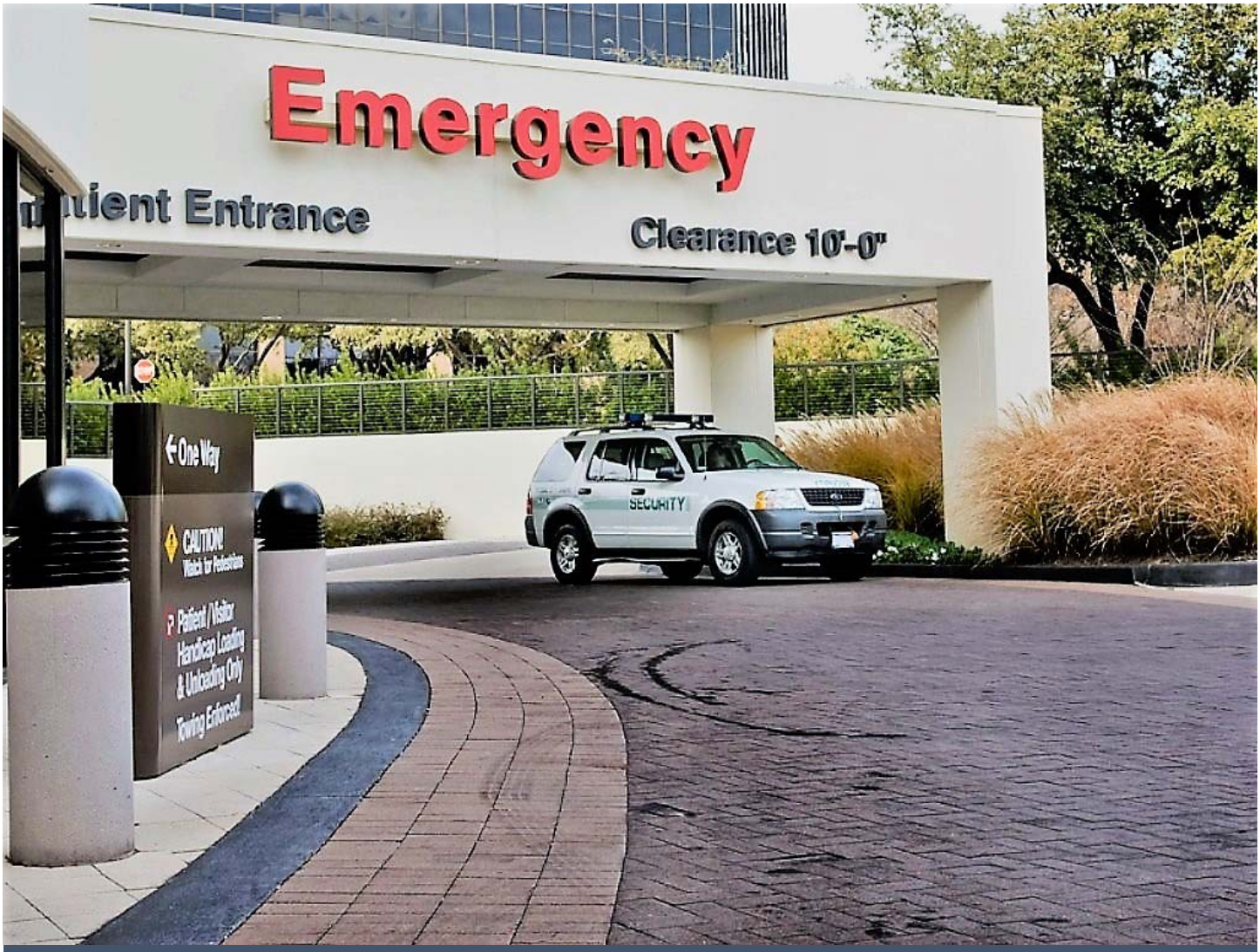

Design Considerations for a Safer Emergency Department

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Nearly every architectural project I've been involved with to renovate, expand, or upgrade an emergency department (and there have been more than 300 of them) has considered the safety of the patient, staff, physicians, and other providers during the design process.

