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# International Emergency Medicine



## CAUSES OF EMERGENCY DEPARTMENT OVERCROWDING AND BLOCKAGE OF ACCESS TO CRITICAL SERVICES IN BEIJING: A 2-YEAR STUDY

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**Abstract—Background:** Emergency department (ED) overcrowding is a serious issue worldwide. **Objectives:** This study was done to evaluate the degree of overcrowding in local “teaching hospitals” in Beijing, and to ascertain the apparent root causes for the pervasive degree of overcrowding in these EDs. **Methods:** This is a multicenter cross-sectional study. The studied population included all ED patients from 18 metropolitan teaching hospital EDs in Beijing for calendar years 2013 and 2014. Patient characteristics, and the primary reasons that these patients sought care in these EDs, are described. **Results:** The total numbers of annual emergency visits were 1,554,387 and 1,615,571 in 2013 and 2014, respectively. High acuity cases accounted for 4.6% and 5.5% of the total annual emergency visits in 2013 and 2014, respectively. The percentage of patients placed into “Observation” beds, which were created to accommodate patients deemed to have problems too complex to be treated in an inpatient bed, or to accommodate patients simply needing chronic care, was 11.9% and 13.1% in 2013 and 2014, respectively. The ED-boarded patients accounted for 2.71% and 2.6% of the total annual emergency visits in 2013 and 2014, respectively. The average waiting time to admit the ED-boarded patients was 37.1 h and 36.2 h in 2013 and 2014, respectively. Respiratory symptoms were the most common presenting complaints, and an upper respiratory infection was the most common ED diagnosis. Patients who had pneumonia or various manifestations

of end-stage diseases, such as advanced dementia or multiple organ dysfunction, were the most common characteristics of patients who had stays in “Observation” units. **Conclusions:** One principal reason for ED crowding in Beijing lies in the large numbers of patients who persist in the expectation of receiving ongoing care in the ED for minor illnesses. However, as is true in many nations, one of the other most important root causes of ED crowding is “access block,” the inability to promptly move patients deemed by emergency physicians to need inpatient care to an inpatient bed for that care. However, in our system, another challenge, not widely described as a contributor to crowding in other nations, is that doctors assigned to inpatient services have been empowered to refuse to admit patients perceived to have overly “complex” needs. Further, patients with multisystem illnesses or end-stage status, who need ongoing chronic care to manage activities of daily living, have begun to populate Beijing EDs in increasing numbers. This is an issue with various root causes. © 2018 Elsevier Inc. All rights reserved.

**Keywords—**emergency department; overcrowding; observation; emergency department-boarded patients

## INTRODUCTION

Emergency departments (EDs) are designed primarily to provide care for patients with sudden deterioration, due to

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either acute exacerbations of chronic diseases, or to sudden and potentially severe manifestations of an acute illness or injury. The role of the ED is crucial for public health. Providing acutely ill patients with rapid access to emergency care is the prime role of emergency medicine (1).

In 1981, the Chinese government published and enacted a policy that required EDs to become created in urban hospitals that had a large inpatient bed capacity. Since the creation of these EDs, the number of patients served as inpatients and in these hospitals' EDs has grown markedly, whereas the resources made available to provide inpatient and ED care have not been similarly expanded. One result has been severe ED overcrowding. ED overcrowding has been described as "the most serious issue confronting EDs in the developed world," and has been recognized internationally as an "international symptom of health care system failure" (2–6).

Since 1981, EDs in Beijing have had "urgent care" and "outpatient" beds. Urgent care beds were created for the care for the sickest patients, whereas outpatient beds have been utilized for care of the less critically ill.

Recent increases in ED overcrowding have necessitated the subsequent creation of 2 new classes of beds. These include beds in "ED Intensive Care Units" (ED-ICUs) and beds in "ED Observation" units with "ED Ward" (EW) beds. ED-ICUs serve patients who merit ICU-level care but who remain in the ED due to "access block," well after the decision to admit them has been reached, due to the unavailability of an appropriate inpatient ICU bed. Observation units with EW beds, created as a response to ED overcrowding, enable new, additional capacity within EDs to provide care for non-ICU patients who, for various reasons, cannot or will not be admitted promptly to hospital inpatient beds. Reasons for the inability to promptly admit these patients include not only access block, but also, refusals by inpatient doctors to accept certain patients for inpatient care. Inpatient admission refusals by inpatient physicians accrue in our system due to the perceived complexity required to provide that patient's inpatient care, or due to the patient's needs for long-term care.

