Ligature-Resistant Patient Safety Hardware

This Online Learning Seminar is available through a professional courtesy provided by:

Accurate Lock and Hardware Co., LLC
1 Annie Place
Stamford, CT 06902
Tel: 203-348-8865
Fax: 203-348-5234
Email: jeff@accuratelockandhardware.com
Web: http://www.accuratelockandhardware.com

AIA Continuing Education Provider

START

powered by www.aecdaily.com @AECDAILY

Ligature-Resistant Patient Safety Hardware

To ensure the current status of this course, including relevant association approvals, please view the course details here.

AIA Continuing Education Provider

The American Institute of Architects
Course No. AEC1080-01
This program qualifies for 1.0 LU/HSW Hour
Course Expiry Date: 02/23/2024

AEC Daily Corporation is a registered provider of AIA-approved continuing education under Provider Number J624. All registered AIA CES Providers must comply with the AIA Standards for Continuing Education Programs. Any questions or concerns about this provider or this learning program may be sent to AIA CES (cessupport@aia.org or (800) AIA 3837, Option 3).

This learning program is registered with AIA CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product.

AIA continuing education credit has been reviewed and approved by AIA CES. Learners must complete the entire learning program to receive continuing education credit. AIA continuing education Learning Units earned upon completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon completion of the test.

AEC Daily Corporation has met the standards and requirements of the Registered Continuing Education Program. Credit earned on completion of this program will be reported to RCEP at RCEP.net. A certificate of completion will be issued to each participant. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the RCEP.

Purpose and Learning Objectives

Purpose:

Risks of self-harm and suicide are inherent in behavioral health facilities. The common areas for concern in psychiatric inpatient units are ligature attachment points that present a hanging risk. In this course, we review the evolution of patient safety hardware with a focus on ligature-resistant hardware designed to prevent the opportunity for self-harm.

Learning Objectives:

At the end of this program, participants will be able to:

- explain how a lockset can be used for ligature attachment and the importance of using ligature-resistant patient safety hardware in psychiatric facilities
- define the three categories that pertain to room risk assessment
- discuss the evolution of patient safety hardware designed to minimize the risks of self-harm, contraband, and barricade, and
- define the specification considerations for patient safety hardware that need to be factored into the design of behavioral health environments.

How to Use This Online Learning Course

To **view** this course, use the **arrows** at the bottom of each slide or the up and down arrow keys on your keyboard.

To **print or exit** the course at any time, press the **ESC** key on your keyboard. This will minimize the full-screen presentation and display the menu bar.

This course includes videos. To view the videos, follow the instructions on the individual slides.

Within this course is a  **test password** that you will be required to enter in order to proceed with the online test. Please be sure to remember or write down this test password so that you have it available for the test.

To receive a **certificate** indicating course completion, refer to the instructions at the end of the course.

For **additional information** and postseminar assistance, click on any of the logos and icons within a page or any of the links at the top of each page.

Contents

Why Patient Safety Hardware?

Introduction

Risks of ligature, self-harm, and suicide are inherent in behavioral health facilities; the best method to manage these risks is through a systematic approach that involves proactive evaluation of the harm that could occur.

For all psychiatric facilities, it is essential to base decisions about the built environment on potential risks to the patients served. Many patients are admitted because they are at risk of harming themselves or others.

Inpatient Suicides

The first data-driven study of suicides, titled “Incidence and Method of Suicide in Hospitals in the United States,” was published in 2018 in the *Joint Commission Journal on Quality and Patient Safety*. Up until that time, there were no reliable estimates of hospital inpatient suicides. This data was important in order to understand the rate of and methods used in suicides and to guide prevention efforts. The period of study was 2010 to 2017.

The conclusions of the study were as follows:

- 48 to 65 suicides per year occurred (which was far below the cited figure of 1,500 annually).
- 74% occurred during psychiatric treatment (inpatient).
- Hanging was the most common method of suicide.
  - More than 90% of suicides took place in private spaces, such as the bathroom, bedroom, closet, and shower.
  - Of the inpatient hanging events, a door, door handle, or door hinge was the most commonly used fixture point (53.8%).

When June walks into her bathroom at the mental health facility where she is a patient, her very life is at risk. Everywhere she turns there is a potential weapon she could use to end her life—everyday objects that, when viewed by those of us who are less vulnerable, seem completely nonthreatening. But to June, these objects may as well be a fistful of pills.

Inpatient Suicides

These findings support the recommendations from a recent Joint Commission Technical Expert Panel that psychiatric hospitals and inpatient psychiatric units in general medical/surgical hospitals should be made “ligature-resistant” environments to decrease the risk of suicide by hanging.

Image source: architecture+, Troy, NY

Ligature-Resistant Hardware

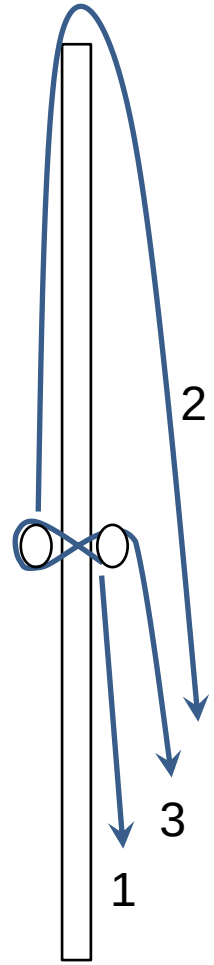
A lockset can be used for ligature attachment in three ways (refer to diagram at far right):

1. Pulling down
2. Pulling up and over the top of the door
3. Transverse attachment: looping around both inside and outside handles

Ligature risks:

a) Handle set
b) Hinge
c) Top door edge
d) Door latch and strike

Click the video icon above to view this video on YouTube
(no audio)



In addition to hospitals, applications for ligature-resistant safety hardware include a range of facilities:

- General hospital psychiatric wards, psychiatric hospitals
- Juvenile detention centers, adult detention centers, prisons
- VA hospitals, military hospitals
- Children's hospitals
- Outpatient clinics, halfway homes

Room Risk Assessment

Although a safe environment is critical, no facility can be totally safe and free of risk.

Furthermore, the level of concern for how the design of the built environment affects the safety of patients and staff is not the same in all areas of a behavioral facility.

Determining a specific room's risk assignment (high risk, medium risk, or low risk) depends on a room-by-room risk assessment of all areas of the facility using that hospital's own risk assessment tool.