However, these architectural projects have had long gestation periods: it can take years for an organization to consider a project, work with an architect to define the project scope, solidify a budget, and gain organizational approval. Then once the project is approved, another year or more is needed for design, then more time for state approval of the design. And more years can pass before the complicated construction phases are completed (to keep the department operational during renovations) so that everyone can finally experience the benefits of a newly designed, safe department.

But an emergency department currently facing immediate problems of patient, staff, physician, and provider safety can't wait years for solutions and doesn't have millions and millions of dollars for a major architectural project. That department might be yours. And if it is, you need help now.

Nicholas Jouriles, MD, FACEP, chair of emergency medicine at Cleveland Clinic Akron General Hospital, leads a high-acuity department accommodating more than 60,000 visits a year, and he sees an escalation in violent behavior among emergency department patients, not just behavioral patients.

"*ED violence has increased, and there is more pressure to not use chemicals or force which places the patients and care providers at great risk*," Jouriles says.

So violence is rising, and budgets to make major changes or add large numbers of security are diminishing. How can we protect all of you who work in emergency departments?

The key is to define the best possible solutions within available and sometimes very limited capital budgets.

As an emergency physician, your position most likely is that the investment in security and upgrades to incorporate safe design features far outweighs the current and future risks to everyone in the department.

Hany Atallah, MD, FACEP, is chief of emergency medicine at Grady Health System, an urban Level I trauma center in Atlanta accommodating 134,000 annual emergency department visits. He believes there are three major considerations for creating a "safe" design:

- **Get the best line of sight possible.** *Line of sight is very important in emergency departments, both for patient and staff safety. Making sure that there are as few blind corners as possible is key. Also important is ensuring that you're able to see into patient care rooms and that there are no family members or patients hidden in the corners of exam rooms.*
- **Partner with your security.** *Having security periodically round in the waiting room and also in the emergency department is very important. This ensures that security is visible and that there is a partnership and understanding between department staff and* security. They *should be equal partners in ensuring a safe working environment.*
- **Encourage staff to provide ideas for improved safety** *as well as "wins" for the current safety mechanism. Getting feedback from the people on the floor ensures they're engaged in a culture of safety and that department leadership believes it's very important.*

In this article, I'll cover safety and security with regard to walk-in/public areas, EMS entry points, forensic patients, general emergency department care areas, and behavioral health patients.

I don't think we'll ever be able to proactively identify and prevent the exact moment a person intends to strike out at another person, but we've got to do all we can to proactively develop an environment that elevates the level of safety for patients, families, staff, physicians, and other providers. I'll cover considerations for immediate and short-term improvements that can support a safer emergency department environment, including security staffing, technology applications, and architectural changes.

I've approached these ideas as if you're looking for changes you can integrate into your current environment as soon as possible. Some of these are small, lower-cost ideas that might make a big difference. Others, like adding security staff at the walk-in and EMS entrances, can be very expensive and might have to be integrated over time.

Some ideas have both pros and cons

Some of these ideas might just be the best you can do with restricted space and limited money. Others are more expensive and might be well worth the money in departments at high risk. Many of these ideas have both pros and cons, including overall benefit versus cost of construction, cost of technology applications, or cost of additional staffing.

Here's an example: creating a separate care area for forensic patients and those in police custody with a separate access door from the outside. The pro is that it eliminates the problem of mixing forensic patients with other patients. The con is that, if your space is already limited, taking what could be three to six spaces away for prisoner care is a sacrifice you can't make.

The costs of construction, technology, and staffing are different in every part of the United States and around the world, so I've done my best to denote lower-cost items versus higher-cost items with regard to the "cost order of magnitude" impacts each solution might have on an implementation budget.

