.0%	5.6%
Skin	5.1%	0.0%	0.1%	0.0%	0.0%	5.2%
Pain	2.1%	0.0%	0.4%	0.0%	0.0%	2.6%
No/CPT	1.1%	0.5%	0.2%	0.0%	0.1%	1.9%
Digestive	0.5%	0.0%	0.0%	0.0%	0.0%	0.5%
Vaccine	0.0%	0.0%	0.0%	0.0%	0.4%	0.5%
Neuro/Mental	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%
Walk Out	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%
Grand Total	84.5%	6.8%	6.2%	1.0%	1.6%	100.0%

The most common encounters were Urgent Care (84.5% of encounters), Occupational Medicine (6.8%) and Workers Compensation episodes (6.2%). A medical history was taken in 88.7% of encounters (n = 24,435), height and weight recorded in 90.8% of encounters (n = 25,037), referrals given in 16.6% of encounters (n = 4,568) and prescriptions given in 80.6% of encounters (n = 22,206). For Urgent Care encounters respiratory/pneumonia/flu diagnoses were most common, comprising 19.1% of cases; sinus cases represented 11.1% of cases.

Encounter durations are summarized in Table 3. Mean duration for all encounters was 59.5 minutes (standard deviation = 35.6 minutes), with a median value of 51.0 minutes. Clinical activities by CPT diagnosis are presented in Table 5, which show that nearly one-third (29.3%) of cases receiving prescriptions for CPT diagnoses were related to respiratory or sinus cases.

Table 3: Summary of Encounter Categories by Duration

CPT Code Category	Urgent Care	Occupation Medicine	Workers Comp	Physical	Misc.	Grand Total
0 to 10 min	18	259	3	6	35	321
11 to 20 min	387	448	45	23	86	989
21 to 30 min	2,281	374	119	44	62	2,880
31 to 40 min	3,577	258	188	47	50	4,120
41 to 50 min	3,309	134	216	27	38	3,724
51 to 60 min	2,785	82	195	24	33	3,119
61 to 90 min	4,709	124	432	44	51	5,360
91 to 100 min	800	21	105	10	4	940
101 to 120 min	1,081	29	122	7	12	1,251
> 120 min	1,334	41	170	13	9	1,567
Total of Count	20,281	1,770	1,595	245	380	24,271*
Mean	61.3	33.2	71.1	52.1	59.2	59.5
St Dev	34.6	30.4	39.5	35.5	35.6	35.6
Median	52.0	25.0	62.0	41.0	51.0	51.0
Maximum	240.0	231.0	238.0	211.0	240.0	240.0
Minimum	3.0	1.0	5.0	7.0	1.0	1.0

Notes:* Some subjects had used two (2) business lines on the same encounter day.

Table 4: Summary of Care Encounters and Clinical Activities

	Prescription	Medical History	Height/Weight	Referral
Respiratory/Pneum/Flu	18.3%	18.7%	19.1%	2.1%
Other	15.2%	17.1%	17.5%	3.1%
Sinus	11.0%	10.9%	11.1%	0.4%
Ear/Eye	6.2%	6.4%	6.6%	0.2%
Joint/Bone	5.6%	7.7%	8.0%	4.3%
Sore Throat	5.6%	6.0%	6.1%	0.7%
Urinary	5.4%	5.4%	5.5%	1.4%
Skin	4.8%	5.0%	5.2%	0.4%
Contusion/Wound	4.4%	6.3%	6.5%	2.4%
Pain	2.1%	2.5%	2.6%	1.0%
No CPT	1.0%	1.2%	1.2%	0.3%
Digestive	0.5%	0.5%	0.5%	0.1%
Exam-Physical	0.2%	0.4%	0.5%	0.1%
Neuro/Mental	0.2%	0.2%	0.2%	0.0%
Walk Out	0.1%	0.2%	0.2%	0.0%
Vaccine	0.0%	0.0%	0.0%	0.0%
Grand Total	80.5%	88.6%	90.8%	16.6%

The distribution of survey vales (0 through 10) scores are presented in Table 4, and Figure 1. For the entire population of surveys, the mean of scores was 8.7, with a standard deviation of 2.4, and a median value of 10. For subjects that had more than 1 encounter during the study period (n = 6,907), the mean of scores was 9.12, with a standard deviation of 1.96, and a median value of 10. These patients provided a mean value of 2.40 surveys per subject.

