

## Emergencies in the Office

### Why Are 911 Calls Placed From Family Medicine and Urgent Care Offices?

**Urgent message:** New data indicate that calls to 911 from family medicine and urgent care offices and subsequent transport to ED occur for a wide range of reasons, with the distribution varying to a large degree based on the age of the patient and the practice setting.

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#### Introduction

Life-threatening emergencies have been reported to occur in primary care medical offices.<sup>1,2</sup> However, the type of medical emergencies that occur remains unclear. Previous studies that have attempted to evaluate emergencies taking place in physician offices have been hindered by recall bias and what defines a medical “emergency.”<sup>2-8</sup> Heath et al demonstrated this problem when seven members of the same pediatric office staff were asked how many emergencies occurred during one year; one member estimated four, two estimated 50, and four reported 100 emergencies.<sup>3</sup>

One would expect that the type of medical emergency encountered in the office setting would vary based upon the type of patient population cared for by a specific practice. For example, a prospective study of 38 pediatric practices in Vermont demonstrated that three-



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quarters of the emergencies were respiratory in origin.<sup>3</sup> However, no data exist for any other patient population or practice setting.

The goal of this study was to evaluate what types of medical emergencies occur in family medicine and urgent care offices from a mix of urban, suburban, and rural practices in northeastern New York. By directly reviewing calls from these offices to the regional 911 system, the problem of recall bias and defining an “emergency” can be eliminated. An understanding of the types of emergencies that present to these practices

may better prepare the family medicine and urgent care physician for such emergency situations in the future.

#### Methods

Thirty-four family medicine office locations and nine urgent care centers from Albany, Schenectady, and Saratoga counties of northeastern New York were iden-

**Background:** Previous studies have documented that medical emergencies can occur during a patient's visit to a physician's office. However, the types of patients and conditions that prompt a call to 911 from the primary care office have not been previously evaluated.

**Methods:** The authors abstracted the age, sex, and chief complaint of all 911 calls from 16 freestanding family medicine and six freestanding, privately owned urgent care practices in northeastern New York from January 1, 2002 through December 31, 2003. These practices represented a mix of urban, suburban, and rural practice locations.

**Results:** Seven hundred and six calls were made to 911 from the 22 practice locations during the study period: 310 calls originated from family medicine practices, with the remaining 396 calls coming from urgent care practices. Patients of all ages were noted, with the majority of calls made for adult patients (95.2% of all calls were for patients 20 years or older, 74.1% for patients 45 years or older, and 40.1% for patients 65 or older). The nature of complaints varied widely, with chest pain being the most common complaint (about one third of all calls). Respiratory conditions were the second most common reason (23.9% of all calls) for a 911 call from the office, and the most common reason for calls in patients younger than 20 years of age.

**Conclusion:** This study demonstrates that while older patients with chest pain and respiratory complaints dominate data regarding the types of emergencies encountered in family medicine and urgent care practices, a broad range of patients and medical conditions result in calls to 911 from these locations.

tified for study. These practices were identified by one of three methods: 1) review of regional telephone and computer yellow pages, 2) registered members of the New York State Chapter of the American Academy of Family Physicians and 3) review of the New York State Physician Profile system (a statewide online system of physician background and practice location).

The inclusion/exclusion criteria for a practice to be included in the study were: 1) a practice could not be located on a hospital campus, 2) the practice remained in the same location during the study period (January 1, 2002 through December 31, 2003), and 3) the practice evaluated patients of all ages, indicative that it practiced the full breadth of primary care medicine (although obstetrics was optional). These criteria were assessed by telephone interview with each practice.

Furthermore, a practice was included in the study only if it was located in a community where emergency medical service (EMS) computer records documented all 911 calls from that location during the two-year study period. In the case of two less-populated communities (Clifton Park and Duanesburg, NY), manual review of EMS reports easily identified the practice

**Table 1. Classification of Complaints Prompting 911 Call**

A. Unknown	No recorded complaint
B. Chest Pain	Chest pain or "heart attack"
C. Blood pressure	High or low blood pressure
D. Heart rate	Abnormal or irregular heart rate, palpitations, or dysrhythmia
E. EKG changes	EKG abnormalities
F. Respiratory	Dyspnea, airway compromise, asthma, COPD, or pneumonia
G. Abdominal pain	Abdominal or flank pain
H. Dehydration	Vomiting, diarrhea, or dehydration
I. Neurologic	Neurologic symptoms, dizziness, or headache
J. Psychiatric/toxicology	Psychiatric symptoms, overdoses, or toxic ingestions
K. Diabetes	Low or high blood sugar
L. Allergy	Allergic reactions, hives, or insect stings
M. Trauma	Trauma
N. OB/Gyn	Pregnancy-related complaints
O. CPR/cardiac arrest	Cardiac arrest and initiation of CPR
P. GI bleed	Gastrointestinal bleeding
Q. Fever/infectious disease	Febrile illness or need for antibiotic therapy
R. Syncope	Syncope or near syncope

location as the site of the EMS visit. Ultimately, a total of 16 family medicine practices and six urgent care practices were included in the analysis.

