

# SpaceMed Case Study

---

## Evaluating Emergency Department Expansion

### Background



Originally printed in the  
**SpaceMed Newsletter**  
Summer 2008

Midwest Hospital (MH) planned to expand (and potentially replace) their emergency department (ED) in response to increased crowding and congestion. Although the current number of annual visits (40,000) was not expected to grow significantly in the near future, the patient/visitor waiting room was frequently overflowing during the evening hours. ED staff also began creating "hall beds" by labeling and assigning defined stretcher bays in their hallways to gain additional treatment space during peak periods. The relocation of an adjacent occupational medicine clinic was viewed as an option for ED expansion in lieu of total ED replacement.

Specific facility expansion goals included expanding the patient/visitor waiting space with enhanced amenities; providing adequate exam and treatment space; triaging nonurgent patients into a separate "fast track" area; and developing a holding area for patients to be admitted who are waiting for an inpatient bed to become available. Although facility expansion and operational improvement were deemed necessary by all members of the planning team, the CFO was concerned about spending significant capital dollars when ED revenues were relatively flat. ED staff were also not in agreement regarding the extent of required expansion — some wanted to almost double the size of the current ED while others were concerned that significant expansion would require additional staff at a time when budgets were tight and staff recruiting was difficult. Others were concerned about the long ED length of stay and its impact on customer satisfaction. However, all members of the planning team agreed that a detailed analysis of the relationship between improvements in treatment room turnaround time and resulting space need and construction cost was warranted prior to initiating the detailed operational and space programming process for a major construction project.

### Planning Approach

A detailed database was assembled and a number of operational issues were identified that would ultimately impact the overall size of the upgraded ED as follows:

- **Trend in ED utilization and patient mix.** Historically, emergency visits at MH increased 2 to 4 percent annually; however, during the past two years ED visits have stabilized at around 40,000 annual visits. The leveling-off in volume has been generally attributed to a community-wide initiative to redirect the uninsured to primary care clinics. However, MH's ED has been on diversion frequently due to a lack of intensive care beds at the hospital. Both the percent of ED patients that are admitted (currently at 18 percent) and the percent of nonurgent care patients (currently at 40 percent) have been increasing even though total ED volume has stabilized.

# SpaceMed Case Study

---

## Evaluating Emergency Department Expansion

Continued

- **Treatment room turnaround time.** Currently, the average treatment room turnaround time at MH is over three hours (180 minutes) which would be even longer when the time from initial triage to placement in the treatment room and the time from exiting the treatment room to eventual discharge is added. Critical operational issues include slow responsiveness from the imaging department for CT scans; lengthy test report turnaround time from the central lab; and long waiting times for physician consults. The backup in the ED of patients to be admitted while they are waiting for an inpatient bed to become available is also a major issue.
- **Number of treatment bays.** A total of 29 ED treatment spaces (or bays) are currently available including two large triage/resuscitation rooms and dedicated rooms for ob-gyn and orthopedic casting. Four of the treatment bays are designated for nonurgent patients although they are generally used on a first-come-first-serve basis with no formal "fast track" procedure in place. In addition, a dedicated X-ray room is also located within the ED resulting in a total of 30 patient treatment/procedure spaces.
- **Average NSF per treatment bay.** The existing treatment rooms/bays currently average only 105 net square feet (NSF) with some stretcher bays sized at less than 70 NSF compared to contemporary standards of 120 NSF for general ED treatment rooms; more than double the space is required for trauma and resuscitation rooms.
- **Total DGSF per treatment room/bay ratio.** The ratio of the current amount of department gross square feet (DGSF) to the total number of treatment rooms (or bays) was evaluated to assess the adequacy of the overall "footprint" of the ED to support the number of treatment bays. With 11,250 DGSF occupied by the current ED, an average of 375 DGSF per treatment bay is calculated compared to contemporary design standards of 550 to 650 DGSF per treatment bay. This indicates a severe shortage of support space as well as inadequately-sized treatment cubicles.
- **Average annual visits per treatment bay.** With 40,000 annual visits and 30 treatment bays/rooms, MH currently accommodates 1,333 annual ED visits per treatment bay.

### Analysis

An overview analysis of the impact of treatment room turnaround time on required ED treatment rooms, total department gross square feet (DGSF), and total project cost was performed. The analysis revealed that even minor improvements in ED turnaround time would have a significant impact on the space and resulting renovation/construction costs as shown in the figure on the following page:

# SpaceMed Case Study

## Evaluating Emergency Department Expansion

Continued

### Impact of Treatment Room Turnaround Time on ED Space and Project Costs (Assuming 40,000 Annual Visits)

Average Treatment Bay Turnaround Time	Treatment Bays Required	Gross Space Required at 550 to 650 DGSF/Bay	Estimated Project Cost
90 Minutes	20	11,000 to 13,000 DGSF	\$3.9 to \$4.6 Million
120 Minutes	25	13,750 to 16,250 DGSF	\$4.8 to \$5.7 Million
180 Minutes	35	19,250 to 22,750 DGSF	\$6.8 to \$8.0 Million

Source: Hayward, C. 2005. *Healthcare Facility Planning: Thinking Strategically*. Chicago: Health Administration Press.

### Conclusion

Due to the high cost of replacing the existing ED, particularly if 30 or more treatment rooms and support space were provided, the ED planning team ultimately decided to focus their operations improvement efforts on improving ED treatment room turnaround time, with a target of 120 minutes, before embarking on a major renovation/construction project.

Since the adjacent occupational health clinic (with six exam rooms and support space) schedules patients only on Monday through Friday and is typically closed at 4:00 p.m. each day — and ED demand for nonurgent (fast track) space is typically from 4:00 p.m. until 11:00 p.m. — an operational plan was developed to use this space to triage and treat nonurgent ED patients during the evenings and on weekends. With the diversion of these nonurgent patients out of the main ED, the smallest ED treatment bays were reconfigured resulting in 25 appropriately-sized ED treatment rooms/cubicles along with the six fast track exam/treatment rooms (using the occupational health clinic). A modest expansion of the patient/family waiting area was undertaken using adjacent office space. This interim solution allowed MH to monitor trends in ED volume and evaluate the success of its operations improvement efforts. Hospital leadership agreed to reevaluate the need for a major ED expansion or replacement project again in another year.

*Cynthia Hayward*  
Principal  
Hayward & Associates LLC  
[chayward@hayward-assoc.com](mailto:chayward@hayward-assoc.com)

[SpaceMed Case Study 1308-03.1](#)