NYS-OMH Risk Assessment

In 2014, New York State Office of Mental Health (NYS-OMH) created a patient safety risk assessment by patient type. The NYS-OMH recommends products to meet that risk level for various areas within the facility.

Identified in the adjacent chart are the areas categorized by risk.

High-risk-approved products are safe for all locations.

It is important to note that hospitals seek a healing environment, and some high-risk-approved products may be too institutional in appearance for patients well on their way to recovery. Other facilities want to limit as much risk as possible. This risk assessment guide can be used as a tool to provide direction for both scenarios.

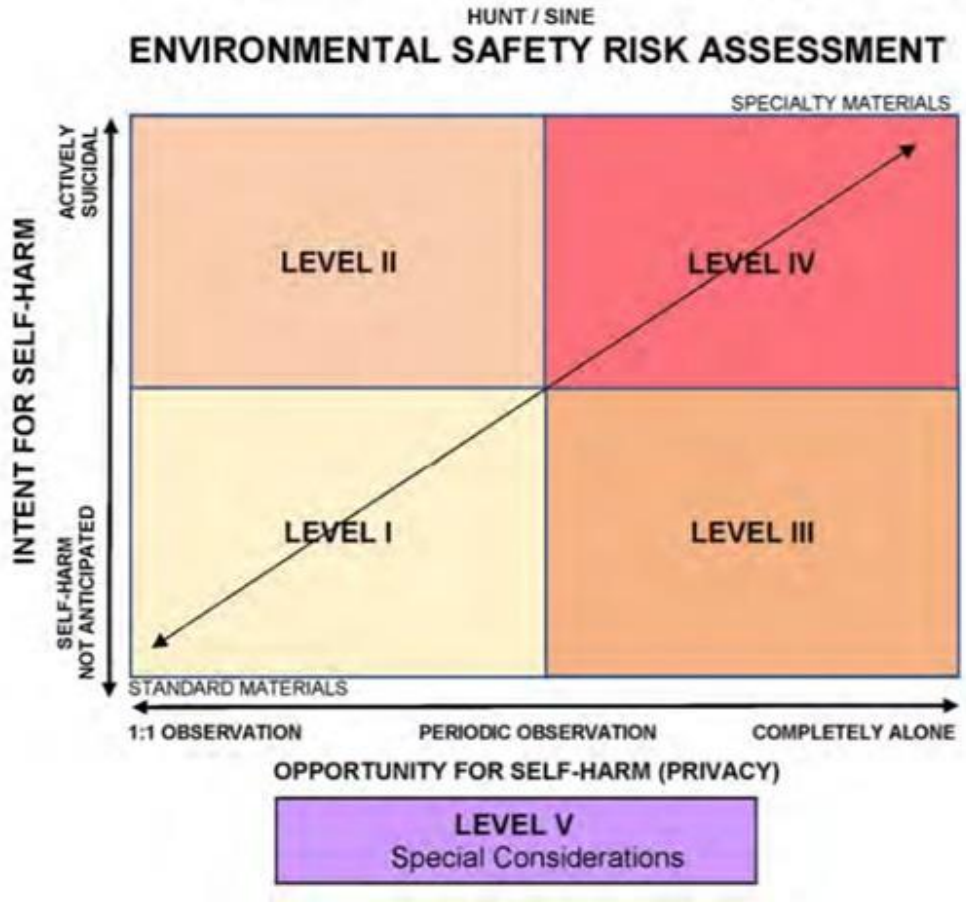
High-Risk Areas	**Medium-Risk Areas**	**Low-Risk Areas**
Patient Bedroom In-Suite Bathroom In-Suite Closet Time-Out Room	Living Room Dining Room Group Room Kitchen Janitor's Closet Hallway Restroom	Medication Room Nurses' Station Office Laundry Room Staff Restroom Classroom
Patient difficult to manage or at risk in solitary and/or unsupervised areas	Patient access is controlled, or use is supervised with no solitary and/or unsupervised care	No patient use, or area is constantly supervised

Hunt / Sine Patient Safety Risk Assessment

Another valuable tool to facilitate conversation between clinical staff and designers regarding patient safety is the Hunt/Sine patient safety risk assessment (PSRA). The PSRA uses a Cartesian matrix to represent an opportunity for a patient to be alone in a space on one axis and a level of risk of self-harm on the other axis. The greater the opportunity for a patient to be alone, the better the opportunity for self-harm, and the greater the care that should be taken pertaining to choices in design and materials.

In the Y-axis (Intent for Self-Harm), “Actively Suicidal” is placed at the top of the scale and “Self-Harm Not Anticipated” is positioned at the bottom.

The X-axis (Opportunity for Self-Harm) represents privacy ranges from “Close Observation” on one end of the scale to “Completely Alone” on the opposite end.



Source: “Design Guide for the Built Environment of Behavioral Health Facilities”

Hunt / Sine Patient Safety Risk Assessment

To expand on the PSRA, a description of each level is presented below:

Level 1 (I): Areas where patients are not permitted or are under constant supervision (e.g., staff and service areas)

Level 2 (II): Areas where patients are highly supervised and are not left alone (e.g., corridors, counseling rooms, activity rooms)

Level 3 (III): Areas where patients may spend time with minimal supervision (e.g., lounges, day rooms)

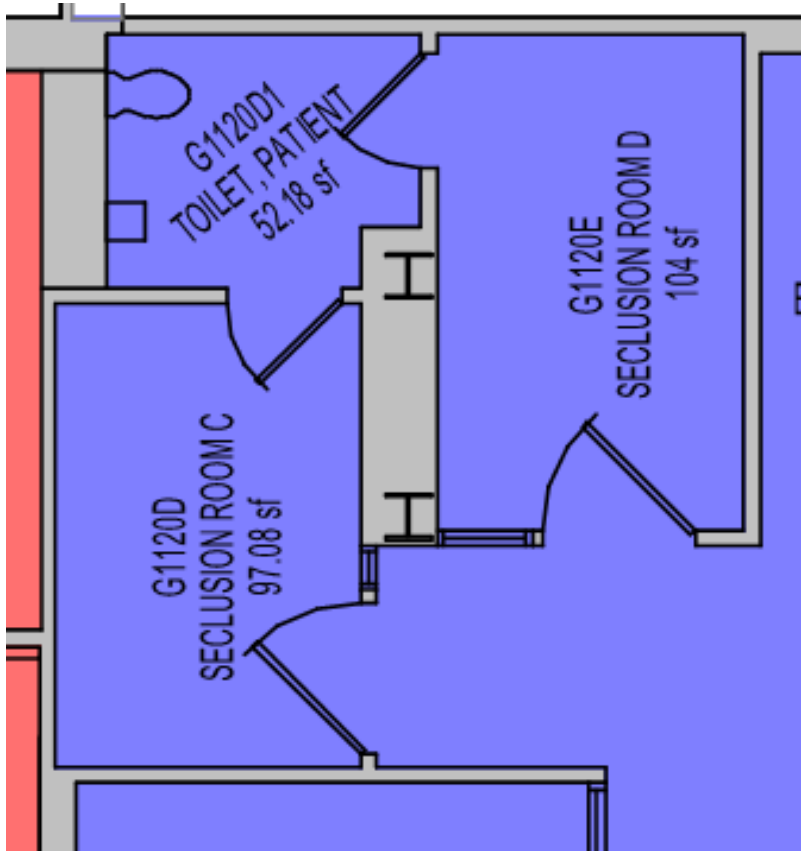
Level 4 (IV): Areas where patients spend a great deal of time alone with little to no supervision (e.g., semiprivate and private patient rooms, patient toilets)