A review of all calls placed to 911 from the predefined medical practices over the study period (January 1, 2002 to December 31, 2003) was collected from the EMS records in the following New York communities: Albany, Bethlehem, Colonie, Berne, Guilderland, Schenectady, Niskayuna, Clifton Park, and Duanesburg. For each call, the following data were recorded: date and time of the call from the office, patient age and sex, and the chief complaint as documented by the EMS dispatcher. Complaints were classified according to the designated categories shown in **Table 1**. When more

than one chief complaint was recorded, such as “chest pain with shortness of breath,” both complaints were recorded in their predefined category.

Statistical analysis was performed using EpiInfo 2000 software (Centers for Disease Control, Atlanta, GA). Bivariate associations between practice type (family medicine or urgent care) and demographic or clinical variables were tested using the uncorrected  $\chi^2$  test. Age difference among groups was analyzed with the ANOVA (analysis of variance between groups) test. A probability of less than 0.05 was considered significant. Odds ratios are not reported, as they did not add any additional information to this descriptive study.

The Institutional Review Boards of St. Clare’s Hospital, Schenectady, NY and the Regional Emergency Medical Organization (REMO) of Northeast New York approved the study protocol prior to initiation of the study.

### Results

Of the 706 calls to 911 recorded, 310 came from family medicine offices and 396 from urgent care practices. In 102 cases, more than one chief complaint was recorded, resulting in a total of 808 complaints being documented. All patients for whom 911 was called were transported to an ED.

**Table 2. Age and Sex Distribution of Patients**

	Family Practice (n=310)	Urgent Care (n=396)	Total (n=706)
Demographic	n (%)	n (%)	n (%)
<b>Age</b>			
0-4	7 (2.3)	7 (1.8)	12 (2.0)
5-19	6 (1.9)	28 (7.0)	34 (4.8)
20-44	54 (17.4)	95 (23.9)	149 (21.0)
45-64	92 (29.7)	142 (35.7)	234 (33.1)
≥65	122 (39.4)	107 (26.9)	229 (32.3)
Not recorded	29 (9.4)	17 (4.3)	46 (6.5)
<b>Mean age</b>	58.1	51.5	54.2
<b>Median age</b>	60	52	54
<b>Sex</b>			
Male	131 (42.3)	178 (44.9)	309 (43.8)
Female	161 (51.9)	204 (51.5)	365 (51.7)
Not recorded	18 (5.8)	14 (3.5)	32 (4.5)

\*P=0.0001

**Table 3. Number and Type of 911 Calls by Practice**

	Family Practice (n=310)	Urgent Care (n=396)	Total (n=706)	p value
<b>Type of 911 Call</b>	<b>n (%)</b>	<b>n (%)</b>	<b>n (%)</b>	
Chest pain	96 (25.5)	139 (32.3)	235 (29.1)	N/S
Respiratory	82 (21.8)	87 (20.1)	169 (20.9)	N/S
Neurologic	34 (9.0)	30 (6.9)	64 (7.9)	N/S
Abdominal pain	19 (5.1)	37 (8.6)	56 (6.9)	N/S
Trauma	9 (2.4)	38 (8.8)	47 (5.8)	0.0002
Heart rate	18 (4.8)	16 (3.7)	34 (4.2)	N/S
Miscellaneous	22 (5.9)	12 (2.8)	34 (4.2)	N/S
EKG changes	19 (5.1)	8 (1.9)	27 (3.3)	0.004
Syncope	11 (2.9)	16 (3.7)	27 (3.3)	N/S
Dehydration	13 (3.5)	9 (2.1)	22 (2.7)	N/S
Psychiatric/toxicology	14 (3.7)	6 (1.4)	20 (2.5)	0.015
Blood pressure	11 (2.9)	2 (0.5)	13 (1.6)	0.003
GI bleed	7 (1.9)	5 (1.2)	12 (1.5)	N/S
Diabetes	5 (1.3)	5 (1.2)	10 (1.2)	N/S
Allergy	4 (1.1)	5 (1.2)	9 (1.1)	N/S
Fever/infectious disease	2 (0.5)	7 (1.6)	9 (1.1)	N/S
Unknown	3 (0.8)	5 (1.2)	8 (1.0)	N/S
CPR	3 (0.8)	4 (0.9)	7 (0.9)	N/S
OB/Gyn	4 (1.1)	1 (0.2)	5 (0.6)	N/S
<b>Total</b>	<b>376 (46.5)</b>	<b>432 (53.5)</b>	<b>808 (100.0)</b>	