Because emergency medicine is a relatively young discipline in China, publications reporting how Chinese EDs are administered are rare. The purpose of this study is to describe the ED patients' characteristics and their lengths of stay in the ED, the presence or absence of "exit block" due to a lack of inpatient capacity, and the apparent underlying causes for overcrowding in Beijing-area teaching hospitals.

## MATERIALS AND METHODS

This is a multicenter cross-sectional study. This research focused on results of a survey completed by the staff who were responsible for work organization at that ED, from

18 metropolitan teaching hospitals for the calendar years 2013 and 2014. The questionnaire included: A description of the source of data for each ED to complete the data collection from that ED, demographic information for each ED (including total annual census, subdivided as the total numbers of urgent care visits and the total numbers of outpatient visits), and the total numbers of ED-ICU and ED-Observation patients served each year in each ED (whether ED-Observation status occurred due to an inability to obtain agreement by inpatient doctors to admit the patient due to the perceived complexity of their needs, or due to the patient's need for long-term care of chronic or end-stage illness), and the total number of patients "boarded" in each ED each year before they were moved to an inpatient bed. To qualify as being "boarded," the patient who was subsequently moved to an inpatient bed had to have stayed in the ED a minimum of 8 h after the decision to admit them for inpatient care was made, in keeping with the Australasian definition of "access block." The time of a case of ED boarding starts when the decision to seek inpatient admission is made, and ends when the patient leaves the ED on their way to their inpatient bed.

Also compiled were the 10 most frequent diagnoses for each ED's patients, including categories of diseases for the ED visits, categories of diseases necessitating urgent care, categories of patients placed in ED-Observation status, and symptom groupings for ED visits and hospital admissions. Also reported are the "average ED waiting time" for obtaining physician care (the average of the total time between initial registration or triage until the patient was first seen by a physician) and the average time spent in ED-boarding status (for those patients boarded in the ED before they were moved to an inpatient bed), and the average time spent in ED-Observation status for the ED-Observation patients (the interval between the time of arrival at triage until the time of departure of the patient from the ED after being in ED-Observation status).

The demographic portion of the form was completed by the staff who was responsible for work organization at that ED. The administrative department of the hospital was responsible for the assurance of completion of the survey. The study team at each hospital was responsible for data entry work. Data were recorded manually on data collection sheets and subsequently transferred into a data spreadsheet (Excel, 2003; Microsoft Corporation, Redmond, WA) for further analysis.

## RESULTS

The study included ED visit data from all 18 of the city of Beijing's teaching hospitals for the calendar year 2013 and 2014. The data source for hospitals entering data

included the hospital information system (HIS) and hand-written information (manual data extraction).

### *Annual Visits*

The annual visits from 18 EDs were 1,554,387 in 2013 and 1,615,571 in 2014, with an increase of 3.9%. Ten EDs had a yearly census of more than 100,000 patients. Together, these 18 EDs have a capacity of 629 beds (138 acute care beds, 314 observation beds, and 177 emergency ward beds). [Table 1](#) shows 2013 and 2014 data across the 18 hospitals, displaying each hospital's annual census, each hospital's number of urgent care cases, each hospital's numbers of patients placed into ED-Observation status, and each hospital's number of patients who were boarded in the ED awaiting an inpatient admission.

### *Throughput Times of ED Patients*

[Table 2](#) displays the Average ED Waiting Time, the Average Boarding Time for ED-Boarded Inpatients, and the Average Time in Observation Status for all hospitals, for both years.

[Table 3](#) displays the cumulative data for all 18 Beijing-area hospitals for the Average Waiting Time, Average Boarding Time for ED-Boarded Patients, and the Average Time in Observation Status, for all 18 hospitals.

### *Category of Disease for Annual ED Visits*

[Table 4](#) shows the 10 most frequent categories of diseases that prompted the ED visits, the 10 most frequent chief symptom complaints, the 10 most frequent categories of diseases for patients placed in urgent care status, and the 10 most frequent categories of diseases of ED-Observation patients.

## DISCUSSION

We believe this is the most recent study of the census and exit block status of teaching EDs in the city of Beijing (7–9). Emergency medicine is a young discipline in China. It is noteworthy that no hospital had complete information available from the HIS, and only six hospitals had partial data from the HIS. Nearly 70% of hospital statistical data came from manual registration, increasing the degree of difficulty of the nurses' work, creating problems with manual data storage, and making management and analyzing of data cumbersome.