Security – Visible and Active

I think we can all agree that security presence in the emergency department is a major (if not the number one) deterrent to violent behavior from patients and visitors.

Many emergency departments have a security presence in the front entrance or public area. However, many emergency departments have no security presence at all. Some have large security forces in the department and have security guards or campus police at multiple locations such as the front entrance, the EMS entrance, and in the behavioral health clinical area.

Presence is as important as coverage

Let me start by defining in a little more detail about what I mean by security "presence."

Many hospitals have main hospital security offices near the emergency department or adjacent to it. But a security guard sitting in an office monitoring cameras is not as effective as one (or two) standing in clear view of the public and patients. Having security "near" the emergency department sounds great, but having security visible and active in the department is more important.

My very first recommendation, then, is to get your security guards out of the private office and into an area where anyone coming into the department can clearly see them. Many emergency departments have security guards stationed near the front door, standing behind a podium or sitting behind a separate security desk open to the public. Although any security presence is better than none at all, more emergency departments are stationing security personnel right at the clinical reception desk with staff responsible for greeting patients.

My recommendation is that you station security personnel as close as possible to the person receiving patients as they walk in. In this way, staff and security present a united front to patients and visitors. I've seen this pairing reduce aggressive behavior.

Metal Detectors

When I work with emergency department and hospital leaders to improve security, adding metal detectors at entrances is one of the first ideas they mention. It's a true "pro versus con" conundrum: screening for weapons (pro) versus delaying access to the clinical team (con).

Here are few issues to consider if you're thinking about getting metal detectors.

Space for equipment and searches

Adding metal detectors to your existing walk-in vestibule is not as easy as it sounds, even if you get the budget to cover the costs of the equipment and required personnel.

You'll need space for the machine itself, but you'll also need space for patients and visitors to wait in line to walk through. You'll need more space immediately beyond the detection equipment to be able to search bags and people. You'll need to consider a different pathway out of the public area so that patients and visitors don't have to pass back through the detection and search area when they leave.

So just adding a metal detector right inside an existing vestibule will most likely not be successful and cause backups and confusion.

Private search room

An additional consideration is a private search room near the metal detectors that can be used for more intensive searching of people who set off the metal detector even after removing items most likely to cause problems. This obviously takes up another room in the department, but it tends to be necessary when metal detectors are used.

Xray equipment

Another space hog is the xray machinery used to scan bags, similar to what is used in airports to check carry-on items. I've worked with a few departments that have installed xray equipment, and it takes up at least another 160 sf for the machine and personnel.

Can you see who's queuing in line?

The largest drawback to the use of metal detectors is that it forces patients and visitors to wait in line. As a result, the queuing line must be staged so that clinical professionals from a reception desk, assessment area, or triage room can maintain visibility of everyone in line.

At some facilities, planners have considered putting a paramedic or nurse outside the building to help with the queuing and allowing them to be up close to arriving patients. This is obviously an additional staff cost, but a risk management assessment might drive the need for it.

Reducing queuing

I've seen a couple of emergency departments with metal detectors come up with options to reduce the length of time people wait in the queuing line. In one approach, a volunteer or staff member stands ahead of the metal detector handing out bins and telling entrants to empty their pockets and giving them instructions for passing through the metal detectors, getting them ready to move through more quickly.

Another option, although an expensive one, is to add a second metal detector. This doesn't necessarily mean that another security guard is needed.

Staffing expense

Metal detectors are a huge operational expense. One security guard has to move entrants through the detector while another security guard searches bags. At any facility, implementing metal detectors with only one security guard will result in very long queuing lines.

EMS patients

More emergency departments are stationing security guards at ambulance entrances to "wand" patients as they arrive to detect weapons. This is obviously an additional staffing cost, but many facilities find it necessary. (More on this later.)

Here, too, a private search room will likely be needed.

Reception Desks

The reception desk is another key consideration in making the emergency department safer. It's an architectural and furniture solution that supports the clinical staff interacting with patients and the public when they arrive.