Level 5 (V): Areas where staff interact with newly admitted patients who present potential risks or where patients may be in a highly agitated condition (e.g., seclusion rooms, examination rooms, admission rooms, emergency department rooms)

Hunt / Sine Patient Safety Risk Assessment

Level 5 (V), continued: These areas fall outside the parameters of the risk map and require special considerations for both patient and staff safety.

- No ADA requirements
- No fire event egress required
- No patient egress allowed
- Vandal-proof design
- Selectable functionality



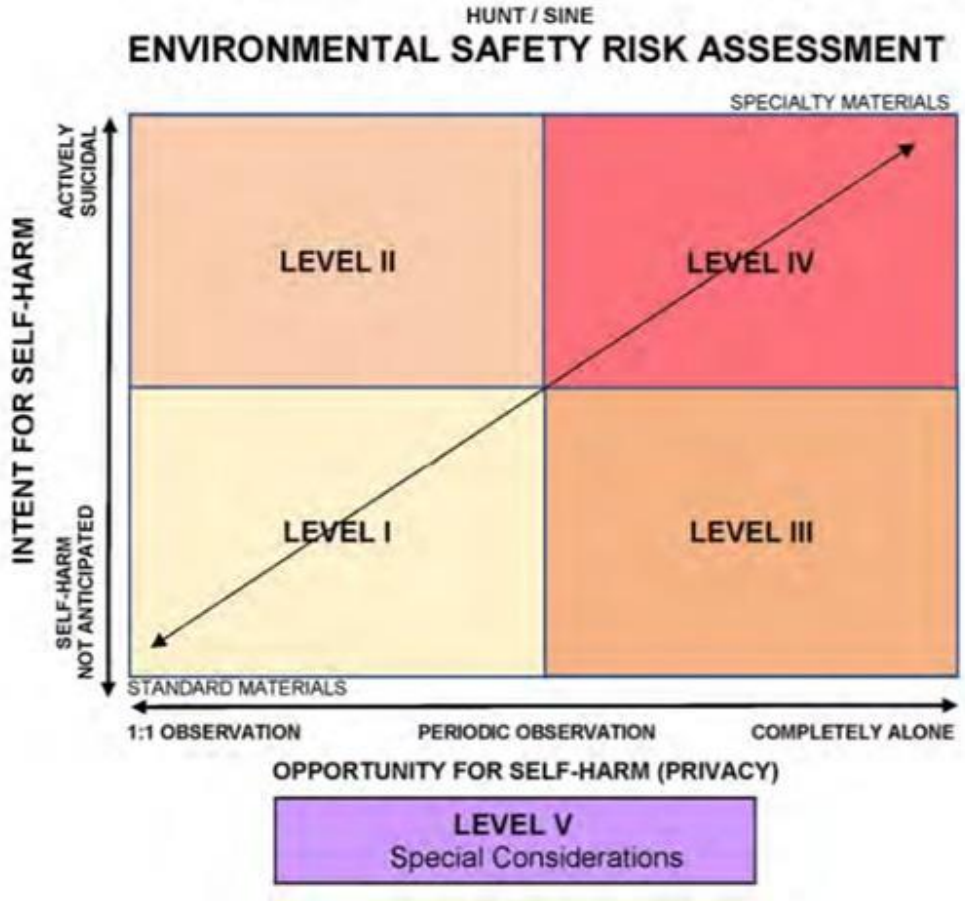
Example of special consideration:
Confinement room door damaged by patient assault

Hunt / Sine Patient Safety Risk Assessment

Using the PSRA, designers and medical professionals can seek to agree on the anticipated degree of privacy a patient will experience in a room or space; it is that agreement that will direct design choices.

For example, a patient bathroom wherein the patient is expected to be alone and have privacy would be at the far end of the privacy axis. If that assessment intersects high up the Y-axis (Intent for Self-Harm), then the space should be designed according to the recommendations for a Level 4 (IV) space as defined in the “Design Guide for the Built Environment of Behavioral Health Facilities.”

For information on construction and material considerations for all levels, refer to the link to the guide found on the References and Resources slide at the end of the presentation.



Ligature Resistance Evolution: 1980 to Early 1990s

Since self-asphyxiation is the most prevalent form of suicide attempts, hospital design from 1980 to the early 1990s addressed the elimination of ligature attachment points (listed below) that were above the waistline.

- Fasteners
- Door hinges
- Closet doors
- Windows and vision panels
- Access doors
- Ceiling systems
- Shower and privacy curtains
- Clothes and towel hooks
- Closet bars
- Mirrors
- Toilet partitions
- Window treatments

- Bulletin boards
- Picture hanging systems
- Cabinet hardware
- Sprinkler heads
- Showerheads
- Medical gas enclosures
- HVAC devices and covers
- Thermostats
- Electrical receptacles
- Light fixtures
- Fire alarm components

Ligature Resistance Evolution: Current Best Practice

Currently, all new and existing psychiatric facilities are required to meet comprehensive built environment standards designed to ensure that the risks to patient safety are minimized.

These standards support patient safety strategies that avoid systems, assemblies, and materials that can be weaponized or provide ligature points in all areas that are accessible to patients.

Ligature points are not limited to the built environment above the patient's waist but can be anywhere in the space. For example, patients have used bed sheets and clothing to strangle themselves with the bottom edge of a door. They wrap their necks then alligator roll until they suffocate.