Overcrowding is a common occurrence in EDs worldwide (2–6). According to the Australasian College for Emergency Medicine, "overcrowding" refers to "the situation where ED function is impeded by the number of

patients waiting to be seen, undergoing assessment and treatment, or waiting for departure, exceeding the physical or staffing capacity of the department," and "access block" is defined as "the situation where patients are unable to gain access to appropriate hospital beds within a reasonable amount of time, no greater than 8 hours" (10). According to this definition and our data, the EDs in China have severe overcrowding and access block.

Trzeciak and Rivers reported that the main cause of ED overcrowding in the United States is inadequate inpatient capacity (1). Our study also addresses the same issue; data revealed a somewhat variable but nevertheless low percentage of ED-boarded patients (these accounted for only 2.7% of visits).

The first reason is the shortage of acute care bed capacity in the ED compared with the huge number of visiting patients. Many EDs in Beijing were designed between 20 and 30 years ago (or longer), mindful of the number of patients at that time. Currently, the volume of ED patients has more than doubled, but the available clinical space has remained the same. The data showed that only 138 acute care beds in 18 EDs have to hold 88,190 acute care patients each year, and the average boarding time of ED-boarded patients was 37 h. This "exit block" reduces the ED's capacity to accept newly arrived patients for care. Times exist when emergency medical services (EMS) crews are forced to wait in the ED with their newly arrived patient for several hours, because the conditions in the ED do not permit the EMS crew to off-load their patient into an ED care bed. This traps EMS crews in Beijing EDs. As a direct consequence, EMS responses to scenes of other ill or injured patients will be needlessly delayed. Further, to enable sufficient EMS responses, the city government must enable the training of more EMS crews than would be necessary if not for the inability of EMS crews to promptly off-load their newly arrived patients. Thus, ED exit block, which constrains ED capacity, also causes wasteful deployment and use of EMS resources. Even specialty hospitals frequently have no beds to receive necessary transfers.

The second reason is exit block due to prolonged inpatient stays that stem directly from the inability to discharge patients, due to limited home care and postacute care resources such as long-term care and rehabilitation services. Data revealed variability between hospitals, but 11.9% of patients were kept in an ED in observation status, and these had a long average stay of 5 days in Beijing-area EDs. Some observation-status patients have stayed in Beijing-area EDs for 3 years or more.

Patients who became ED-Observation status patients were those who could not be quickly stabilized and discharged, but who were denied inpatient admission due