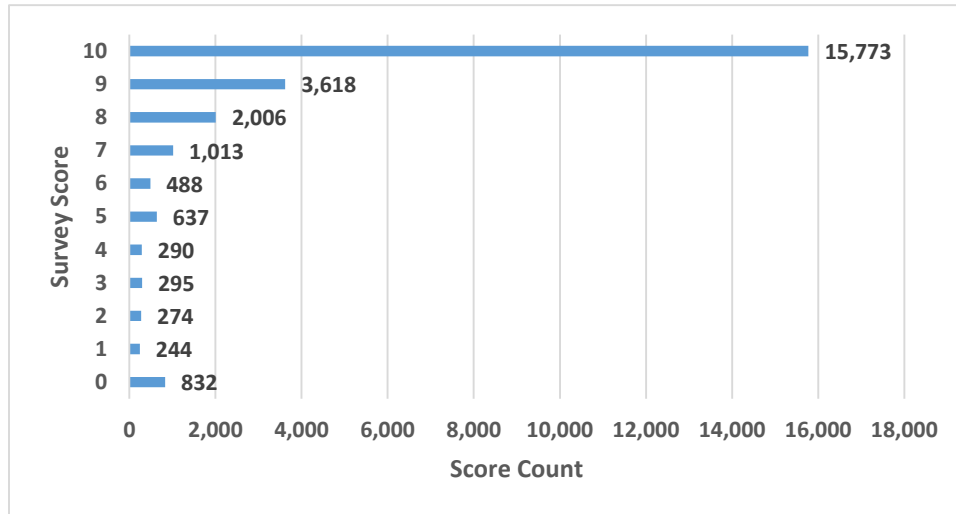


Figure 1: Summary of Survey Scores

Table 5: Summary of Survey Scores (Percent)

Survey Value	Urgent Care	Occupation Medicine	Workers Comp	Physical	Misc.	Grand Total
<i>Percent by Business Line</i>						
0	3.0%	3.9%	6.4%	3.6%	2.8%	3.3%
1	0.9%	1.3%	1.0%	0.4%	0.5%	1.0%
2	1.1%	1.0%	1.4%	0.4%	1.3%	1.1%
3	1.0%	1.4%	2.1%	1.2%	2.0%	1.2%
4	1.1%	1.5%	1.1%	0.8%	1.3%	1.1%
5	2.3%	3.6%	3.8%	2.0%	2.6%	2.5%
6	1.9%	2.0%	2.3%	2.0%	2.0%	1.9%
7	3.8%	4.7%	4.8%	2.8%	4.8%	4.0%
8	7.8%	8.0%	9.9%	4.3%	7.4%	7.9%
9	14.2%	12.7%	15.9%	16.2%	11.5%	14.2%
10	62.9%	59.8%	51.3%	66.4%	63.8%	61.9%
<i>Percent by Score</i>						
0	76.0%	8.8%	12.9%	1.1%	1.3%	
1	82.0%	9.8%	7.0%	0.4%	0.8%	
2	82.5%	6.9%	8.4%	0.4%	1.8%	
3	75.6%	8.8%	11.9%	1.0%	2.7%	
4	81.4%	9.7%	6.6%	0.7%	1.7%	
5	77.1%	10.5%	10.0%	0.8%	1.6%	
6	81.6%	7.8%	8.0%	1.0%	1.6%	
7	80.8%	8.7%	7.9%	0.7%	1.9%	
8	82.4%	7.4%	8.2%	0.5%	1.4%	
9	83.8%	6.5%	7.4%	1.1%	1.2%	
10	84.9%	7.0%	5.4%	1.1%	1.6%	
Grand Total	83.6%	7.3%	6.6%	1.0%	1.5%	

Those variables that were statistically significant (p -value ≤ 0.05) and operationally important (i.e., with a parameter absolute value greater than 0.075 survey units) were retained in the final model. The final model ($R^2 = 0.1583$) was heavily dependent on the verbatim comment categories ($R^2 = 0.1374$ without inclusion of clinical factor variables). Parameter estimates and related model statistics are summarized in Table 6.