Additional Ligature Points to Consider

- Caulks and sealants
- Door handles
- Door bumpers
- Rubber bases
- Trim strips between assemblies
- Toilet accessories
- Grab bars
- Fire extinguishers and hose cabinets
- Furniture
- Lavatories
- Lavatory faucets
- Lavatory valves
- Toilet seats
- Toilet flush valves
- Shower controls and activators
- Plumbing traps and piping

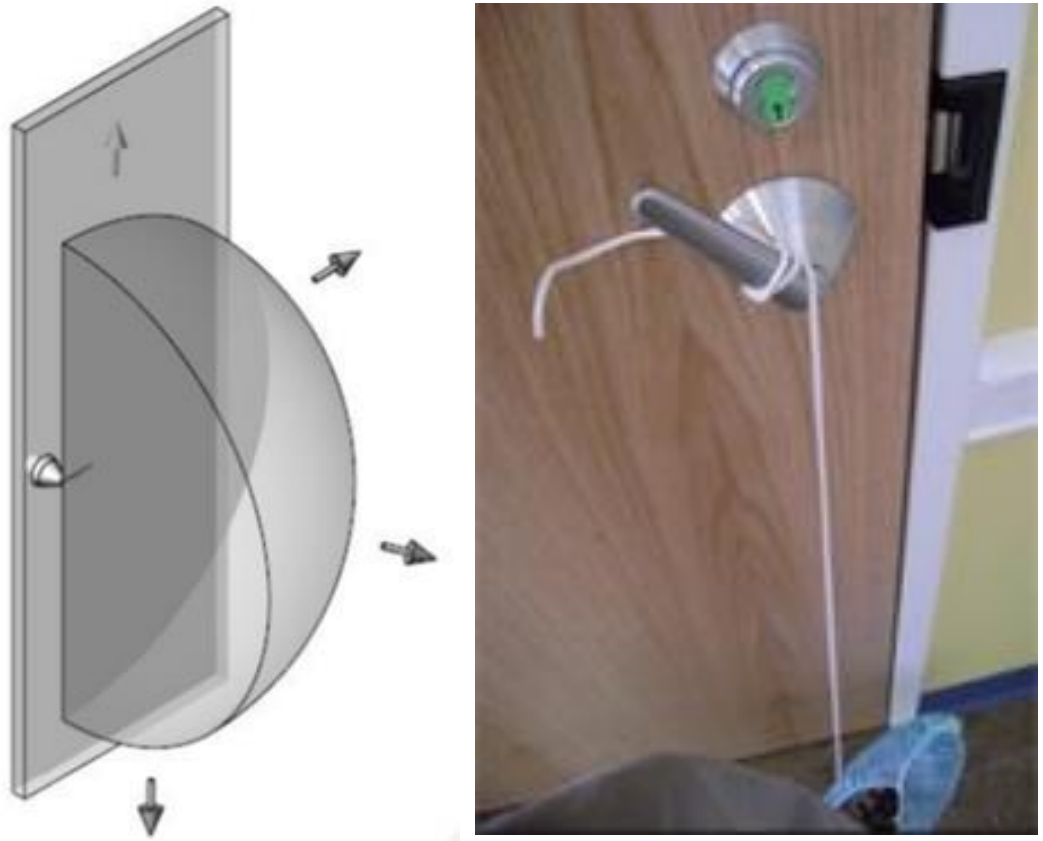
Ligature-Resistant Safety Hardware Guidelines

Currently, there are no ANSI, UL, or ASTM standards that specifically address ligature-resistant safety hardware.

BHMA (Builders Hardware Manufacturers Association) published its own standard in 2019 for locks. It has a limited scope and represents a consensus view by manufacturers (nobody is excluded).

It ignores risks due to the following:

- Transverse tying
- Method of attachment
- Type and material of ligature
- Latch as an anchor
- Strength of attachment (removal)
- Vandal resistance

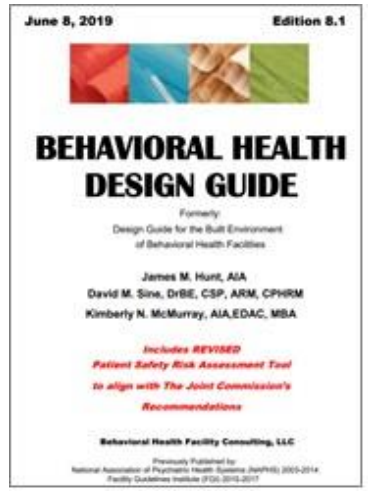


The force gauge does not exceed 11 lbf in any direction from the attachment point within the shaded area. No load can be measured if a ligature attempt slides or slips off the door hardware.

Ligature-Resistant Safety Hardware Guidelines

As the marketplace responds to behavioral health needs, new product introductions make safety-related claims. The standards below evaluate and approve/caution use:

- **Behavioral Health Design Guide (adopted by FGI)**
- **The Facility Guidelines Institute (FGI)**
- **New York State Office of Mental Health (NYS-OMH)**
- **US Department of Veterans Affairs**



Review Question

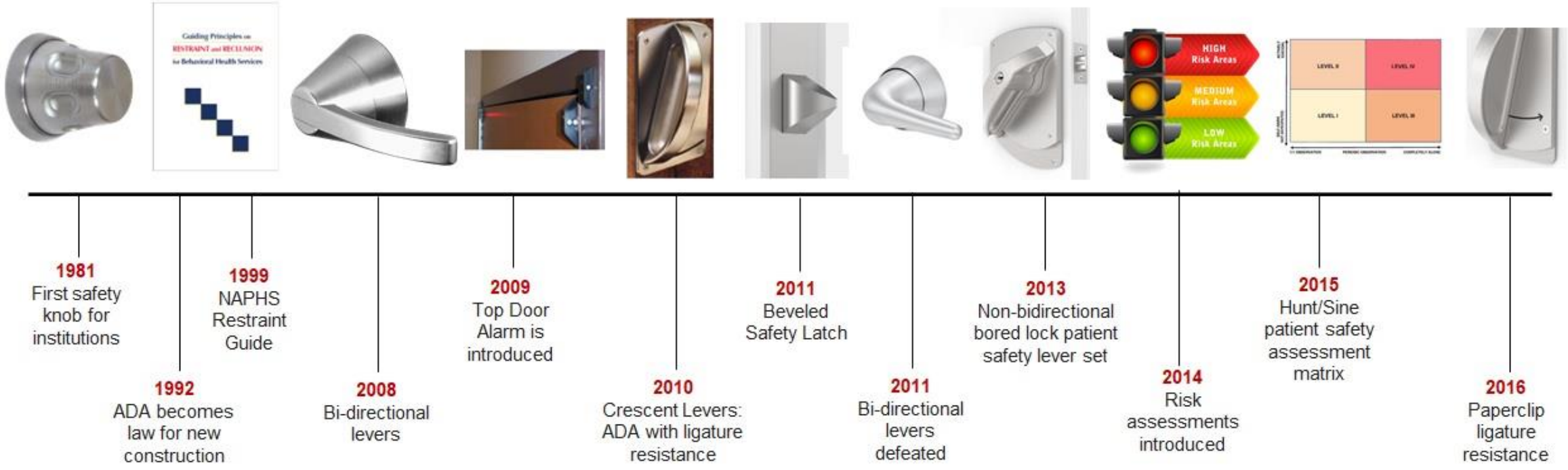
What is the current ligature resistance best practice for psychiatric facilities?