**Table 1. Annual ED Census, Urgent Care Visits, Observation Patients, and ED-Boarded Inpatients in Each ED**

| EDs   | 2013  |  |  | 2014  |  |  |
|-------|---|--|--|---|--|--|
|       | Number of Urgent Care Visits/Annual ED Census (%) | Number of Observation Status Patients/Annual ED Census (%) | Number of ED-Boarded Patients/Annual ED Census (%) | Number of Urgent Care Visits/Annual ED Census (%) | Number of Observation Status Patients/Annual ED Census (%) | Number of ED-Boarded Patients/Annual ED Census (%) |
| ED-A  | 13,355/120,315 (11.1)                             | 18,643/120,315 (15.5)                                      | 4695/120,315 (3.9)                                 | 14,228/128,180 (11.1)                             | 20298/128,180 (15.8)                                       | 4534/128,180 (3.5)                                 |
| ED-B  | 11,261/165,584 (6.8)                              | 61,124/165,584 (36.9)                                      | 5396/165,584 (3.3)                                 | 23,467/170,276 (13.8)                             | 76405/170,276 (44.8)                                       | 4843/170,276 (2.8)                                 |
| ED-C  | 11,075/100,009 (11.1)                             | No data  | No data  | 11,219/113,177 (9.9)                              | No data  | No data  |
| ED-D  | 7365/145,110 (5.1)                                | 429/1,451,110 (0.5)  | 1723/145,110 (1.2)                                 | 6958/151,570 (4.6)                                | 573/151,570 (0.5)  | 1692/151,570 (1.1)                                 |
| ED-E  | 6498/126,180 (5.1)                                | 3058/126,180 (2.4)   | 7007/126,180 (5.5)                                 | 6829/104,090 (6.6)                                | 3483/104,090 (3.3)   | 5710/104,090 (5.5)                                 |
| ED-F  | 4785/154,651 (3.1)                                | 6226/154,651 (4.0)   | 482/154,651 (0.3)                                  | 6790/158,651 (4.3)                                | 6906/158,651 (4.3)   | 459/158,651 (0.3)                                  |
| ED-G  | 3890/47,516 (8.2)                                 | 12574/47,516 (26.5)  | 4800/47,516 (10.1)                                 | 4210/52,743 (8.0)                                 | 16,808/52,743 (31.8)                                       | 5050/52,743 (9.6)                                  |
| ED-H  | 3448/133,778 (2.6)                                | 2276/133,778 (1.7)   | 895/133,778 (0.7)                                  | 3941/149,653 (2.6)                                | 2292/14,965 (1.5)  | 924/149,653 (0.6)                                  |
| ED-I  | 2795/117,750 (2.4)                                | 4502/117,750 (3.8)   | 1284/117,750 (1.1)                                 | 2855/113,164 (2.5)                                | 3418/113,164 (3.0)   | 1266/113,164 (1.1)                                 |
| ED-J  | 2415/119,079 (2.0)                                | 34,582/119,079 (29.0)                                      | 2112/119,079 (1.8)                                 | 2476/110,419 (2.2)                                | 35,445/110,419 (32.1)                                      | 2746/110,419 (2.5)                                 |
| ED-K  | 1645/171,545 (1.0)                                | 26,543/171,545 (15.4)                                      | 3162/171,545 (1.8)                                 | 2001/169,872 (1.2)                                | 27,308/169,872 (16.1)                                      | 3113/169,872 (1.8)                                 |
| ED-L  | 901/23,926 (3.8)                                  | 6387/23,926 (26.7)   | No data  | 1073/33,596 (3.2)                                 | 9749/33,596 (29.0)   | No data  |
| ED-M  | 778/35,194 (2.2)                                  | 531/35,194 (1.51)  | 666/31,681 (2.1)                                   | 877/40,728 (2.15)                                 | 340/407,28 (0.87)  | 612/40,728 (1.50)                                  |
| ED-N  | 356/18,798 (1.9)                                  | 492/18,798 (2.6)   | 2456/18,798 (13.1)                                 | 744/23,376 (3.2)                                  | 841/23,376 (3.5)   | 2385/23,376 (10.2)                                 |
| ED-O  | 257/8206 (3.1)                                    | 3375/8206 (41.1)   | No data  | 169/9129 (1.9)                                    | 2741/9129 (30.1)   | No data  |
| ED-P  | 257/29,979 (0.9)                                  | 196/29,979 (0.7)   | 3420/29,979 (11.4)                                 | 158/41,069 (0.4)                                  | 109/41,069 (0.3)   | 4172/41,069 (10.2)                                 |
| ED-Q  | 113/14,398 (0.8)                                  | 739/14,398 (5.1)   | 246/14,398 (1.7)                                   | 125/14,556 (0.9)                                  | 771/14,556 (5.3)   | 301/14,556 (2.1)                                   |
| ED-R  | 30/22,682 (0.1)                                   | 3600/22,682 (15.9)   | 3800/22,682 (16.8)                                 | 70/31,502 (0.2)                                   | 4400/31,502 (14.0)   | 4200/31,502 (13.3)                                 |
| Total | 71,224/1,554,387 (4.58)                           | 185,277/1,554,387 (11.9)                                   | 42144/1,554,387 (2.71)                             | 88,190/161,5571 (5.46)                            | 211,900/1,615,571 (13.11)                                  | 42,007/1,615,571 (2.60)                            |

Urgent Care visits: This included patients required or at least merited inpatient admission for inpatient care or need immediate medical treatments.

Observation Status Patients: patients who cannot be admitted to the hospital, causing "exit block": lack of an available inpatient care bed, refusal of the inpatient doctor(s) to accept the patient for care, or some other cause.

ED-Boarded Patients: the number of patients for whom the decision was made that inpatient care was needed, but who needed to wait for a prolonged time in the ED before an inpatient bed became available for them, in order that they could receive inpatient care in an inpatient unit.

ED = emergency department.

