Comparison of presenting complaint vs. discharge diagnosis for identifying "non-emergency" emergency department visits

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Abstract

Context—Reduction in emergency department (ED) utilization is frequently viewed as a potential source for cost savings. One consideration has been to propose denying payment if the patient's diagnosis upon ED discharge appears to reflect a "non-emergency" condition. This approach does not incorporate other clinical factors such as chief complaint that may inform necessity for ED care.

Objective—To determine whether ED presenting complaint and ED discharge diagnosis correspond sufficiently to support use of discharge diagnosis as the basis for policies discouraging ED use.

Design, Setting, and Participants—The New York University emergency department algorithm (EDA) has been commonly used to identify "non-emergency" ED visits. We applied the EDA to publicly available ED visit data from the 2009 National Hospital Ambulatory Medical Care Survey (NHAMCS) for the purpose of identifying all "primary care treatable" visits. For each visit with a discharge diagnosis classified as "primary care treatable" we identified the chief complaint. To determine whether these chief complaints correspond to "non-emergency" ED visits, we then examined all ED visits with this same group of chief complaints to ascertain the ED course, final disposition, and discharge diagnoses.

Main Outcome Measures—Patient demographics, clinical characteristics, and disposition associated with chief complaints related to "non-emergency" ED visits.

Results—Although only 6.3% (95% CI 5.8–6.7) of visits were determined to have "primary care treatable diagnoses" based on discharge diagnosis and our modification of the EDA, the chief

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complaints reported for these ED visits with "primary care treatable" ED discharge diagnoses were the same chief complaints reported for 88.7% (95% CI 88.1–89.4) of all ED visits. Of these visits, 11.1% (95% CI 9.3–13.0) were identified at triage as needing immediate or emergent ED care; 12.5% (95% CI 11.8–14.3) required hospital admission; and 3.4% (95% CI 2.5–4.3) of admitted patients went directly from the ED to the operating room.

Conclusions—Among ED visits with the same presenting complaint as those ultimately given a "primary care treatable" diagnosis based on ED discharge diagnosis, a substantial proportion required immediate emergency care or hospital admission. The limited correspondence between presenting complaint and ED discharge diagnoses suggests that these discharge diagnoses are unable to accurately identify "non-emergency" ED visits.

CONTEXT

With increasing medical care costs, policy-makers have turned to emergency department (ED) utilization as a potential source for cost savings. Although the assumptions driving this policy approach are unproven,[1] recent attempts to reduce ED use have occurred in Medicaid programs.[2–6] If implemented for patients in Medicaid programs, it is likely that such practices may result in similar policies by other payers, potentially affecting access to ED care for other segments of the population.

One approach aimed at reducing ED use has been to deny or limit payment if the patient's diagnosis on discharge from the ED appears to reflect a "non-emergency" condition. [3,7,8] Legislatures or regulators in Tennessee, Iowa, New Hampshire, and Illinois have considered or enacted legislation or regulations that would limit payment for "non-emergency" ED visits by Medicaid enrollees, based on discharge diagnosis. Other states, including Arizona, Oregon, Illinois, Iowa, Nebraska, North Carolina, and New Mexico, have recently implemented or considered implementation of some level of copayment requirement for non-emergency use of the ED (personal communications, Craig Price, American College of Emergency Physicians; April 13, 2012 and February 11, 2013). Although criteria for determining "non-emergency" ED visits vary by state and no systematic review of states' practices is available, Washington State recently drew attention for a proposal in which the payer may make a determination about payment based only on the ED discharge diagnosis and whether the patient is hospitalized during the ED visit, without other clinical information,[9] and other states appear to have similar practices. For this approach to be effective at reducing "non-emergency" ED use without discouraging ED use for more serious conditions, it would be necessary to predict discharge diagnosis based on information available before the patient is seen in the ED – i.e., based on presenting symptoms. Many have questioned whether this approach is possible. For example, a 65-year-old patient with diabetes may be discharged with the "non-emergency" diagnosis of gastroesophageal reflux after presenting with a chief complaint of chest pain; however, that patient still required an emergency evaluation to rule out acute coronary syndrome. In addition, there is concern that this approach may violate the prudent layperson standard, which establishes the "criteria that insurance coverage is based not on ultimate diagnosis, but on whether a prudent person might anticipate serious impairment to his or her health in an emergency situation." [10]

The purpose of this study was to determine the correspondence between ED presenting complaint and ED discharge diagnosis

METHODS

Study Design and Data Source

This study is a secondary analysis of data collected in the 2009 National Hospital Ambulatory Medical Care Survey (NHAMCS). As described by its developers, "The NHAMCS is an annual, national probability sample of ambulatory visits made to non-federal, general, and short-stay U.S. hospitals conducted by the Centers for Disease Control and Prevention, National Center for Health Statistics (NCHS). Although the survey includes visits to selected ambulatory care departments, this analysis focuses solely on the visits to hospital emergency departments (EDs). The multi-staged sample design is comprised of a three stages for the ED component: 1) 112 geographic primary sampling units (PSUs); 2) approximately 480 hospitals within PSUs; and 3) patient visits within emergency service areas."[11] Per NHAMCS protocol, trained hospital staff members abstract ED visit data using a structured data entry form during 4-week data periods randomly assigned for each sampled hospital. The sampled data are extrapolated to national estimates through use of assigned patient visit weights, which account for probability of visit selection, nonresponse, and ratio of sampled hospitals to hospital universe. The study was exempt from review by the institutional review board of the University of California, San Francisco.