### Age and Sex Distribution

The median age of patients for all calls was 54 years. Patients from urgent care practices who required EMS services were younger (median age=52) than were patients from family medicine offices requiring the same services (median age=60,  $p=0.0001$ ). **Table 2** shows the age distribution of all patients for whom 911 calls were made.

For calls in which sex was identified, 54.2% of patients were women and 45.8% were men. This finding is consistent with the data from the National Ambulatory Medical Care Survey (NAMCS) in 2001 that noted women accounted for 59.1% of all office visits.<sup>9</sup>

### Reason for 911 calls

The complaints associated with all calls to 911 are noted in **Table 3**. The most frequent complaint leading to an EMS call to either family medicine or urgent care offices was chest pain, which accounted for one-third of all calls. Respiratory complaints accounted for almost

one-quarter of calls. The types of conditions that initiated 911 calls were similar between family medicine and urgent care practices. Only trauma-related conditions were noted to be statistically more common in urgent care practices, while EMS calls for EKG changes, blood pressure abnormalities, and psychiatric and toxicologic conditions were statistically more common in family medicine practices.

Complaints were also stratified according to age (**Table 4**). Five age groups were defined as typical groupings: a) infant and young children (ages 0-4), b) older children and adolescents (ages 5-19), c) young adults (age 20-44), d) older adults (ages 45-64) and e) geriatric patients (age  $\geq 65$ ). While respiratory complaints were the most common reason that EMS was summoned for patients younger than 20, chest pain was the predominant reason for 911 calls in adult patients.

### Discussion

By reviewing EMS data for 911 calls from family medicine and urgent care practices, we have demonstrated that emergencies prompting these calls occurred in patients of all age groups with a wide range of medical conditions. However, some specific trends do emerge from our data:

- First, older patients were most likely to require

EMS services. This appears to be consistent with the NAMCS report in 2001, which noted that the number of visits to office-based physicians increases with patient age.<sup>9</sup>

- The emergencies in this older population of patients appear more likely to be cardiopulmonary in origin.
- Younger patients in the primary care office setting who require emergency services are more likely to have respiratory complaints, which is also consistent with previous studies.<sup>3</sup>

These data suggest that family medicine and urgent care physicians need to be prepared to deliver care for a diverse group of patients with a wide variety of emergency conditions.

*"It is possible that the need for EMS and emergency care in the family medicine and urgent care office may increase."*

Perhaps the most dramatic of all emergencies that can occur in the office is the patient who sustains a cardiac arrest. In our series, seven cases of cardiac arrest occurred in five different practices (two urgent care, three family medicine) and accounted for 1% of all calls to EMS. The youngest vic-

tim was 9 months of age; the oldest was 80 years of age. In a review of 142 cardiac arrests in medical and dental practices in King County, WA, family medicine and urgent care practices were just as likely to have a cardiac arrest occur in the office as were cardiology and internal medicine practices. Only dialysis centers were more likely than these office settings to have a patient sustain a cardiac arrest.<sup>1</sup>

Data from the NAMCS report note that between 1992 and 2001, office visits became more complex, involving older patients with more diagnoses per visit and more multiple medications to manage.<sup>9</sup> If this trend of older, more complex and ill patients making office visits continues, it is possible that the need for EMS and emergency care in the family medicine and urgent care office may increase, as well.

### Strengths and Limitations

Previous surveys of pediatric office practices attempted to identify the frequency of emergencies in the office, but such studies were plagued by recall bias and what defines an emergency.<sup>2-8</sup> By identifying a clear and reproducible definition of an emergency (i.e., a call to 911 from the medical office), we have been able to avoid this dilemma.