**Table 2. Average Waiting Time, Average Time of ED-Boarded Patients, and Average Time of Observation in the ED in Different EDs**

| Emergency Departments | 2013                         |   |  | 2014                         |   |  |
|-----------------------|------------------------------|---|--|------------------------------|---|--|
|                       | Average Waiting Time (Hours) | Average Time of ED-Boarded Inpatients (Hours) | Average Time of Observation in the ED (Days) | Average Waiting Time (Hours) | Average Time of ED-Boarded Inpatients (Hours) | Average Time of Observation in the ED (Days) |
| ED-A                  | 0.15                         | 48  | 2  | 0.15                         | 48  | 2.5  |
| ED-B                  | 0.13                         | 72  | 3  | 0.16                         | 72  | 4  |
| ED-C                  | No data                      | No data                                       | 12.85  | No data                      | No data                                       | 15.45  |
| ED-D                  | No data                      | No data                                       | 7.4  | No data                      | No data                                       | 7.2  |
| ED-E                  | 3.1                          | 12  | 4.2  | 3                            | 10  | 4  |
| ED-F                  | 0.5                          | 76  | 2.3  | 0.25                         | 89  | 2.9  |
| ED-G                  | 0.7                          | 36.2  | 1.78   | 0.5                          | 35.6  | 1.58   |
| ED-H                  | 1                            | 80  |  | 0.67                         | 80.6  |  |
| ED-I                  | 0.5                          | 24  | 12   | 0.5                          | 24  | 12   |
| ED-J                  | 0.3                          | 72  | 3  | 0.3                          | 72  | 5  |
| ED-K                  | 1                            | 6   | 3  | 1                            | 5   | 3  |
| ED-L                  | 0.25                         | 24  | 2  | 0.25                         | 24  | 2  |
| ED-M                  | 0.5                          | No data                                       | 2.5  | 0.5                          | No data                                       | 2.5  |
| ED-N                  | 0.5                          | 3   | 2  | 1                            | 3   | 2  |
| ED-O                  | 1                            | 3.4   | 3.9  | 1                            | 6.5   | 6.6  |
| ED-P                  | 1                            | 14  | 1  | 1                            | 12  | 1  |
| ED-Q                  | 0.11                         | No data                                       | 1  | 0.66                         | No data                                       | 1  |
| ED-R                  | No data                      | No data                                       | No data                                      | No data                      | No data                                       | No data                                      |

Average waiting time (hours): The total time from initial registration/triage to first being seen by an MD.

Average time of ED-boarded patients (hours): This is the average boarding time, which starts when the decision to seek inpatient admission was made, and ends when the patient leaves the ED on their way to their inpatient bed.

Average time of observation in the ED: This is the time from arrival at triage or registration until departure from the ED.

ED = emergency department.

to the chronicity and complexity of their problems, or due to the fact that long inpatient stays that they would be likely to require are not advantageous to the hospital from a budgetary standpoint. In other words, the priority of meeting budgetary targets outweighed the priority of the provision of necessary patient care. The individual departments have no obligation to admit patients to their wards, even if such an admission is medically indicated, and these departments often do not have available beds or sufficient care capability. Thus, complex patients with chronic multisystem illnesses who cannot be sent elsewhere are admitted to ED observation units. The most common categories of patients in ED observation status are older persons with dementia or prior cerebrovascular

accidents, or other late-stage disease or organ dysfunction. Included here are patients with advanced chronic obstructive pulmonary disease, chronic or acute-on-chronic respiratory failure due to other causes, latter stages of cancer, and other end-stage diseases.

Many of these patients would be eligible for home care and postacute care resources such as long-term care or rehabilitation services, but cannot receive such care due to limited resources and a lack of beds. Since 2012, when the Beijing government changed the previous insurer policy of not covering expenses if an ED stay exceeded 7 days, all expenses are now covered, regardless of the length of the ED stay or its underlying reason. Since this change, steadily

**Table 3. Comparison of Average Waiting Time, Average Time of ED Boarding for ED-Boarded Patients and Average Time in Observation Status in the ED**

|                 | Average Waiting Time (Hours)   | Average Time of ED Boarding for ED-Boarded Patients (Hours) | Average Time in Observation Status in the ED (Days) |
|-----------------|--------------------------------|---|---|
| 2013            | 0.72 ± 0.19 (95% CI 0.31–1.12) | 37.1 ± 8.8 (95% CI 18.0–56.1)                               | 4.5 ± 1.0 (95% CI 2.4–6.6)                          |
| 2014            | 0.73 ± 0.18 (95% CI 0.34–1.12) | 36.2 ± 8.3 (95% CI 18.2–54.2)                               | 5.0 ± 1.1 (95% CI 2.8–7.2)                          |
| <i>p</i> -Value | 0.829                          | 0.441   | 0.063   |

Average waiting time (hours): The total time from initial registration/triage to first being seen by an MD.