Key Variables

ED visit with "primary care treatable diagnosis" based on ED discharge diagnosis—We sought a method for identifying "non-emergency" ED visits that would maximize the probability of successfully classifying such visits based on the ED discharge diagnosis. Although the process for defining "non-emergency" diagnoses varies by state and various lists of "non-emergency" diagnoses have been proposed,[12,13] many are based at least in part on the Emergency Department Algorithm (EDA) developed at New York University.[14,15] Although the EDA was developed for other purposes and the EDA developers caution that "the algorithm is not intended as a triage tool or as a mechanism to determine whether ED use is appropriate for required reimbursement by a managed care plan,"[15] it has been used by policymakers both to characterize "overuse" of EDs in several states (e.g., Connecticut[16], Oregon[17] and Massachusetts[18]) and, in modified form, as a basis for denying payment for ED visits in Washington State. [9,12]

We selected the EDA as the basis for classifying "non-emergency" ED visits for this study, both because of its use for similar purposes and because its classification system is more evidence-based than others that have been proposed. The EDA was developed with input from emergency physicians and based on ED visit data abstracted from 5,700 ED visit records. After excluding visits for injuries, mental health, and drug- and alcohol-related conditions, physician reviewers used data including chief complaint, demographic data, duration of symptoms, presenting vital signs, and medical history to classify visits as "emergent" (requiring care in under 12 hours) or "non-emergent." Emergency cases were then further categorized as "emergency, primary care treatable" or "emergency, ED needed," based on whether the resources required during the ED visit (including radiology, blood work, etc.) are normally available in the outpatient setting, in the judgment of the algorithm's creators. In addition, "ED needed" visits were categorized based on whether or not they were "preventable or avoidable" with timely and effective outpatient care. [15,19]

The final step in the development of the EDA was designed to allow the EDA to be applied to administrative datasets. To do so, the above classifications were "mapped" to the discharge diagnoses for each case in the sample to determine the percentage of sample cases in each of the 4 categories for each diagnosis.[14] As stated elsewhere, "For instance, multiple patients in the sample were discharged with ICD-9 code 789.00 (abdominal pain,

unspecified site). All were deemed to require care within 12 hours and were classified as emergent. Two-thirds of these patients were managed with resources available in primary care settings, while one-third received interventions not available outside the ED. Therefore, the ICD-9 code 789.00 is assigned a 0.67 probability of emergency, primary care–treatable and a 0.33 probability of emergent, ED needed."[20]

We used 2 additional strategies to maximize the probability that our classification system would identify only "non-emergency" ED visits. First, based on the ED discharge diagnosis, we classified a visit as "primary care treatable diagnosis" only if the EDA predicted that the probability of the diagnosis being primary care treatable was 100% (Figure 1, Step 1). This approach leads to a more limited number of "primary care treatable diagnoses" than that used by some other researchers.[20–22] Second, because some policymakers have proposed only denying payment for visits after which the patient was discharged home, we excluded visits resulting in hospital admission. By eliminating these higher-acuity visits, we eliminated some of the higher-risk chief complaints associated with a diagnosis.

Chief Complaints Associated with "non-emergency" ED visits—Because patients present to the ED with a chief complaint, not with a discharge diagnosis, our next step in identifying "non-emergency" visits was to determine what chief complaints were associated with the "primary care treatable diagnoses" (Figure 1, Step 2). The NHAMCS database contains a field for the most important reason for visit (RFV), in which the patient's chief complaint is coded according to a standardized classification system developed by the National Center for Health Statistics.[23,24] This coding system is similar to ICD9-CM coding, in that it allows conversion of free-text data into a structured system. The RFV coding for chief complaints has been widely used by NCHS in NHAMCS and other surveys.[25,26] At each hospital, triage nurses document the patient's chief complaint per hospital protocol. Then, chart abstractors trained by the National Center for Health Statistics review the patient record and record the verbatim text, which is later classified as a chief complaint using RFV codes by an NCHS contractor. "As part of the quality assurance procedure, a 10 percent quality control sample of Patient Record Forms is independently keyed and coded. Error rates typically range between 0.3 and 0.9 percent for various survey items."[11]

For all visits with "primary care treatable diagnoses," based on the ED discharge diagnosis, we generated a list of RFVs. We then identified all ED visits in the dataset with RFVs identical to those on our list. These are referred to as ED visits with "non-emergency complaints" (Figure 1, Step 3). We chose the term, "non-emergency complaint" because, if it were possible to prospectively identify ED visits with diagnoses on the "primary care treatable diagnosis" list, the chief complaints resulting in these diagnoses might not require ED care.