Table 6:- Linear Regression for Survey Score

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > t	95% Confidence Limits	
Intercept	1	8.87420	0.16320	54.38	<.0001	8.55433	9.19407
Workers Comp	1	-0.28852	0.05950	-4.85	<.0001	-0.40515	-0.17190
Repeat Patient	1	0.37876	0.03643	10.40	<.0001	0.30736	0.45016
Verbatim: Unfriendly	1	-3.87057	0.66354	-5.83	<.0001	-5.17114	-2.57000
Verbatim: Friendly	1	0.90292	0.03218	28.06	<.0001	0.83985	0.96599
Verbatim: Long Wait	1	-1.20923	0.06271	-19.28	<.0001	-1.33214	-1.08632
Verbatim: Slow	1	-3.09251	0.22006	-14.05	<.0001	-3.52384	-2.66119
Verbatim: Quick or Fast	1	0.67117	0.04087	16.42	<.0001	0.59106	0.75127
Verbatim: Disorganized	1	-4.03357	0.61142	-6.60	<.0001	-5.23197	-2.83516
Verbatim: Messy or Unclean	1	-4.02227	0.73675	-5.46	<.0001	-5.46634	-2.57820
Verbatim: Clean	1	0.55449	0.05355	10.35	<.0001	0.44953	0.65945
Verbatim: Impolite or Rude	1	-4.98054	0.17804	-27.97	<.0001	-5.32950	-4.63158
Verbatim: Polite Courteous	1	0.69592	0.06742	10.32	<.0001	0.56377	0.82807
Verbatim: Professional	1	-0.10392	0.03542	-2.93	0.0033	-0.17334	-0.03450
Verbatim: Unprofessional	1	-4.61047	0.25439	-18.12	<.0001	-5.10909	-4.11185
Age: 0 to 17	1	-0.14786	0.05640	-2.62	0.0088	-0.25841	-0.03732
Age: 18 to 30	1	-0.69100	0.05367	-12.88	<.0001	-0.79619	-0.58581
Age: 31 to 50	1	-0.35233	0.04668	-7.55	<.0001	-0.44383	-0.26083
Age: 51 to 64	1	-0.10757	0.04716	-2.28	0.0226	-0.20002	-0.01513
Monday	1	-0.12140	0.03584	-3.39	0.0007	-0.19165	-0.05114
CPT Category: Sore Throat	1	-0.16733	0.05659	-2.96	0.0031	-0.27824	-0.05641
Prescription: Antibiotic	1	0.16782	0.02827	5.94	<.0001	0.11240	0.22323
Prescription: Other	1	0.08927	0.03123	2.86	0.0043	0.02806	0.15048
Encounter Duration > 14 min	1	-0.33497	0.09877	-3.39	0.0007	-0.52857	-0.14137
Encounter Duration > 29 min	1	-0.13502	0.04571	-2.95	0.0031	-0.22462	-0.04542
Encounter Duration > 44 min	1	-0.10605	0.03935	-2.70	0.0070	-0.18318	-0.02893
Encounter Duration >59 min	1	-0.15208	0.03999	-3.80	0.0001	-0.23046	-0.07369
Encounter Duration > 89 min	1	-0.17738	0.05126	-3.46	0.0005	-0.27784	-0.07691
Encounter Duration > 119 min	1	-0.38461	0.06639	-5.79	<.0001	-0.51473	-0.25448
Copay = \$0	1	0.30627	0.12716	2.41	0.0160	0.05703	0.55551
Copay to \$25	1	0.57744	0.13066	4.42	<.0001	0.32134	0.83353
Copay \$26 to \$100	1	0.38231	0.12772	2.99	0.0028	0.13199	0.63264

Unfavorable verbatim comment categories (e.g., unfriendly, slow, messy, etc.) had impacts almost four times larger—and in the opposite direction—as the related antonyms. For example,

- comments that characterized service as “unfriendly” were associated with scores 3.871 lower than comments that did not include the term (95% CI -5.171 to -2.570; p-value < 0.0001), whereas comments that characterized service as “friendly” were associated with scores 0.903 higher than comments that did not include the term (95% CI 0.840 to 0.966; p-value < 0.0001);
- comments that characterized service as “impolite” or “rude” were associated with scores 4.981 lower than comments that did not include the terms (95% CI -5.330 to -4.632; p-value < 0.0001), whereas comments that characterized service as “polite” or “courteous” were associated with scores 0.696 higher than comments that did not include the terms (95% CI 0.564 to 0.828; p-value < 0.0001).