Answer

Currently, all new and existing psychiatric facilities are required to meet comprehensive built environment standards designed to ensure that the risks to patient safety are minimized. These standards support patient safety strategies that avoid systems, assemblies, and materials that can be weaponized or provide ligature points in all areas that are accessible to patients.

Evolution of Patient Safety Hardware

Evolution of Patient Safety Hardware



Continued on next page…

Evolution of Patient Safety Hardware

2016
High Security Anti-barricade System
- Steel door and frame x wood veneer
- Breakaway stop and lockset

2017
Anti-barricade
Door Hinges

2018
Ligature Resistant
Sliding Door System

Evolution of Patient Safety Hardware

2019
Pivots rejected by JAHCO

2019
Ligature Resistant Safety Strike

2019
Ligature Resistant Exit Device Trim

Push Pull / Pull Handles

The first attempts to reduce ligature points on doors were simple hospital push pull/pull handles. Typically, they were oriented in the downward position on the patient room side. The hallway side was oriented upward to discourage attempts to secure a ligature and then loop it over the top of the door. However, the handles could be mounted in the up, down, or side position.

The problem with this design is that a wedge point could be created in the gap required for operational clearance of the handle, providing the opportunity for self-harm.

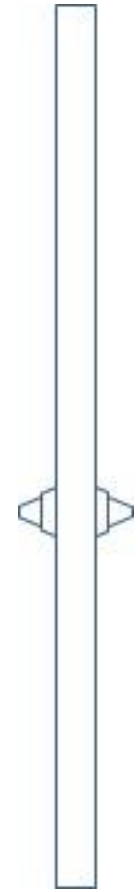
Due to poor visibility with some door installations (e.g., vestibule doors, in-suite patient bathroom doors), care staff could not easily determine if a patient was actively attempting suicide. As a result, patients successfully defeated this method.

Tapered Knobs

By the early 1980s, a tapered knob was introduced that was much more difficult to defeat as an anchor point. However, it was not a perfect solution. When used on both sides of a door, the knobs could be used to anchor a lanyard by looping it around both knobs.

The knobs were difficult for staff to use. When used frequently at certain applications, such as at nurses' station entries, tapered knobs often caused wrist pain due to the repeated twisting of the wrist required.

With the introduction of the Americans with Disabilities Act (ADA) in 1990, the use of tapered knobs was discontinued.



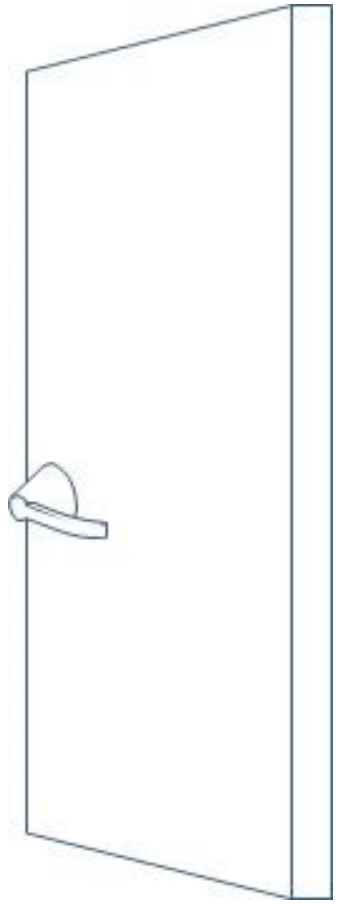
Inside patient room

Hallway side

Collapsible (Bidirectional) Levers

Ligature prevention was still a priority when the ADA was developed, so the demand for better utility was met by collapsible levers that would release ligatures from an upward or downward force greater than that required to retract the latch.

These types of levers are still in use today; however, they are not recommended for high-risk patients, as the design can easily be defeated by looping a lanyard around levers on both sides of the door or by wedging a shoe behind the lever to anchor a lanyard.



Inside patient room

Hallway side

Bidirectional Lever Locks

Now we move on to discuss latches and locks.

An important product introduction for its time, “clutching” or bidirectional lever locks gave hospitals an easy retrofit solution at minimal cost with both ADA and antiligature features.

These types of locksets still offer some reduced ligature risks but are easily defeated by looping both sides of the door or forcibly wedging an object behind the lever. In fact, some designs allow simple shoelaces to anchor on one side only. A lever-style trim is not appropriate for high-risk areas. At best, they are only appropriate for medium- and low-risk areas.

Sheet

Shoelace

Shoe with laces

Images source: architecture+, Troy, NY
https://omh.ny.gov/omhweb/patient_safety_standards/guide.pdf

Crescent Levers

Eventually, systems were introduced that met ADA accessibility guidelines while further decreasing ligature attempts.

A crescent lever design prevents dual-sided door looping while meeting ADA requirements by requiring no pinching, grasping, or twisting to operate.

Because of the evolution of patient safety hardware, many existing facilities seek to improve safety standards and reduce self-harm risks with newer door hardware. For retrofit applications, large escutcheon plates can be used with crescent levers to cover previous hardware cutouts.

Inside patient room

Hallway side

Beveled Safety Latches

Hospitals seek to balance patient privacy and dignity with safety, but a patient inside a room with the door closed represents a high-risk situation. For example, the latchbolt itself has been used successfully as an attachment point to anchor lanyards and is invisible to care staff in between room checks if the door remains closed.

To address this concern, beveled safety latches were developed for in-suite patient bathroom and bedroom doors, featuring bevels on the top and bottom to diminish ligature points. An upward, downward, or horizontal force (from inside the room) will cause the latch to retract and release a ligature attempt.