Variables reflecting the acuity of "non-emergency complaint" ED visits—Next, for the group of ED visits with "non-emergency complaints" we identified diagnoses, disposition, and other key factors related to the patient's initial presentation and ED course. Demographic variables included age, gender, race/ethnicity, insurance type, region, and urban/rural status. We also included triage categories defined on a scale of 1–5 by nursing staff as "immediate," "emergent," "urgent," "semi-urgent," or "non-urgent."[27] Triage vital signs were classified as normal or abnormal using standards based on published guidelines.[28,29] Pain scale was by patient self-report on presentation, with a scale from 1–10, with 10 being the most severe. We also identified whether patients arrived by ambulance. We ascertained whether the visit resulted in hospital admission and, if so, whether the patient was admitted to an observation unit, to a standard bed or to a higher level of care. NHAMCS does not distinguish between observation unit stays occurring in the ED and those occurring in the inpatient facility. For the purposes of this analysis, we grouped

observation unit stays with inpatient admissions, reasoning that an observation unit admission indicated a patient could not safely be discharged home.

Statistical Analysis

If presenting complaint corresponded closely with the discharge diagnosis, visits with "non-emergency complaints" based on the reasons for visit would be expected to correspond to visits with "primary care treatable diagnoses." In this situation, the number of visits with "non-emergency complaints" would be similar to the number of visits with "primary care treatable diagnoses." Conversely, if presenting complaint corresponded poorly with the discharge diagnosis, multiple chief complaints would be expected to be associated with each diagnosis and multiple diagnoses would be associated with each complaint. In this situation, the number of visits with "non-emergency complaints" would exceed the number of visits with "primary care treatable diagnoses." Therefore, we compared the proportion of ED visits with "primary care treatable diagnoses" based on ED discharge diagnosis to the proportion ED visits with "non-emergency complaints" based on the reason for the visit. In addition, we calculated descriptive statistics for "non-emergency complaint" ED visits, presenting frequencies and proportions.

We report actual ED visits from the hospitals included in the NHAMCS sample, national estimates based on survey visit weights, and 95% confidence intervals (CIs) based on standard errors provided by NHAMCS. The analyses follow recommendations on the NHAMCS website for using the sampling weights in the dataset to project, for all ED visits in the United States, the proportions with the specified characteristics. [11] Confidence intervals were calculated using standard methods for survey data collected with stratified sampling, based on weights provided by NHAMCS.[30] All estimates conform to NCHS standards.[11] Unweighted estimates based on less than 30 records are considered unreliable by NCHS and are marked by an asterisk. Estimates were sufficiently precise with a single year of data to avoid the need to combine multiple years of NHAMCS data, which would have added complexity to the analyses given changes in variable definitions (e.g., triage category) over time. All analyses were performed using SAS 9.2 (Cary, NC) and SUDAAN (version 10.0; RTI International, Research Triangle Park, North Carolina).

RESULTS

The 2009 NHAMCS dataset contains 34,942 records, each representing a unique ED visit. Of these visits, an estimated 6.3% (95% CI 5.8–6.7) had "primary care treatable diagnoses" based on the ED discharge diagnosis and our modification of the EDA. However, the presenting complaints associated with the ED visits (i.e., "non-emergency complaints") were also the presenting complaints for 88.7% (95% CI 88.1–89.4) of all ED visits, reflecting poor correspondence between ED discharge diagnosis and chief complaint.

These findings were similar for age-stratified subgroups. For children under age 18, 5.5 % (95% CI 4.7–6.3) had "primary care treatable diagnoses" and 90.0% (95% CI% 88.6–91.1) had "non-emergency complaints." For adults age 65 and older, 3.2% (95% CI 2.8–3.8) had "primary care treatable diagnoses" and 86.9% (95% CI 85.8–88.1) had "non-emergency complaints." (See eTables 1 and 2 for additional age-stratified results.)

Of the ED visits for chief complaints identical to chief complaints generated by the group of ED visits with "primary care treatable" diagnoses, 9.3% (95% CI 8.2–10.5) had an "emergent" triage category; 3.7% (95% CI 3.4–4.1) of patients had been seen in the same ED within the last 72 hours; and 2.1% (95% CI 1.7–2.5) had been discharged from a hospital within the past 7 days (Table 1). In addition, 79.7% (95% CI 78.2–81.3) had at least one abnormal triage vital sign recorded. Although the most common vital sign abnormalities

were respiratory rate (61.8%, 95% CI 59.9–63.8) and blood pressure (34.2%, 95% CI 32.7–35.8), patients presented with abnormal heart rates at 21.8% (95% CI 20.8–22.8) of visits, were hypoxic at 6.6% (95% CI 5.3–7.9) of visits, and were either hypo- or hyperthermic at 6.1% (95% CI 5.5–6.7) of visits . The mode of arrival for 13.8 % (95% CI 12.8–14.8) of "non-emergency" patients was ambulance, and 38% (95% CI 35.9–40.1) reported pain scales   6 (Table 2).