While less important, the study identified several factors that were predictive of survey responses. Encounter duration was the most significant clinical factor, in terms of magnitude (Figure 2).

Co-payments were also a relatively important predictor. Those greater than \$100 (the model basis) were associated with lower satisfaction scores:

- No co-payment (i.e., \$0) scores were 0.306 greater than the basis (95% CI 0.057 to 0.556; p-value = 0.0160);
- Co-payments greater than \$0 but less than \$26 were 0.577 greater than the basis (95% CI 0.321 to 0.834; p-value < 0.0001); and
- Co-payments greater than \$25 but less than \$101 were 0.382 greater than the basis (95% CI 0.132 to 0.633; p-value = 0.0028).

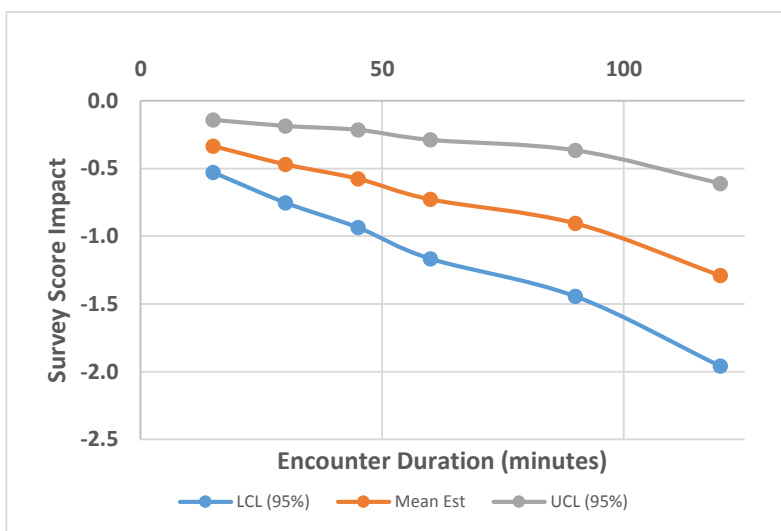


Figure 2: Impact of Encounter Duration on Survey Score

Patient age was also a relatively important factor, with patients 65 years and older (the model basis) associated with high survey scores, and patients 18 to 30 years having mean scores 0.691 lower than the basis (95% CI -0.796 to -0.586; p-value < 0.0001). Interestingly, the association between whether patients were given prescriptions and the patients' survey scores was statistically significant, but not operationally important.

Finally, surveys scores related to workers compensation-type encounters were 0.289 lower than other scores for other business lines (95% CI -0.405 to -0.172; p-value < 0.0001). Anecdotally, such encounters can have an adversarial atmosphere as some patients reportedly assume that the care givers' loyalties are to the employer rather than the patient.

Aggregating encounter records at the center level (n = 53) allowed evaluation of mean center-level factors. While the number of statistically significant variables decreased substantially (6 compared to 31 in the encounter-level PROC REG regression model), predictive strength improved ($R^2 = 0.8510$). As in the case of prior models, patient perceptions of long wait and slow service had statistically significant and negative impacts on NPS. At the center level, sinus-related and Neurological/Mental CPT Codes had statistically significant impacts—favorable and unfavorable, respectively.

Likewise, aggregating encounter records at the care-giver level (n = 187) allowed evaluation of mean factors. Again, predictive strength improved ($R^2 = 0.5233$), compare to the encounter-level regression models. Several clinical factors were statistically significant (Sinus CPT Codes Low- and Moderate-Complexity, encounter durations of less than 15 minutes, moderate copayments between \$26 and \$100) were statistically significant, but smaller in magnitude than perceptions of long waits and rude or impolite behavior).