Beveled safety latch

Standard commercial-grade antifriction latch

Cylindrical Lock Systems

Many hospital facilities are equipped with cylindrical or bored lock lever sets.

Conversion of these doors involves labor-intensive and disruptive retrofitting to install a mortise-style lock case or may require purchasing a new door. Bidirectional levers are an answer to this application, but as previously mentioned, they provide only limited risk reduction.

A cylindrical, ligature-resistant, key-in lever set was introduced to solve these retrofit issues with minimal disruption in a live unit for a quick patient safety upgrade. Along with retrofit capabilities, cylindrical hardware offers ease of installation.

Cylindrical sets are available in a variety of functions including passage, classroom, storeroom, asylum, entry, and dormitory/institutional (refer to next slide).

Cylindrical lock system

Passage function (no key)

Key-in lever set

Cylindrical Lock Systems: Functions

ASYLUM OR INSTITUTIONAL

Both handles rigid at all times.

Latch by key either side.

Verify code compliance before using this function.

ENTRANCE OR OFFICE

Latch by handle either side unless outside handle is locked by push/turn-button inside.

Push button released by key outside or handle inside.

Latch by key outside when outside handle is locked.

PASSAGE OR CLOSET

Latch by handle either side.

PRIVACY / BATHROOM

Latch by handle either side unless outside handle is locked by inside button.

Turning inside handle or closing door releases button.

Emergency slot on outside handle unlocks and releases inside button.

CLASSROOM

Latch by handle either side unless outside handle is locked by key.

Key outside locks/unlocks outside handle and retracts latch.

Inside handle is always free.

STOREROOM OR CLOSET

Latch by handle inside or key outside.

Outside handle rigid at all times

Mortise Locks

Mortise locks offer strength and are available with advanced safety features. High-security detention-grade locks may be specified that are proven to withstand over 300 times more abuse than the Grade 1 requirement. Available in all functions and with a variety of backsets, mortise locks are used for both new and retrofit installations.

Ligature-resistant safety push/pull and lever systems can be paired with mortise locks. The push/pull option offers a low profile that prevents obstruction and abuse. The push side allows hands-free operation, while the pull side features easy egress due to the unique latch retraction mechanism, even with high loads on the door.

Standard Grade 1 mortise lock with antifriction latch

High-security mortise lock

Mortise lock with crescent lever trim

Mortise lock with safety push/pull trim

Integrated Turnpieces with Escutcheon and Lever

Patient privacy functions have evolved with an integrated turnpiece with escutcheon and lever. An optional indicator is provided to let the patient know the status of the outside lever.

A reset feature automatically unlocks the outside lever each time the door is closed, preventing accidental or intentional lockout.

Outside with indicator
Red: Locked
Green: Unlocked

Inside sets with thumb turn. Optional indicators let patient know if door is properly locked.

Cost and Options

Are cylindrical-style locks less expensive than mortise?

- No. Even though door preparation is cheaper for a cylindrical lock, the hardware is significantly more expensive. However, it's still less expensive to purchase a new lock than to replace a door to accept a mortise lock.

What are the finish options of locks?

- US26D and US32D are standard finishes.
- US10B is possible with an upcharge, depending on quantity.
- US10 (bronze) is not preferred. It is custom and expensive, and it has a long lead time.
- Antimicrobial coatings are available with an upcharge.

Can locks be electrified?

- Yes, standard electrification is available.
- Latch-bolt monitors (LM), request-to-exit or authorized egress (AE), and locking bar monitors (LB) are available.

Can locks be used with existing key systems?

- Yes. Most mortise and cylindrical-style locks can be used with most brands of cylinders, including small-format interchangeable systems.

Paperclip Ligature Resistance

The evolution of patient safety hardware continues with combatting specific contraband.

Hospital care staff struggle to control contraband that patients acquire. Newly admitted patients are thoroughly inspected, including a strip search. Their clothing is given up, inspected, and washed prior to return. Patients often leave the ward for other treatments and are inspected prior to their return.

The ordinary paperclip has been identified by one guideline as a dangerous ligature source.

The prevention of this ligature type requires hardware with the highest level of ligature resistance.

Available in the market is ligature-resistant hardware designed for use in high-risk environments that features paperclip protection. These products have withstood paperclip testing by the NYS-OMH and are ADA compliant and UL Listed for 3 hours.

Ligature-resistant hardware with paperclip protection

Ligature-Resistant Sliding Door Systems

More recent product developments include ligature-resistant sliding door systems and acoustically engineered door hardware.

Designed for behavioral healthcare environments, ligature-resistant sliding doors are a surface-applied door system that can easily convert conventional swing doors into ligature-resistant patient safety openings.

They help keep patients and staff safe by eliminating the inherent associated risk of using a swinging door as a weapon. The design also makes the top door edge inaccessible for ligature points.

Ligature-resistant sliding doors are installed on the exterior side of the patient room, eliminating the possibility of barricade tactics.

Ligature-Resistant Sliding Door Systems

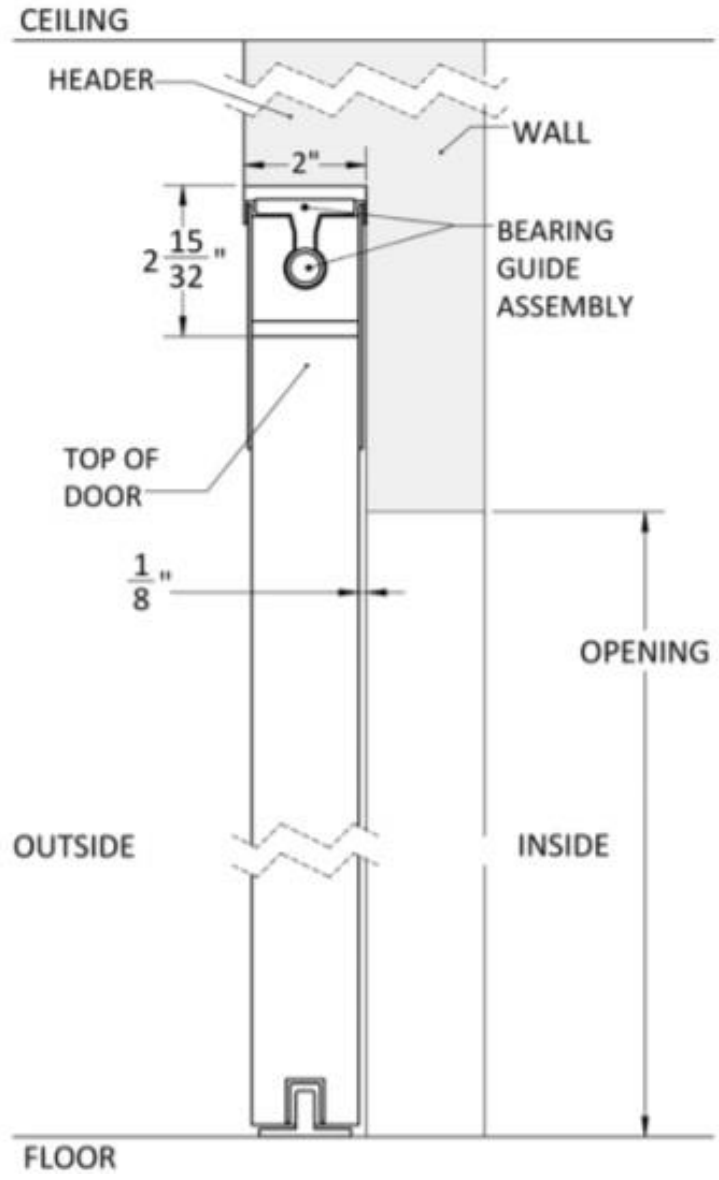
Ligature-resistant sliding doors are composed of the following individual components:

Track system: A standard 1 ¾″ door hangs without any exposed anchor points or cavities where contraband could be stored. The seamless design eliminates opportunities to use the top edge of the door as a ligature point.

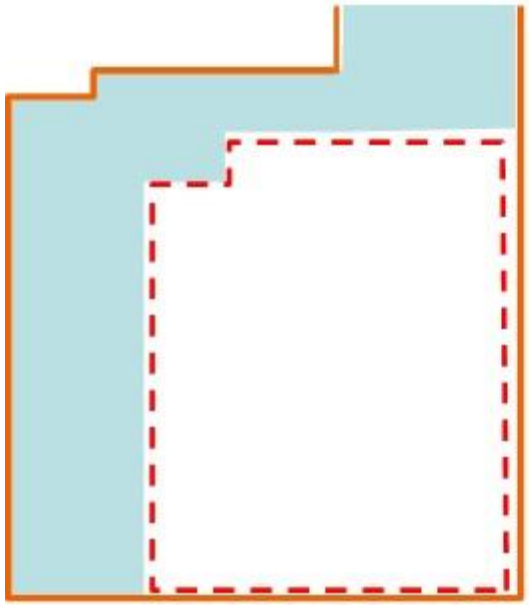
Floor guide: A simple floor guide keeps the door flush against the wall when opened or closed.

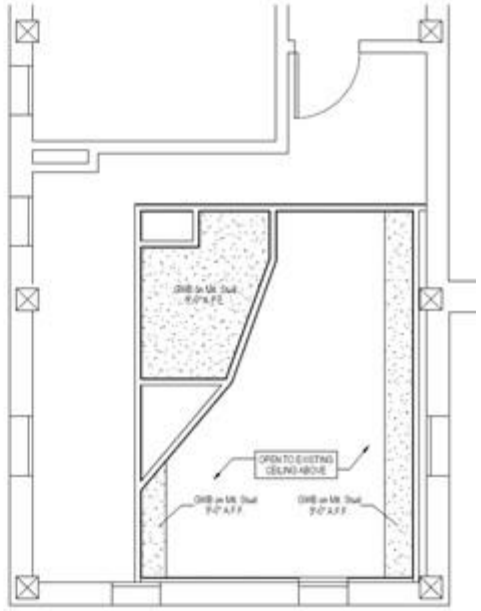
Vertical rod bolt: A concealed vertical rod operated by a ligature-resistant thumb turn provides privacy. A clutch override feature is included to unlock the door from the outside when the inside turn piece is forcibly held.

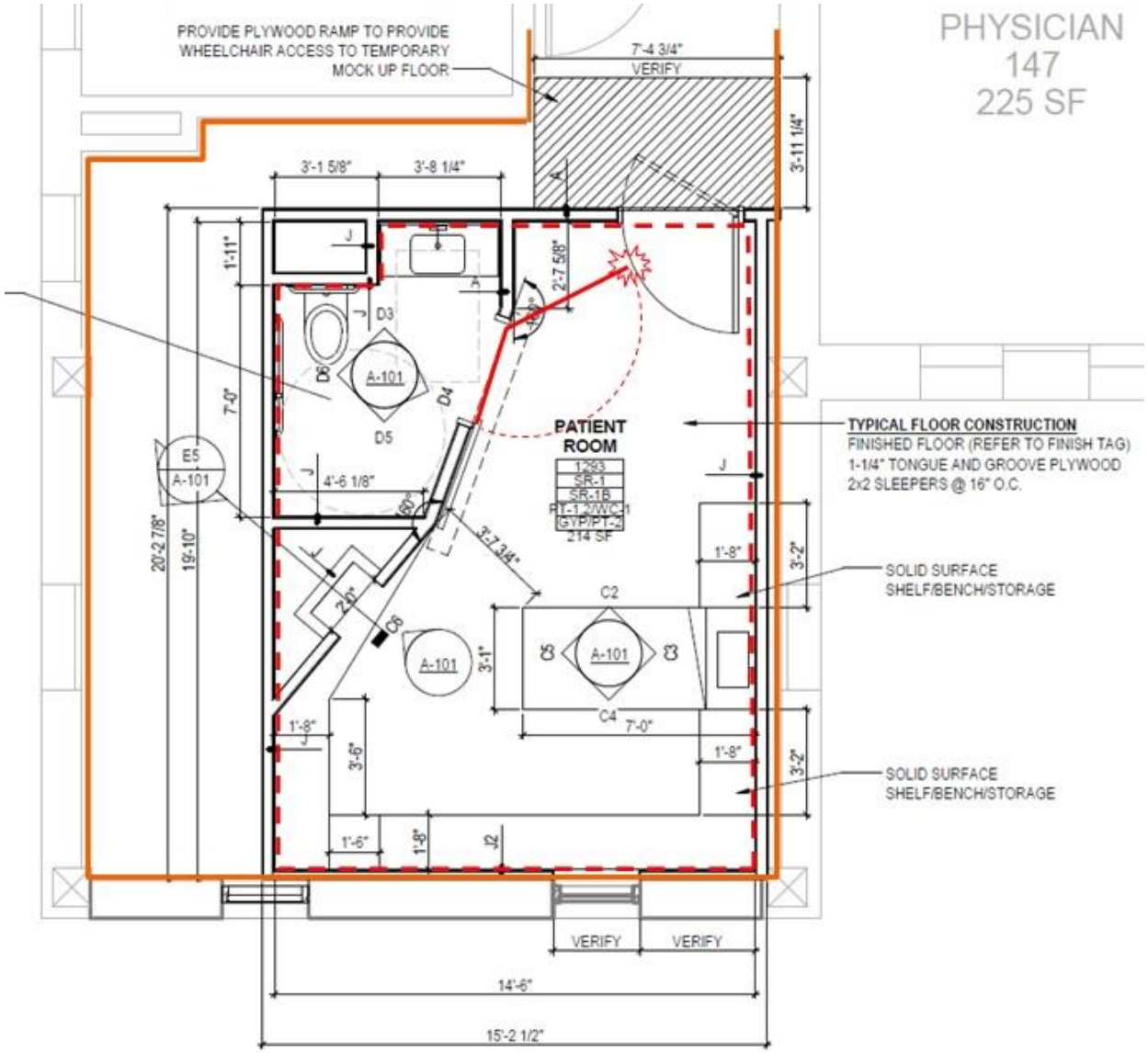
Flush pulls: Ligature-resistant flush pulls allow the door to be opened and closed.