Regarding disposition of patients with "non-emergency complaint" ED visits, 12.5% (95% CI 11.8–14.3) were admitted to the hospital. Of admitted patients, 11.2% (95% CI 9.5–12.9) were admitted to a critical care unit, 22.9% (95% CI 18.4–27.4) required step-down or telemetry monitoring, 3.4% (95% CI 2.5–4.3) required the operating room, and 7.0% (95% CI 5.7–8.4) of the admissions were to an observation unit (Table 3).

There were 192 different "primary care treatable diagnoses" (eTable 3) and 304 "non-emergency complaints" (eTable 4) represented. "Unspecified disorder of the teeth and gums" was the most common "primary care treatable diagnosis" and accounted for 11.6% of ED visits with "primary care treatable diagnoses." The 3 most common "non-emergency complaints" (Table 4) were toothache (10.05%), skin rash (5.99%), and abdominal pain, cramps, spasms (5.03%); other "non-emergency chief complaints" were as variable as skin itching, insect bite, ingrown nail, foreign body to eye, migraine headache, blood in stool, and symptoms of labor. For patients with "non-emergency complaint" ED visits, the 3 most common diagnoses identified were abdominal pain/unspecified site, acute respiratory infection, and chest pain/unspecified (Table 5).

Because our analysis was conducted in aggregate, it was possible that a subset of "primary care treatable" diagnoses might be concordant with chief complaints and therefore appropriate targets for discouraging ED use. Therefore, we used the same techniques described above to analyze some of the most common primary care treatable diagnoses individually (unspecified disorder of the teeth and supporting structures, diarrhea, and esophageal reflux). Each of these common "primary care treatable" diagnoses was associated with 20 or more "non-emergency complaints." In turn, these "non-emergency complaint" visits were associated with 29 to over 300 distinct discharge diagnoses with a wide range of clinical severity, consistent with our overall study findings.

COMMENT

Patients present to the ED with chief complaints, symptoms, and signs, but usually not with diagnoses. For a list of ED discharge diagnoses to be considered "non-emergency," the ED discharge diagnoses must be predictable based on chief complaint information available at triage. Our study illustrates the challenges of mapping from discharge diagnosis to chief complaint. Although only 6.3% of ED visits had "primary care treatable" discharge diagnoses, the chief complaints reported for these visits encompassed 88.7% of all ED visits. If a triage nurse were to redirect patients away from the ED based on "non-emergency complaints," 93% of the redirected ED visits would *not* have "primary care treatable diagnoses." Adding vital signs to the decision rule would add little discriminatory power, because 79.7% of ED visits with "non-emergency complaints" had abnormal vital signs, including 76.8% of ED visits with "primary care treatable diagnoses" and 80.0% with other diagnoses.

These results highlight the flaws of a conceptual framework that fails to distinguish between information available at arrival in the ED and information available at discharge from the ED. The results call into question reimbursement policies that deny or limit payment based on discharge diagnosis. Attempting to discourage patients from using the ED based on the

likelihood that they would have "non-emergency diagnoses" risks sending away patients who require emergency care.[31–36] The majority of Medicaid patients, who stand to be disproportionately affected by such policies, visit the ED for "urgent or more serious" problems.[37]

Our results are in keeping with the original intention of the EDA. The EDA does not classify specific diagnoses as "non-emergency" or "primary care treatable," as policy-makers have attempted to do.[6] Instead, as the developers of the algorithm acknowledge, "few diagnostic categories are clear cut in all cases;"[15] a discharge diagnosis related to a given ED visit can be in each of *multiple* categories (based on the initial complaint, vital signs, resources used in the ED, etc. that have been mapped to the discharge diagnosis),[19] highlighting the complexity of the issue.

A limitation of this study is the choice of the EDA as the basis for classifying ED visits as "non-emergency." In theory, a different list of "non-emergency diagnoses" might correspond better with chief complaints. We chose to use the EDA because – despite the intent of the EDA's developers – the EDA has been modified for this purpose, and had been developed more rigorously than other proposed "non-emergency" diagnosis lists. We used two methodological strategies to try to optimize the classification system. First, in selecting ED visits with "non-emergency diagnoses" based on ED discharge diagnosis, we also limited the visits to those that did not result in hospital admission. Second, in using the EDA, we selected only diagnoses that, in the EDA classification system, had 100% probability of not requiring care in the ED. Had we chosen to classify visits less conservatively as other authors have – for example by including visits with low probability (but not zero probability) of needing ED care in our sample – it is likely that our results would reflect final diagnoses and ED visit characteristics of even greater severity. A list of "non-emergency diagnoses" such as the one recently proposed in Washington State,[10,12] which includes some diagnoses that the EDA classifies as having substantial risk of requiring ED care, is likely to have worse performance than the approach we tested.