In generalizing the conclusions of this study, it must be borne in mind that the study population was not necessarily representative on the U.S. population, as (1) subjects were not chosen at random, nor (2) were they geographically diverse. Adequate clinical performance and effectiveness were imbedded assumptions in this study. No effort was made to assess the impact of misdiagnosis, nor inappropriate intervention on patient satisfaction, as measured by survey scores. A more complex clinical measurement framework might provide better insight into higher magnitude relationships between clinical factors and patient satisfaction, but it seems clear from the study that more qualitative factors (e.g., professional behavior, courtesy, expedient attention) are the principal influencers of satisfaction.

The study did not control for confounding factors, such as the potential relationship between age and diagnosis, nor whether care was provided by a physician, nurse practitioner, or nurse. Likewise, cultural nor racial differences between the patient and care giver(s) were not considered. Patients that had multiple encounters on the same day (i.e., the specific patient visited the center more than once on a single day) may have had a small effect of regression results, as the study assumed the day-associate survey applied to all activities on that day.

Finally, in investigating whether clinical-encounter factors (e.g., patient demographics, time of day, process delays) are predictive of patients' satisfaction with care received in an urgent-care center (UCC) setting, the present study determined that several factors are important. Specifically, duration of the encounter, co-payment more than \$100 and patient ages greater than 64 years were associated with higher survey scores. Much more important to patient satisfaction were qualitative attributes such as a polite, professional staff and a clean organized care setting.

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Appendix 3 – SAS Code

```
* Proc Print of sample of records;
proc print data = DataFile (obs=10);
run;

*Confirm Record Count;
PROC FREQ DATA = DATAFILE;
TABLE BUSINESS_LINE;
RUN;

* Check Verbatims;
proc reg data = DataFile;

model Survey = UNFRIENDLY FRIENDLY LONG_WAIT SHORT_WAIT SLOW QUICK_FAST
DISORGANIZED ORGANIZED MESSY_UNCLEAN CLEAN
IM_UNPOLITE_RUDE POLITE_COURTEOUS PROFESSIONAL UNPROFESSIONAL;
run;

* Final Simple Regression Model;
proc reg data = DataFile;

model Survey =
Workers_Comp
Repeat
UNFRIENDLY FRIENDLY LONG_WAIT SLOW QUICK_FAST DISORGANIZED MESSY_UNCLEAN
CLEAN
IM_UNPOLITE_RUDE POLITE_COURTEOUS PROFESSIONAL UNPROFESSIONAL
AGE_17 AGE_30 AGE_50 AGE_64
MONDAY
SORE_THROAT
P_antibiotic P_Other
M_15 M_30 M_45 M_60 M_90 M_120
COPAY_0 COPAY_TO_25 COPAY_26_TO_100 copay_101_to_150 copay_GT150

/ CLB;

run;

* Check Logistic Model;
proc logistic data = DataFile;

Model DETRACTOR (event = '1') = UNFRIENDLY FRIENDLY LONG_WAIT SLOW QUICK_FAST
DISORGANIZED ORGANIZED MESSY_UNCLEAN CLEAN
IM_UNPOLITE_RUDE POLITE_COURTEOUS PROFESSIONAL UNPROFESSIONAL
AGE_17 AGE_30 AGE_50 AGE_64
MONDAY
SORE_THROAT
P_antibiotic P_Other
M_15 M_30 M_45 M_60 M_90 M_120
COPAY_0 COPAY_TO_25 COPAY_26_TO_100 / rsq;
run;
```

```

* Linear Regression at Center Level;
proc reg data = DataFile;

model NPS = SINUS NEURO_MENTAL LONG_WAIT SHORT_WAIT SLOW QUICK_FAST
/clb ;

* R-Sq = 0.8510;
* Non-sig terms:
REPEAT
DURATION MALE MEDICAL_HISTORY_TAKEN HEIGHT_WEIGHT_MEASURED REFERRAL_GIVEN
PRESCRIPTION_GIVEN COPAY
URGENT_CARE OCC_MED WORKERS_COMP
AGE_17 AGE_30 AGE_50 AGE_64 OVER_65
LOW_COMPLEX MODERATE HIGH_COMPLEX
EXAM_PHYSICAL JOINT_BONE CONTUSION_WOUND OTHER EAR_EYE SKIN URINARY PAIN
WALK_OUT VACCINE DIGESTIVE NO_CPT SORE_THROAT
M_15 M_30 M_90 M_105 M_120
COPAY_0 COPAY_TO_25 COPAY_26_TO_100 COPAY_101_TO_150 COPAY_GT150
FRIENDLY UNFRIENDLY MESSY_UNCLEAN CLEAN IM_UNPOLITE_RUDE POLITE_COURTEOUS
DISORGANIZED ORGANIZED PROFESSIONAL UNPROFESSIONAL
TRAIL_2HR_CASES_C;
run;