Every reception desk should have a welcoming design that allows interaction among staff, patients, and families, but the design goals should also include reducing the ability for a patient or visitor to leap over the desk and grab a staff member.

No, we don't want to go back in time and put staff in cages like wild west bank tellers or behind glass enclosures with tiny speaking holes; older patients have a tough time communicating through glass walls. There are alternatives to both completely glass-enclosed reception desks (see the "Bulletproof Glass" sidebar) and completely open and vulnerable reception desks.

The goal is to make the reception desk welcoming and functional while including key design features that deliver elevated security for staff.

As noted in **Figure 1**, the reception desk can be created with a 30-degree slope toward the public side. Topping the sloped part of this desk with a slick material like stainless steel makes it extremely difficult to climb over. The intent is to delay the aggressor long enough that security can respond or the staff member can escape if in danger. Another surface that appears aesthetic but can help prevent an aggressive person from climbing over is a decorative shatterproof glass.

Figure 2 shows a combination of the sloped desk and the various panes of vertical glass running along the top of the counter. The glass components are staggered with various small openings along the top of the desk to allow staff to reach over the desk and in between panes of glass as needed to gain signatures on electronic pads or paper, attach printed wristbands, and so on. The openings to the glass are too small for anyone to crawl through.

Figure 1. Sloped reception desk

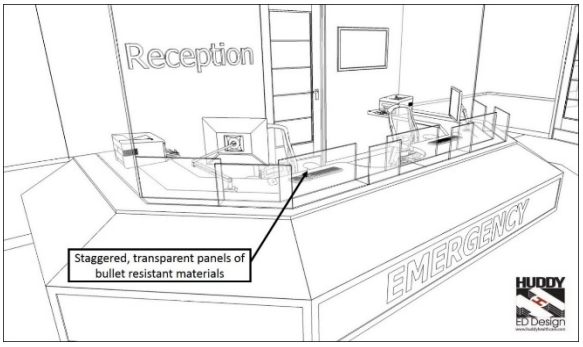

Figure 2. Staggered transparent material on the desktop

Bulletproof Glass

The common term we all use for clear glass we think will stop a bullet is “bulletproof” when, in fact, no glass is bulletproof. The term more commonly used in the safety business is bullet-resistant glass. And, in fact, the clear material used is not really glass at all, but either an acrylic (hard plastic), polycarbonate (a type of stronger, soft plastic), or a glass-clad polycarbonate that is combination of various laminated materials.

Each bullet-resistant solution does just that, it resists the bullets from penetrating at full speed through the clear material. With the high-powered and semiautomatic weapons that are becoming commonplace in some of our domestic terrorist assaults, it is important to note that any material that is fired upon, consistently, long enough, and with enough firepower, will eventually fail.

Also, please be aware that if you integrate a bullet-resistant material into your department, the people with the guns know that once the “glass” rejects a bullet, they’ll need to shoot through the walls and desks below the glass instead. So you also need to consider steel panels in any walls or desks that support the bullet-resistant material.

No islands!

Many reception desks or triage desks are placed out in a public area in what I would describe as "on an island": patients and visitors can walk completely around and behind it. This limits the ability for staff to maintain visual control of all persons in the reception area (as they move behind the staff at the desk). It also exposes staff to danger and eliminates immediate escape through a “back door” behind the desk.

If you have a reception or triage desk out on an island, I recommend that you immediately move it against a wall. If possible, the wall behind the reception desk should have an escape door to allow personnel to immediately vacate the public area in the event of a violent or potentially violent situation.

What if you have to add a door? Finding a place for an escape door might seem like a complicated architectural problem, but your facility staff or local architect might be able to find a very simple solution at minimal cost, thus providing a greater level of safety and security for the members of your clinical team who have

the first contact with patients and visitors. Don't discount any potential solution as too complicated or too costly without asking the design professionals in your organization to discuss your options. (More on this later.)