A second potential limitation of our study is that the only triage information we used was the patient's chief complaint. It is possible that a combination of chief complaint and vital signs could map to diagnoses in a more helpful manner. However, previous attempts at developing triage decision rules based on chief complaint and vital signs have not succeeded.[31,32] In addition, the majority of current state proposals to deny or limit Medicaid payments for ED visits use discharge diagnosis alone and do not incorporate other patient characteristics such as vital signs. A payment system that used vital signs as well as diagnosis would require more complex billing datasets and information technology than currently exist. Given the lack of alternative approaches, we anticipate that there will be further attempts to discourage ED use through retroactive denial for "non-emergency" diagnoses.

A complex interplay of community, patient, and health system factors influence ED use.[38–40] Strategies aimed narrowly at reducing such use are unlikely to improve population health or to reduce health system costs.[41,42] Instead, a more innovative and sustainable path forward is through policies that allow for the creation of integrated systems of health and community care where risk is shared and resources allocated rationally. It is possible that other diagnosis lists may correspond better with chief complaints that do not occur in true emergencies. Policy-makers who are considering such approaches that involve lists of diagnoses may wish to use our rather simple methodology to evaluate the proposed lists prior to implementation.

Supplementary Material

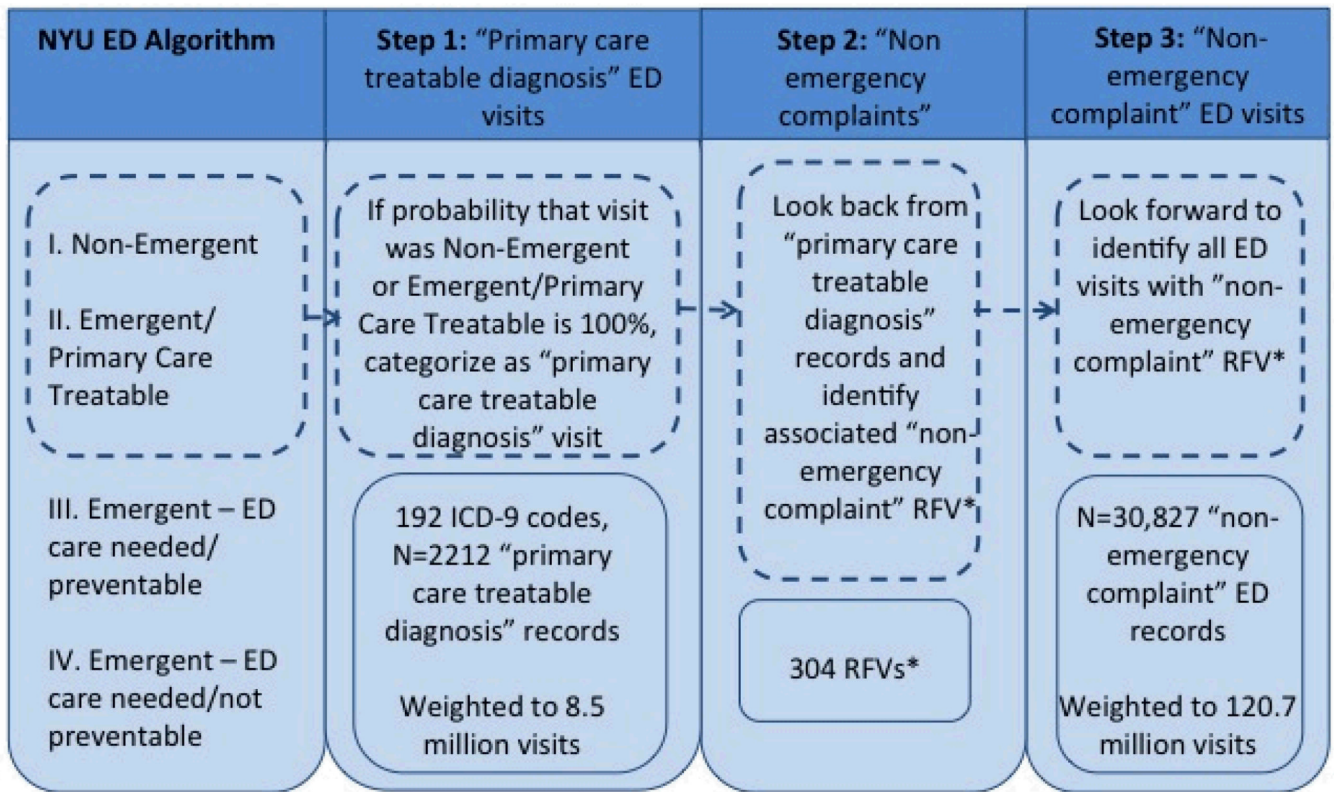Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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NYU ED Algorithm	Step 1: "Primary care treatable diagnosis" ED visits	Step 2: "Non emergency complaints"	Step 3: "Non-emergency complaint" ED visits
I. Non-Emergent II. Emergent/ Primary Care Treatable	If probability that visit was Non-Emergent or Emergent/Primary Care Treatable is 100%, categorize as "primary care treatable diagnosis" visit	Look back from "primary care treatable diagnosis" records and identify associated "non-emergency complaint" RFV*	Look forward to identify all ED visits with "non-emergency complaint" RFV*
III. Emergent – ED care needed/ preventable IV. Emergent – ED care needed/not preventable	192 ICD-9 codes, N=2212 "primary care treatable diagnosis" records Weighted to 8.5 million visits	304 RFVs*	N=30,827 "non-emergency complaint" ED records Weighted to 120.7 million visits

*Reason for Visit

Figure 1.