**Table 4. Most Common Complaint by Group**

Complaint ranking	Age Group (years)				
	0-4 (n=14)	5-19 (n=34)	20-44 (n=140)	45-64 (n=234)	≥65 (n=229)
1	Respiratory (n=11; 78.6%)	Respiratory (n=9; 26.5%)	Chest pain (n=48; 32.2%)	Chest pain (n=113; 48.3%)	Respiratory (n=65; 28.4%)
2	CPR (n=1; 7.1%)	Abdominal pain (n=9; 26.5%)	Respiratory (n=29; 19.5%)	Respiratory (n=49; 20.9%)	Chest pain (n=62; 27.1%)
3	Dehydration (n=1; 7.1%)	Trauma (n=8; 23.5%)	Abdominal pain (n=18; 12.1%)	Abdominal pain (n=16; 6.8%)	Neurologic (n=30; 13.1%)
4	Psych/tox (n=1; 7.1%)	Psych/tox (n=2; 5.9%)	Neurologic (n=15; 10.1%)	Neurologic (n=14; 6.0%)	EKG changes (n=18; 7.9%)
5	Miscellaneous (n=1; 7.1%)	Chest pain (n=2; 5.9%)	Miscellaneous (n=8; 5.4%)	Heart rate (n=14; 6.0%); trauma (n=14; 6.0%)	Heart rate (n=15; 6.5%); trauma (n=15; 6.5%)

The locations of the office practices used in our study represented a mix of urban, suburban, and rural practice locations and varied in their distances to the nearest acute care hospital (**Table 5**). The practice types also ranged from solo practitioner to large group practices. All were private practices, including one family medicine residency clinic site. The breadth of practice locations, types of practices, and large sample size represent the broad range of family medicine and urgent care practices in which medical emergencies may be encountered. However, regional trends in practice patterns—in particular the limited amount of obstetrics performed by family physicians in northeastern New York state—may limit the “generalizability” of our results.

In this study, only three of 16 family medicine and none of the urgent care offices cared for obstetric patients. Therefore, the low frequency of obstetrical emergencies in our study may be underrepresented when compared with other regions of the country.

All of the practices included in this study were contacted in hopes of obtaining the number of patients evaluated at each facility during the study period, so that a rate of 911 calls from the office could be calculated. However, either due to unwillingness or lack of available data, a number of offices could not provide the requested data,

thus limiting a calculation of rates for these occurrences. Since a demographic base of all patient visits was not available for the practices studied, only limited, indirect comparison with the NAMCS data was possible.

Misclassification of the chief complaint might be possible if the EMS dispatcher incorrectly documented the chief complaint in the computer record or the EMS provider incorrectly documented the chief complaint on the documentation form in the two smaller communities without computerized EMS documentation. Since we were unable to obtain either audio recordings of the 911 calls or the subsequent admission and discharge diagnosis in this study group, misclassification of some of our cases is possible. However, we believe that this lack of validation does not diminish the conclusions of this large descriptive study since, in most cases, the chief complaint was unambiguous and in cases where multiple complaints were present, all complaints were recorded.

Finally, our study did not address the question of preparedness for emergencies in the office setting. One survey of family physician preparedness for pediatric emergencies conducted in North Carolina suggested that family physicians were less likely to have pediatric resuscitation equipment or Pediatric Advanced

**Table 5. Types and Locations of Practices in the Study**

Practice*	No. of EMS calls	Miles to hospital†	Location‡	Practice size§
FP 1	52	12	Rural	Solo
FP 2	41	1	Urban	Large
FP 3	36	12	Suburban	Medium
FP 4	33	4	Suburban	Medium
FP 5	32	6	Suburban	Large
FP 6	28	7	Suburban	Medium
FP 7	19	10	Suburban	Medium
FP 8	18	9	Suburban	Medium
FP 9	12	1	Urban	Medium
FP 10	9	9	Suburban	Medium
FP 11	7	12	Suburban	Medium
FP 12	6	20	Rural	Solo
FP 13	6	24	Rural	Medium
FP 14	6	2	Suburban	Large
FP 15	4	6	Urban	Solo
FP 16	1	7	Suburban	Solo
UC 1	200	12	Suburban	Medium
UC 2	120	8	Suburban	Medium
UC 3	27	8	Urban	Medium
UC 4	27	6	Suburban	Medium
UC 5	20	4	Suburban	Solo
UC 6	2	6	Suburban	Solo

\*FP = Family practice; UC = Urgent care; †Rounded to closest mile, as calculated by Mapquest; ‡Per 2004 U.S. census population estimates; §Solo=1 physician with possible midlevel provider; medium=2-5 physicians; large=>5 physicians

Life Support (PALS) training, when compared with pediatricians.<sup>4</sup> No other studies of preparedness for emergencies of any kind in the primary care office setting could be identified. We believe this question would be worthy of future evaluation.

### Conclusion

We have demonstrated that 911 calls from family medicine and urgent care practices in northeastern New York were placed for patients of all ages and a wide variety of medical conditions. Older patients were most likely to require EMS services in the office setting, with chest pain the most common chief complaint. In pediatric patients, respiratory emergencies were the most common reason for a 911 call from the office setting. ■

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