Panic buttons

Panic buttons in the reception or triage desk should be put in easily accessible locations so staff can call security immediately. A panic button should also alert the main nurse's station or work area in the main emergency department to alert the charge nurse or other leader in the clinical areas.

Here's an important tip: don't put a panic button in a spot where a staff member's knee will likely continuously and accidentally trigger a false alarm. I've seen this design mistake in many emergency departments; multiple false alarms tend to lead to security ignoring all alerts…a typical "boy who cried wolf" scenario.

Real time location systems

Mary Jagim, MS, RN, CEN, FAEN, is a long-time friend and associate of mine (and past ENA president). She has introduced me to real time location systems (RTLS). This approach is similar to the radio frequency identification (RFID) technology that allows hospitals to track the movement and location of tagged equipment, supplies, and personnel. By integrating a communication component, RTLS takes RFID a step further.

Hospitals use RTLS to immediately connect staff to security no matter where they are in the facility through the use of a small wireless tag worn on the staff member's badge. Each badge has a button configured to send an alert message to hospital security. When a staff member presses the button, security receives the alert along with the staff member's name and exact location. It's a panic button gone mobile.

The RTLS technology is easiest to implement during a renovation or construction because it usually involves additional network wiring and hardware infrastructure.

No way out?

In triage or initial assessment spaces, staff members don't know the level of sobriety or the depth of aggression or mental illness a patient might reveal during the first, immediate encounter.

So the most important security component for this part of the emergency department is a second exit, or passthrough concept, with a front door and a back door that allows the staff member to escape a dangerous situation. I can't tell you the number of departments I've toured that have triage rooms with a single door. The result is an immediate dead end for the staff if the patient or wheelchair blocks the doorway.

Work with the design professionals in your organization to see if a second or back door can be added to any triage room that currently has a single door.

Can you see into assessment and triage rooms?

Old-fashioned triage rooms had four hard walls and a door; they allowed for extended triage assessments and privacy for the patient to disrobe. Times have changed. Triage and initial assessment spaces and processes are streamlined, and the total time spent there has been reduced.

If you're renovating your triage area and have a chance to make more extensive changes, consider asking that the triage rooms be glass enclosed. I believe that the security personnel stationed at the front of your department should be able to visually supervise the first encounter between a patient and clinical staff inside these initial receiving and assessment rooms, and glass enclosure makes that possible. A patient who needs to disrobe or get an ECG can be moved to an adjacent private room.

Lockdown capabilities

I assume your entire emergency department has a locked-down perimeter that can be accessed only through key code or key card swipe. If my assumption is incorrect, then the very first thing you should do is find the funds to add an electronic locking system that controls access to your department.

The ability to control access to your emergency department is extremely important, whether that access is for patients and visitors from the waiting room or for any person gaining access from a back door on the perimeter.

What's the challenge to maintaining control of who can access your clinical area from the public waiting area in your department? If you have one set of doors that opens (with electronic control!) to let a patient or visitor into your main clinical area, you've probably seen what can happen: someone who was waiting for those doors to open jumps inside without anyone knowing someone has breached the perimeter of the clinical zone.

Here's one solution: a "man-trap" or sally port just inside the main entry doors to your clinical area, a second set of locking doors that is not unlocked until the first set of doors is closed and latched. To get through a sally port, a staff member, patient, or visitor must step through the first set of doors, wait a few seconds until those doors close, then open the second set of doors using a card swipe or keyed access. This inner vestibule should be equipped with security cameras and monitored.

Again, ask your facility staff or design professionals if a second set of cross-corridor doors can be added to the main entry corridor of your emergency department to create this safety measure. An emergency button that opens both doors simultaneously can be added to keep the security measure from becoming a barrier in emergent clinical situations.

A sally port as described here for the walk-in entrance is more common in departments that have separate entrances for behavioral health transfers (in or out) or separate entrances for forensic/prisoner patients. In some departments, the sally port has a door into a private room so the patient can be searched before moving through the second set of doors.