Table 1

Demographic characteristics of study population with original "primary care treatable" diagnoses[a] and "non-emergency complaint" ED visits[b], NHAMCS 2009

	"Primary care treatable" diagnoses			"Non-emergency complaint" ED visits		
	Unweighted No.[c]	Weighted proportion,%	(95% CI)	Unweighted No.	Weighted proportion,%	(95% CI)
Age						
<18	467	21.5	(19.0–23.9)	7,254	24.7	(22.4–27.0)
18–44	1,128	51.5	(48.5–54.2)	12,450	39.6	(38.1–41.1)
45–64	439	19.3	(17.4–21.3)	6,655	21.4	(20.5–22.3)
65–79 [d]	111	4.5	(3.4–5.6)	2,680	8.6	(8.1–9.2)
>80[e]	67	3.1	(2.3–4.0)	1,788	5.6	(5.2–6.1)
Gender						
Female	1,337	62.8	(59.9–65.7)	17,223	55.9	(54.9–56.8)
Male	875	37.2	(34.3–40.1)	13,604	44.1	(43.2–45.1)
Race/ethnicity						
Non-Hispanic white	1,199	56.3	(52.0–60.6)	17,777	59.1	(55.2–63.0)
Non-Hispanic black	606	28.1	(23.5–32.6)	7,151	22.8	(19.1–26.4)
Hispanic	96	3.1	(2.1–4.2)	1,293	3.7	(2.4–5.0)
Other	311	12.5	(9.9–15.2)	4,606	14.4	(11.5–17.3)
Insurance						
Private	726	33.2	(29.7–36.8)	11,947	39.0	(36.5–41.5)
Medicare	153	6.7	(5.4–8.0)	3,319	10.5	(9.6–11.3)
Medicaid	689	32.2	(29.0–35.4)	7,908	25.3	(23.0–27.6)
Uninsured/Self-pay	423	18.8	(16.2–21.5)	4,701	15.6	(13.9–17.3)
Other	56	2.3	(1.5–3.2)	964	2.9	(2.3–3.5)
Missing/unknown	165	6.7	(4.2–9.3)	1,988	6.7	(4.5–9.0)
Triage category						
Immediate	20[*]	1.4	(0.5–2.2)	529	1.8	(1.1–2.5)
Emergent [d]	119	5.2	(3.7–6.8)	2,926	9.3	(8.2–10.5)

	"Primary care treatable" diagnoses			"Non-emergency complaint" ED visits		
	Unweighted No.[c]	Weighted proportion,%	(95% CI)	Unweighted No.	Weighted proportion,%	(95% CI)
Urgent[d]	755	34.5	(31.0–38.0)	12,836	41.7	(39.6–43.8)
Semi-urgent	900	42.2	(38.5–45.8)	10,552	35.7	(33.5–38.0)
Non-urgent[d]	314	13.2	(10.7–15.8)	2,500	7.9	(6.9–9.0)
Triage not conducted	104	3.5	(1.1–5.9)	1,484	3.5	(1.3–5.8)
Region						
Northeast	559	17.2	(13.5–20.9)	7,856	18.0	(14.1–21.9)
Midwest	521	26.7	(18.9–34.4)	6,664	23.2	(16.9–29.6)
South	773	39.1	(32.0–46.3)	10,902	39.7	(33.3–46.1)
West	359	17.0	(11.9–22.1)	5,405	19.1	(14.3–23.8)
Metropolitan Statistical Area						
Urban	1,848	80.2	(69.6–90.8)	26,245	82.0	(72.3–91.6)
Rural	364	19.8	(9.2–30.4)	4,582	18.0	(8.4–27.7)
Seen within last 72 hours						
Yes	79	3.3	(2.4–4.3)	1,151	3.7	(3.4–4.1)
No	1,801	77.8	(70.9–84.8)	24,990	79.9	(75.1–84.7)
Unknown	332	18.9	(11.7–26.0)	4,686	16.4	(11.6–21.2)
Discharged from hospital within last 7 days						
Yes	33	1.3	(0.7–2.0)	720	2.1	(1.7–2.5)
No	1,327	58.7	(51.5–65.8)	18,243	59.0	(52.7–65.2)
Unknown	852	40.0	(32.7–47.3)	11,864	39.0	(32.7–45.3)

Abbreviations: CI, confidence interval; NHAMCS, National Hospital Ambulatory Medical Care Survey; ED, emergency department

[*]
Under 30 records, estimate considered imprecise by the National Center for Health Statistics

[a]
n=2,212 records, representing an estimated 8.5 million visits

[b]
n=30,827 records, representing an estimated 120.7 million visits

[c]
Number of records in the data set for each type of category (unweighted). Proportions, however, are calculated using survey weights.