Average time of ED boarding for ED-boarded patients (hours): This is the average boarding time, which starts when the decision to seek inpatient admission is made, and ends when the patient leaves the ED on their way to their inpatient bed.

Average time in observation status in the ED (days): This is the time from arrival at triage or registration until departure from the ED.

ED = emergency department; CI = confidence interval.

**Table 4. Comparison of Top 10 Categories of Diseases for ED Visitors, Top 10 Symptoms/Chief Complaints for ED Visits, Top 10 Urgent Care Diseases of ED Visitors, and Top 10 Category of Diseases of ED-Observation Patients\***

|    | 2013  |  |   |  | 2014  |  |   |   |
|----|---|--|---|--|---|--|---|---|
|    | Top 10 Categories of Diseases for ED Visitors | Top 10 Symptoms/Chief Complaints for ED Visits | Top 10 Urgent Care Diseases of ED Visitors                            | Top 10 Category of Diseases of ED-Observation Patients | Top 10 Categories of Diseases for ED Visitors | Top 10 Symptoms/Chief Complaints for ED Visits               | Top 10 Urgent Care Diseases of ED Visitors                              | Top 10 Category of Diseases of ED-Observation Patients            |
| 1  | Upper respiratory tract infection<br>J06.903  | Sore throat<br>R07.001                         | Acute cerebrovascular disease<br>I67.801                              | Immobilization combined pneumonia<br>J18.201           | Upper respiratory tract infection<br>J06.903  | Sore throat<br>R07.001                                       | Acute cerebrovascular disease,<br>I67.801                               | Immobilization combined pneumonia<br>J18.201                      |
| 2  | Bronchitis<br>J40.102                         | Trauma<br>T14.951                              | The exacerbation of chronic obstructive pulmonary diseases<br>J44.151 | Chronic obstructive pulmonary disease<br>J44.901       | Bronchitis<br>J40.102                         | Trauma<br>T14.951  | Acute coronary syndrome<br>I24.802                                      | Heart failure<br>I50.911  |
| 3  | Pneumonia<br>J18.901                          | Fever<br>R50.952                               | Acute coronary syndrome<br>I24.802                                    | Heart failure<br>I50.911                               | Pneumonia<br>J18.901                          | Fever<br>R50.952   | Respiratory failure<br>J96.901  | Exacerbations of chronic obstructive pulmonary disease<br>J44.151 |
| 4  | Coronary heart disease<br>I25.101             | Abdominal pain<br>R10.401                      | Heart failure<br>I50.911  | Cerebrovascular disease<br>I67.903                     | Trauma<br>T14.951                             | Abdominal pain<br>R10.401                                    | Heart failure<br>I50.911  | Cerebrovascular disease<br>I67.903                                |
| 5  | Trauma<br>T14.951                             | Dizziness<br>R42.X51/R42.X01                   | Gastrointestinal hemorrhage<br>K92.208                                | Later stage of cancer<br>C80.X02/C80.X51               | Coronary heart disease<br>I25.101             | Dizziness<br>R42.X51/R42.X01                                 | Acute exacerbation of chronic obstructive pulmonary diseases<br>J44.151 | Later stage of cancer<br>C80.X02/C80.X51                          |
| 6  | Cardiac arrhythmia<br>I49.904                 | Chest pain<br>R07.401                          | Respiratory failure<br>J96.901  | Respiratory failure<br>J96.901                         | Cerebrovascular disease<br>I67.903            | Chest pain<br>R07.401  | Cardiac arrhythmia<br>I49.904   | Gastrointestinal hemorrhage<br>K92.208                            |
| 7  | Cerebrovascular disease<br>I67.903            | Vomit<br>R11.X01                               | Cardiac arrhythmia<br>I49.904   | Various end-stage of disease<br>R53.X04                | Cardiac arrhythmia<br>I49.904                 | Vomit<br>R11.X01   | Hypertensive crisis<br>I10.X06  | Multiple organ failure<br>R68.801                                 |
| 8  | Hypertension<br>I10.X02                       | Dyspnea<br>R06.001                             | Multiple organ failure<br>R68.801                                     | Hypertension<br>I10.X02                                | Gastroenteritis<br>K52.908                    | Dyspnea<br>R06.001   | Multiple organ failure<br>R68.801                                       | Diabetes complications<br>E14.851                                 |
| 9  | Gastroenteritis<br>K52.908                    | Diarrhea<br>K52.904                            | Complex injury<br>T07.X01   | Gastrointestinal hemorrhage<br>K92.208                 | Hypertension<br>I10.X02                       | Poisoning<br>F10.001/T60.002/<br>T58XX01/T40.051/<br>X41.995 | Upper gastrointestinal bleeding<br>K92.204                              | Cardiac arrhythmia<br>I49.904                                     |
| 10 | Urinary system infection<br>N39.001           | Palpitation<br>R00.201                         | Acute poisoning<br>F10.001/T60.002/<br>T58XX01/T40.051/<br>X41.995    | Combined injury<br>T07.X01                             | Urinary tract infection<br>N39.001            | Palpitation<br>R00.201                                       | Diabetic acidosis ketosis<br>E14.103                                    | Respiratory failure<br>J96.901                                    |