The EMS Entrance

Hospitals that can put security personnel in their emergency departments commonly post them at walk-in entrances. But as volumes and security concerns continue to rise, more departments are adding security at their EMS entrances, too.

Many EMS security desks are sized to allow space for police officers as well. Some emergency departments have established police substations within the department.

Wands instead of metal detectors

The practice of scanning patients for weapons as they come through the EMS entrance is gaining support. Posting security personnel with electronic wands to scan patients is an alternative to the use of metal detectors, which can be set off every time a stretcher comes through.

If this security measure is implemented in your emergency department, you'll need space for individual lockers to store weapons or other items taken from patients.

Forensic Patients

For the purpose of this discussion, I'll use the term forensic patient to refer to prisoners and jail inmates who are brought to the emergency department for care. And the number of these patients is growing.

Some emergency departments have developed separate exterior doors that go directly into care areas secured for forensic patients. These doors allow direct access for security guards and police officers to deliver forensic patients from transport vehicles immediately into secured treatment areas.

Some very large emergency departments, such as the one at Grady Memorial Hospital in downtown Atlanta, have vehicle sally ports: the vehicle pulls into a secured area, and a garage door rolls down before the forensic patient is taken out of the vehicle. At Grady, the sally port area is one level below the emergency department on the back side of the hospital and is connected by secure elevator up into a secured holding area. This lower level sally port area also includes multiple holding rooms for patients awaiting transport.

In many emergency departments, forensic patients are moved through areas where patients are receiving care. This mixing of forensic and other patients and visitors is obviously the worst situation possible. For that reason, many larger departments are developing separate and secured forensic patient holding areas that include standard examination rooms with limited equipment.

The intent is to bring the care team to the forensic patient rather than bring the forensic patient through the department to a designated care team or area.

Work rooms in the clinical area

You know first-hand that the interruptions you have to handle throughout the day severely limit your efficiency in caring for patients. Interruptions have motivated many emergency departments to create separate physician work rooms in the center of the department or adjacent to care areas. It's common for workrooms in the center of a department to be glass enclosed to maximize visibility across the department.

But in some of these designs, there's only one door or opening. Anytime you have a space for multiple staff or clinicians to gather, you should have more than one door; otherwise, the space becomes a dead-end when someone blocks the doorway – a potentially lethal situation when that someone is a violent patient or visitor. No, we can't put two doors in every room in the emergency department, but you should consider asking for two doors for as many work rooms as possible, including nurse's stations and physician work rooms. As part of any review of a proposed design or an analysis of an existing emergency department, it's important that you identify escape paths for every staff member and every clinician wherever they sit, chart, or work.

Means of egress

As part of developing a safer emergency department, be sure to meet with your security personnel and educate all your staff and clinicians and other providers about all means of egress (ie, exit pathways) from different areas within your emergency department. Walk the entire department with security, and define the quickest exit pathway to escape a violent situation. Once the means of egress are defined, make this part of your training and on-boarding for new staff.

If you're designing a brand-new emergency department, be advised that most states allow dead-end corridors to be up to 20 feet deep – they believe that the dead end is not too long in the event of a fire for someone to backtrack and still get out safely. However, I still recommend that you do your best to eliminate all dead-end corridors, no matter what length, in support of clear exit pathways.

As for nurse's stations (or central work areas with work counters), we need to get away from the long U-shaped desks (**Figure 3**, top) that can unintentionally create a dead-end. Instead of these long runs of counters with limited entry and exit points, our newer designs should split charting and work areas into smaller sections of 6 feet or 8 feet long "touch-down" stations (**Figure 3**, bottom) that can accommodate two or three working personnel. By creating multiple shorter work desks, you automatically create more exit points for staff in the event of a violent situation.