[d]
indicates significant difference (non-overlapping 95% CI) between visits with "primary care treatable" diagnoses and "non emergency complaint" ED visits.

Table 2

Severity of Illness Characteristics Associated with original "primary care treatable" diagnoses[a] and "non-emergency complaint" ED visits[b], NHAMCS 2009

Vital signs[f]	"Primary care treatable" diagnoses			"Non-emergency complaint" ED visits		
	Unweighted No.[c]	Weighted proportion, %	(95% CI)	Unweighted No.[c]	Weighted proportion, %	(95% CI)
Respiratory Rate						
Normal	787	36.1	(32.8–39.4)	10,038	33.5	(31.7–35.3)
Abnormal	1,336	60.1	(56.8–63.4)	19,307	61.8	(59.9–63.8)
Missing	89	3.8	(2.6–5.0)	1,482	4.7	(3.2–6.1)
Heart Rate						
Normal[d]	1,741	77.7	(74.7–80.6)	22,378	71.9	(69.9–74.0)
Abnormal[d]	343	16.1	(14.0–18.3)	6,605	21.8	(20.8–22.8)
Missing	128	6.2	(3.3–9.0)	1,844	6.2	(3.8–8.7)
Blood Pressure						
Normal[d]	1,303	58.9	(55.5–62.4)	16,665	52.7	(51.2–54.1)
Abnormal[d]	642	28.5	(25.6–31.5)	10,302	34.2	(32.7–35.8)
Missing	267	12.6	(10.3–14.8)	3,858	13.1	(11.3–14.9)
Pulse Oximetry						
Normal	1,769	78.8	(74.5–83.2)	24,337	77.5	(74.1–81.1)
Abnormal	76	3.7	(1.9–5.5)	1,904	6.6	(5.3–7.9)
Missing	367	17.5	(13.3–21.7)	4,586	15.9	(12.5–19.3)
Temperature						
Normal	2,086	93.9	(92.1–95.6)	27,530	88.4	(86.9–89.9)
Abnormal[d]	47	2.0	(1.3–2.6)	1,745	6.1	(5.5–6.7)
Missing	79	4.2	(2.4–6.0)	1,552	5.5	(4.0–7.0)
All vital signs						
All normal	285	12.6	(10.5–14.7)	3,265	10.4	(9.5–11.2)

	"Primary care treatable" diagnoses			"Non-emergency complaint" ED visits		
	Unweighted No.[c]	Weighted proportion, %	(95% CI)	Unweighted No.[c]	Weighted proportion, %	(95% CI)
Any abnormal	1,689	76.8	(74.5–79.2)	24,612	79.7	(78.2–81.3)
All missing	238	10.6	(9.0–12.1)	2,950	9.9	(8.3–11.5)
Mode of arrival						
Ambulance[d]	116	5.8	(4.3–7.2)	4,289	13.8	(12.8–14.8)
Other[d]	1,975	88.5	(86.2–90.8)	25,000	81.2	(80.0–82.5)
Missing/unknown	121	5.8	(4.3–7.2)	1,538	5.0	(3.8–6.2)
Pain scale						
0–5	802	34.8	(30.7–38.8)	11,906	38.0	(35.7–40.3)
6–10	899	41.3	(37.6–45.0)	11,623	38.0	(35.9–40.1)
Missing	511	23.9	(19.6–28.2)	7,298	24.0	(20.6–27.4)

Abbreviations: CI, confidence interval; NHAMCS, National Hospital Ambulatory Medical Care Survey; ED, emergency department

[a] n=2,212 records, representing an estimated 8.5 million visits

[b] n=30,827 records, representing an estimated 120.7 million visits

[c] Number of records in the data set for each type of category (unweighted). Proportions, however, are calculated using survey weights.

[d] Indicates significant difference between the visits with "primary care treatable" diagnoses and "non emergency complaint" ED visits

[f] Normal vital signs were adjusted for age and are based on published values from Rosen's Emergency Medicine (RR, HR) and from EMS guidelines (BP) below. Values that fell outside (above or below) these ranges were considered abnormal. Abnormal temperature was defined as a recorded temperature above 38°C/100.4° F

Age	RR (breaths/min)	HR	BP, mmHg
<1	30–60	100–160	Neonates (−1–28d) =60 SBP
1–2	24–40	90–150	Infants (1mo–1yr)=70–90 SBP
2–5	22–34	80–140	Children (1y–8y)=70–95 SBP
6–12	18–30	70–120	Adults= 90–140 SBP, 60–90 DBP
Adult	12–16	60–100	

Table 3

Disposition and admitted patients location for "non-emergency complaint" ED visits[a], NHAMCS 2009