ED = emergency department.

\* International Classification of Diseases, Tenth Revision code is listed under each category of disease or symptom in the column.

increasing numbers of families have demanded that their relative be kept for care in an ED, because nurses and not family members will provide care, even if the care provided is only to enable activities of daily living. This change in policy has made the ED overcrowding worse. Only 314 observation beds are officially assigned in 18 EDs, but the real situation is that most EDs have to put more beds into the limited available space to hold growing numbers of observation patients, making the overcrowding worse. However, this indeed has been the effect, to the detriment of EDs being able to meet their primary mission of the care of the acutely sick and injured.

The third reason is the ED function is inappropriately used currently in China. According to the study, the most common reason for ED visits is an upper respiratory infection without concomitant abnormal vital signs, a chief complaint that is ideally handled in a day clinic. The average percentage of true emergency care provided in EDs is very low. The EDs function as clinics because there is no barrier against inappropriate patient access. Any citizen who wishes to can walk into the ED and seek care, regardless of the apparent severity of disease. As a result, the ED functions as a sort of “everything department,” because it serves as a combination of an ED, a walk-in clinic, a nursing home, a medical ward, and an “overflow” intensive care unit. As this “everything department” role expands, unless there is a commitment of markedly more resources from governmental units, the degree of ED overcrowding will undoubtedly increase. As a result, it will undoubtedly expand the scope of ED visits and contribute to the ED overcrowding.

The fourth reason that affects ED crowding is the recent focus on patient satisfaction (11). Hospitals have the expectation that emergency clinicians will evaluate and treat all patients, regardless of the patient’s complaint or the patient’s acuity of illness. The ED and medical services in general find it very difficult to limit access and extent of care. For example, to maintain patient satisfaction, if the patient has an upper respiratory infection and wants intravenous therapy, then the doctors feel the need to comply with that patient’s nonmedically indicated request to achieve patient satisfaction. Such enabling behavior on the part of physicians and others on the care team will further challenge the ED to meet its primary mission. Many patients come to the ED for low-acuity and chronic problems at night when they are not working. This subset of patients overwhelms scarce health care resources, especially at night.

The result of this overcrowding is unnecessary death, permanent disability, additional procedures, and increased length of hospitalization (1,5,10,12). One report linked ED overcrowding to delays in the identification and treatment

of time-sensitive conditions such as acute myocardial infarction, acute stroke, acute surgery emergencies, and sepsis (13,14). Our previous study of septic shock showed that in our system, nearly 80% of the patients with septic shock received their entire treatment course in an ED, rather than having that care provided in an inpatient ICU. Antibiotics were administered within 3 h of ED triage in only 25.6% patients at baseline, likely related, at least in part, to ED nurses’ and physicians’ workload (14). With such overcrowding, public health events such as disasters or infectious disease outbreaks will not be handled ideally. In 2003, during the outbreak of severe acute respiratory syndrome, there were inadequate resources to hold even fever patients. All patients with fever stayed in the ED, where they easily infected each other, then severe acute respiratory syndrome was transmitted to other departments in the hospital, resulting in a requirement that some hospitals close entirely.