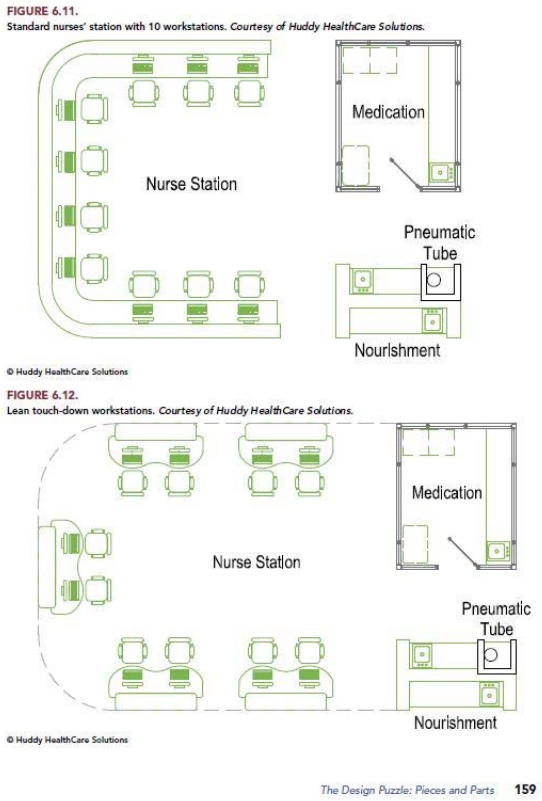

Figure 3. Nurse's stations, standard (top) and safer (bottom), as printed in *Emergency Department Design: A Practical Guide to Planning for the Future*, 2nd Edition

Means of Egress

The following is an excerpt from a 2014 article, "Designing a Safe and Secure Emergency Department," that I wrote for *The Health Estates Journal* in the United Kingdom (www.healthestatejournal.com) published by Institute of Healthcare Engineering and Estate Management (www.iheem.org.uk)

"Every designer should be aware of the hospitals disaster plans and 'violent event' strategies. If someone brandishes a weapon or someone is attacked in any location within the ED, is the hospital's plan to vacate all patients from the department, or lock them down safely in the ED? A designer should meet with security and disaster response personnel to design an environment that supports the disaster response goals of the organization. If the intent is to 'lock down' the environment and keep all patients and personnel inside the ED, then the designer needs to establish 'areas of refuge' within the ED. And these areas should consider steel panels in the walls and bullet resistant glass as applicable."

Behavioral Health Areas

I've lost count of the (large) number of emergency departments I've toured that have behavioral health patients sitting in hallways in chairs among the general emergency department patients. I'm sure it's obvious to anyone reading this article that this is the most dangerous situation we can have in any emergency department.

Governing authorities and health system leaders must give greater attention to the poor conditions for interviewing and examining behavioral health patients in emergency departments. Sadly, there is no end in sight to the rising volumes of behavioral health patients, and there are fewer community resources outside the emergency department to handle this rising volume. Of course, money is tight, but more capital should be directed at developing appropriate, safe facilities for psychiatric patients who seek care in our emergency departments.

The smallest details matter

Before I get to behavioral health area design features, I want to share a story that shows how even the smallest details of an emergency department design can support greater safety for staff, clinicians, and other providers.

A staff member in an emergency department behavioral health unit was pinned against an exit door by an aggressive patient. Two issues put her in greater danger even after being grabbed by a violent patient and thrown against a door. First, the door to the behavioral health unit had an in-swinging door, meaning, instead of the door releasing and swinging out for an easier escape, the door hardware was developed for the door to swing in. So, the staff member was pinned against a door that could not open outward. Second, the door was locked electronically and could be unlocked only with the staff member's badge. But, the electronic pad that could deactivate the lock was on a wall more than 5 feet away – too far to respond to her frantic attempts to get free by waving her badge in front of the sensor. Within days, facility engineers changed the direction of the doors to open outward and started the work of relocating the electronic pad immediately next to the exit.