```

```

* Linear Regression at Care-Giver Level;
proc reg data = DataFile4;

```

```

model NPS = SINUS LONG_WAIT
LOW_COMPLEX MODERATE
EXAM_PHYSICAL
M_15
COPAY_26_TO_100
FRIENDLY CLEAN IM_UNPOLITE_RUDE
/clb ;

```

```

* R-Sq = 0.5233;
* Non-sig terms:
REPEAT
DURATION MALE MEDICAL_HISTORY_TAKEN HEIGHT_WEIGHT_MEASURED REFERRAL_GIVEN
PRESCRIPTION_GIVEN COPAY
URGENT_CARE OCC_MED WORKERS_COMP
AGE_17 AGE_30 AGE_50 AGE_64 OVER_65
LOW_COMPLEX MODERATE HIGH_COMPLEX
EXAM_PHYSICAL JOINT_BONE CONTUSION_WOUND OTHER EAR_EYE SKIN URINARY PAIN
WALK_OUT VACCINE DIGESTIVE NO_CPT SORE_THROAT
M_15 M_30 M_90 M_105 M_120
COPAY_0 COPAY_TO_25 COPAY_26_TO_100 COPAY_101_TO_150 COPAY_GT150
FRIENDLY UNFRIENDLY MESSY_UNCLEAN CLEAN IM_UNPOLITE_RUDE POLITE_COURTEOUS
DISORGANIZED ORGANIZED PROFESSIONAL UNPROFESSIONAL
TRAIL_2HR_CASES_C;
run;

```

```

proc glm data = DataFile;
class Center Clinician;

```



```

model Survey =
    P_ANTIBIOTIC P_OTHER COPAY
    WORKERS_COMP
    AGE_30 AGE_50
    SORE_THROAT WALK_OUT
    M_15 M_30 M_45 M_60 M_105 M_120
    COPAY_TO_25 COPAY_26_TO_100
    REPEAT
    UNFRIENDLY FRIENDLY LONG_WAIT SLOW QUICK_FAST DISORGANIZED
MESSY_UNCLEAN CLEAN
                                IM_UNPOLITE_RUDE POLITE_COURTEOUS PROFESSIONAL
UNPROFESSIONAL

                                / solution clparm;
* R-Sq = 0.1584;
* Non-sig terms:
DOOR_TO_DOOR_ENCOUNTER_DURATION
MALE
MEDICAL_HISTORY_TAKEN HEIGHT_WEIGHT_MEASURED REFERRAL_GIVEN
URGENT_CARE OCC_MED
PRESCRIPTION_GIVEN P_PAIN
AGE_17 AGE_64
LOW_COMPLEX MODERATE HIGH_COMPLEX
OTHER_EXAM_PHYSICAL SINUS_EAR_EYE SKIN URINARY PAIN NEURO_MENTAL
NO_CPT VACCINE JOINT_BONE CONTUSION_WOUND
DUR_TO_15 DUR_TO_30 DUR_TO_45 DUR_TO_60 DUR_TO_90 DUR_TO_120
M_90
COPAY_101_TO_150 COPAY_GT150
SHORT_WAIT ORGANIZED
TRAIL_2HR_CASES_C TRAIL_2HR_CASES_G;
run;

```