	"Non emergency complaint" ED visits		
	Unweighted No.[b]	Weighted proportion, %	(95% CI)
Disposition			
Admit to hospital or observation unit	4,027	12.5	(11.8–14.3)
Discharged	25,190	82.4	(81.1–83.7)
Left AMA	261	0.7	(0.6–0.9)
No answer	423	1.4	(1.2–1.6)
Transfer	461	1.3	(1.0–1.6)
Left before/after medical screening exam	441	1.5	(1.2–1.9)
DOA/died in ED	24[*]	[‡]	[‡]
For admitted patients			
Admitted patients location			
Critical Care Unit	413	11.2	(9.5–12.9)
Stepdown/telemetry unit	894	22.9	(18.4–27.4)
Operating Room	158	3.4	(2.5–4.3)
Mental health/substance use detoxification	103	1.8	(1.1–2.6)
Cardiac Catheterization Laboratory	26	[‡]	[‡]
Other bed/unit	1,677	40.5	(36.8–44.3)
Observation unit	325	7.0	(5.7–8.4)
Location unknown	431	12.5	(9.1–16.0)

Abbreviations: CI, confidence interval; NHAMCS, National Hospital Ambulatory Medical Care Survey; ED, emergency department

[*] Under 30 records, estimate considered imprecise by the National Center for Health Statistics

[‡] Confidence interval is not produced because there were only 24 people who died, and 26 people admitted to the cardiac catheterization laboratory.

[a] n=30,827 records, representing an estimated 120.7 million visits

[b] Number of records in the data set for each type of category (unweighted). Proportions, however, are calculated using survey weights.

Table 4

10 most common reasons for visit ("non-emergency complaints") associated with "primary care treatable diagnoses"[a], NHAMCS 2009

Reason For Visit	Unweighted Visit No.[b]	Weighted proportion, %	(95% CI)
Toothache	202	10.05	7.92–12.18
Skin rash	139	5.99	4.67–7.31
Abdominal pain, cramps, spasms, not otherwise specified	102	5.03	3.77–6.29
Earache, pain	103	4.27	3.46–5.08
Fever	47	2.24	1.46–3.02
Uterine and vaginal bleeding	47	2.23	1.33–3.13
Hip pain, ache, soreness, discomfort	37	2.04	1.16–2.92
Diarrhea	49	1.93	1.19–2.67
Chest pain	34	1.75	0.86–2.64
Other diseases of the skin	29[*]	1.51	0.90–2.12
Other	1423	62.96	60.28–65.62
Total	2212	100.0	100.0–100.0

Abbreviations: NHAMCS, National Hospital Ambulatory Medical Care Survey; ED, emergency department

[*] Under 30 records, estimate considered imprecise by the National Center for Health Statistics

[a] n=2,212 records, weighted 8.5 million visits

[b] Number of records in the data set for each type of category

Table 5

27 most common discharge diagnoses associated with "non-emergency complaint" ED visits[a], NHAMCS 2009

Diagnosis	Unweighted Visit No.[b]	Weighted proportion, %	(95% CI)
Abdominal pain, unspecified site	1068	3.60	3.23–3.97
Acute upper respiratory infections	842	2.87	2.51–3.23
Chest pain, unspecified	862	2.75	2.41–3.09
Sprains and strains, unspecified	733	2.35	2.07–2.63
Fever, unspecified	535	2.04	1.65–2.43
Left before seen/walked out/not seen	594	1.99	1.60–2.38
Urinary tract infection, unspecified	535	1.71	1.52–1.90
Unspecified otitis media	500	1.67	1.37–1.97
Headache	468	1.53	1.33–1.73
Missing	258	1.49	0.19–2.79
Other unknown and unspecified cause of morbidity and mortality	443	1.46	1.24–1.68
Pneumonia, organism unspecified	396	1.37	1.17–1.57
Acute pharyngitis	405	1.34	1.18–1.50
Backache, unspecified	341	1.14	0.94–1.34
Bronchitis, not specified as acute or chronic	286	1.02	0.81–1.23
Head injury, unspecified	297	1.00	0.81–1.19
Other and unspecified noninfectious gastroenteritis and colitis	319	0.99	0.82–1.16
Lumbago	303	0.98	0.82–1.14
Syncope and collapse	297	0.95	0.79–1.11
Vomiting alone	278	0.94	0.80–1.08
Acute bronchitis	290	0.92	0.73–1.11
Influenza with other respiratory manifestations	254	0.91	0.64–1.18
25 most common discharge diagnoses associated with "non-emergency complaint" ED visits[a], NHAMCS 2009			
Other cellulitis and abscess	245	0.90	0.71–1.09
Migraine, unspecified	257	0.84	0.56–1.12
Unspecified disorder of the teeth and supporting structures	249	0.82	0.65–0.99
Asthma, unspecified with acute exacerbation	251	0.81	0.66–0.96
Open wound of finger(s)	247	0.80	0.65–0.95

Abbreviations: NHAMCS, National Hospital Ambulatory Medical Care Survey; ED, emergency department

[a] n=30,827 records, representing an estimated 120.7 million visits

[b] Number of records in the data set for each type of category