De-escalation rooms

In many emergency departments, violent or disruptive behavioral health patients are transported the full length of the department to specially designed behavioral health examination rooms. If moving the behavioral health area close to the entry points isn't an option, some of these facilities are developing de-escalation rooms near walk-in entrances, triage and initial assessment areas, or EMS entrances.

In these rooms, anti-ligature fixtures and medical gases are hidden behind locked panels, a design decision that likely helps lower patient anxiety and de-escalate disruptive behavior. These rooms also double as search rooms. They usually are closely monitored, with a sitter space just outside the room, and equipped with cameras for monitoring from clinical areas and security desks.

De-escalation rooms are becoming more prevalent in emergency departments that are built on multiple levels, thus allowing a behavioral health patient to be sedated before being transported on an elevator to an upper-level psychiatric care area. If you're in a single-level or multi-level emergency department, you might want to identify a room that is currently being used for another function that could be repurposed as a de-escalation room.

With violent and disruptive patient behavior becoming more common and challenging in emergency departments, the obvious solution is to attempt to segregate these patients from the main patient population into specially designed care areas. Large emergency departments might have separate behavioral health suites, psychiatric care areas, or prisoner care areas, but smaller departments with limited patient care spaces need the ability to flex various rooms for general patients and disruptive patients.

If this applies to your department, consider designs that allow typical examination rooms (with sink, supplies, medical gases) to convert to tamper-proof or suicide-proof spaces as needed with, for example, rolldown shutter doors to automatically cover gases, sinks, and supplies. If you can't afford the automatic rolldown shutter doors, here are alternatives: place sinks on the outside of the room, use only removeable carts for supplies, and install stainless steel panels over medical gases and electrical outlets inside the room that can be closed and locked as needed.

Visual supervision of private areas

In any area used for behavioral health or potentially violent patients, consider the ability to see into the private areas such as toilets and showers. Small unbreakable windows in the doors that include integral blinds (inside the glass planes) allow staff outside the room to look into the room as necessary. Privacy is important, of course, but so is the need to check on a patient or a staff member with a patient if too much time has passed.

For behavioral health examination spaces, sitter stations can be placed in adjacent alcoves so personnel can physically visually supervise patients in the care spaces (**Figure 4**). The windows between the sitter space in the examination rooms can be outfitted with integral blinds.

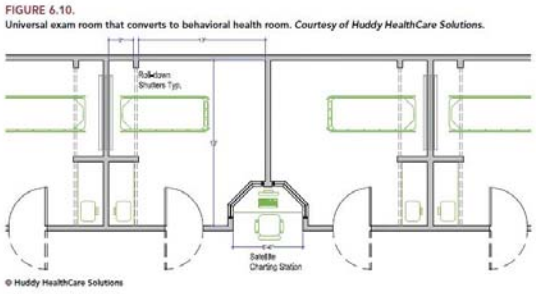

Figure 4. Sitter station near behavioral health room, as printed in *Emergency Department Design: A Practical Guide to Planning for the Future*, 2nd Edition

Summary

Both high-cost major renovations and lower-cost applications can be used to elevate security in any emergency department. I recommend that you work with your facilities or engineering director and your security director to complete a security audit of your current department. Identify the challenges and dangerous situations in your emergency department. Put the issues in order of importance according to what you want to change first. Then work with your facilities and security team to estimate potential costs for architectural and engineering changes, new technology applications, and staffing and operations costs. Armed with that information, you can work with your hospital and department administrators who control the budgets and approval process to move forward.

Yes, money is tight, but what's the cost of protecting your staff and patients?

That's the million-dollar question.

About the Author

Jon Huddy is an architect and President of Huddy HealthCare Solutions, LLC, a health care analytics and planning firm focused on the specialty of emergency department design. Mr. Huddy has teamed with more than 330 health care organizations and 120+ architectural, engineering, and construction firms in the United States, Canada, South America, and Europe to deliver safe facility designs. He is the author of the ACEP emergency department design book *Emergency Department Design: A Practical Guide to Planning for the Future* published in 2016.

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