EDs in Beijing are like continuously expanding balloons, accepting patients at the entrance side without limit, while being expected to expand no matter how badly the exit side is blocked. Just as balloons, when overstretched, will burst, so too do EDs have a finite capacity. One way to resolve the overcrowding problems is to build home care and postacute care resources such as long-term care or rehabilitation services. This could permit disposition of many observation patients and significantly decrease the number of extra beds deployed in the Observation area. Secondly, the insurance administration needs to be monitored closely, while permitting doctors to decide which patients should stay in the ED and which should leave the ED. Emergency physicians also need to be able to determine which diagnostic tests and treatments are medically indicated, and which are not, so that the pursuit of high patient satisfaction scores does not enable wanton and wasteful expenditures of medical resources. Third, information systems are currently inadequate. Due to the existence of poor information systems, no public information platform can be established to enable hospitals to communicate their ED occupancy and capacity status in any useful fashion to EMS agencies and providers. As a result, information about the number of vacant observation beds and empty urgent care beds in EDs cannot be displayed in a real-time fashion to EMS agencies and patients. Thus, the transport of patients is inefficiently distributed. When EDs are overcrowded, ambulances are forced to divert to other hospitals, and EMS crews are instructed to pass by the closest ED. Recently, crowding has been so severe that some ED directors have instructed the local EMS crews not to deliver any patients to their departments at any time, including early mornings, when capacity tends to not be maximally challenged. Therefore, the



improvement of the information system is very urgent in each ED in Beijing.

### *Study Limitations*

Due to the fact that the information system in each hospital is very low, some data are from manual registration, so there might be some differences.

## CONCLUSIONS

EDs in Beijing have been forced to assume the task of becoming the “everything department” because so many demands have been made of them and so many roles have been forced upon them, to the point that they cannot function as efficient EDs. These ever-growing demands and roles are paralyzing EDs and have led to severe overcrowding.

Although there continue to be a significant number of patients who do not have emergency conditions seeking ED care, contributing somewhat to ED overcrowding, other root causes of crowding must first be addressed. As is the case in many Western nations, one issue is ED “exit block.” There is chronic inpatient under-capacity, which causes this exit block. This problem could be ameliorated by building more inpatient capacity or using the facilities that exist in a more efficient fashion.

However, metropolitan Beijing teaching hospital EDs have several unique challenges that have been inappropriately enabled by the inexplicable and inexcusable demands that have been forced upon them. One of these demands is the manner by which families continue to be enabled to utilize EDs to provide long-term care, chiefly for activities of daily living, for elderly and disabled patients whose needs should be met in a long-term care facility. The other is that inpatient doctors repeatedly refuse to admit certain patients that they deem too “complex” for them to handle. Patients with complex chronic medical illnesses deserve to receive inpatient care, not ED care. These two demands may be unique to our system.

*Acknowledgments*—We would like to thank all the ED staff at 18 teaching hospitals in Beijing for their assistance, as well as Gary Gaddis, MD, PhD for his constructive input. We also would like to offer a special “thank-you” to Gary Gaddis MD PhD, the Associate Editor who was the decision editor for this manuscript. His extensive and helpful comments to us have gone above and beyond the typical level of helpfulness provided to authors during the review process. His editorial suggestions have enabled us to express ourselves more clearly, so as to markedly improve this manuscript.

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### ARTICLE SUMMARY

#### **1. Why is this topic important?**

To the best of our knowledge, this is the first study of the status of emergency departments (EDs) in China. The study confirmed that the EDs are severely overcrowded.

#### **2. What does this study attempt to show?**

This study aims to show that EDs are severely overcrowded in Beijing, and the reasons.

#### **3. What are the key findings?**

The ED settings in Beijing are different from other countries. The EDs actually assume the task of the clinic and thereby make EDs severely overcrowded. The main reasons are the large number of nonemergency patients visiting the ED and difficulty in admitting ED patients. Observation patients with end-stage disease and multiple organ failure stayed in the ED due to nursing home shortage.

#### **4. How is patient care impacted?**

Many patients were left in the ED as observation patients. These included patients who needed to be hospitalized but there was an inpatient bed shortage. Some emergency patients occupy the scarce health care resources at night; as a result, this situation increased the burden of the EDs to some extent. ED overcrowding causes delays in diagnosis, delays in treatment, decreased quality of care, and poor patient outcomes.