Ligature-Resistant Sliding Door Systems





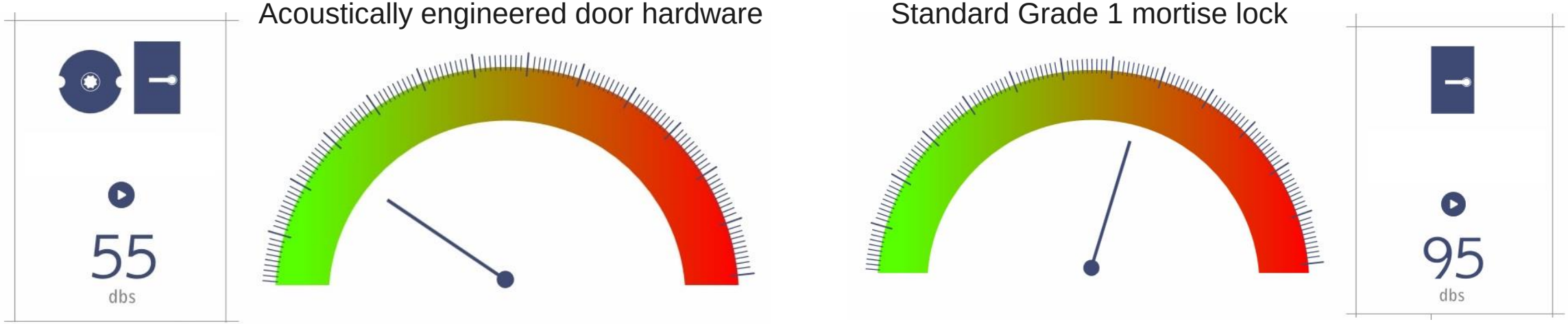


VA Hospital in Lyons, NJ

Sliding door eliminates interference between bathroom and patient room entry doors and allows for overall smaller room size.

Acoustically Engineered Door Hardware

Available in the market is a suite of acoustically engineered door hardware (pictured on subsequent slide) designed to reduce disturbances from door noise. Ideal for both new doors and retrofit applications, this type of hardware is simple to install and can achieve a 16-times reduction in decibel levels, resulting in more peaceful and quiet environments.



Acoustically Engineered Door Hardware

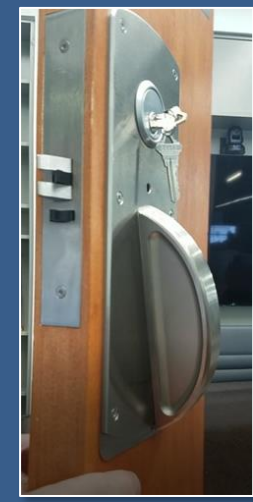
Mortise Lock

The cushioned latch bolt and insulated lock body muffle noise to operate at a low decibel range (Grade 1 certified and UL Listed for 3 hours).

Lever Dampening Disc

Diminishes noise by making the lever return smoother and slower to avoid the abrupt snapback of levers into place. Designed for maximum flexibility, the lever dampening disc is compatible with a variety of lock series and trims.

Click the video icon above to view this video on YouTube (with audio)



Review Question

What four components comprise a ligature-resistant sliding door system?

Answer

These sliding door systems are composed of a rack system, floor guide, vertical rod bolt, and ligature-resistant flush pulls that allow the door to be opened and closed.

Safety Hardware: Specification

Safety Hardware Specification: Introduction

Patient safety hardware is designed to mitigate the following risks:

- Self-harm
- Harm to others
- Barricade
- Contraband

In this section of the course, we review the specification considerations for safety hardware that need to be factored into the design of behavioral health environments, along with the product solutions that are available in the market.

- ADA compliance
- Ligature resistance (looping)
- Contraband (paperclip) ligature resistance
- Antibarricade
- High-security/vandal-proof applications

ADA Compliance

When specifying safety hardware, it is important to ensure that the products meet ADA standards.

Door and hardware must:

- allow one-handed operation, and
- not require tight grasping, pinching, or twisting of the wrist (tapered knobs do not comply because they require twisting of the wrist).

Types	
Tapered knob	No
Cylindrical, ligature-resistant, key-in lever set	Yes
Ligature-resistant thumbpiece	Yes
Ligature-resistant hardware with paperclip protection	Yes
Crescent handle x mortise	Yes

Ligature Resistance (Looping)

Recall that collapsible levers are not recommended for high-risk environments, as the design can easily be defeated by looping a lanyard around levers on both sides of the door or by wedging a shoe behind the lever to anchor a lanyard.

The lower image is a door edge view of a ligature-resistant mortise lock with half-moon-shaped, ADA-compliant levers. Looping is not possible with this type of hardware, even when attempting to use both sides of the door.

Collapsible levers

Ligature-resistant mortise lock

Contraband (Paperclip) Ligature Resistance

As previously mentioned, the presence of paperclips in even the most rigorously monitored patient environment is difficult to control. It should be assumed that almost anything in the patient environment can be compromised by a paperclip. For high-risk areas, ligature-resistant hardware that features paperclip protection is recommended.

Antibarricade Door System

One of the unintended outcomes of providing more patient privacy is the increased opportunity for a patient to use a bedroom or bathroom door as a barricade.

One solution is direct penetration of the door by force, although this option will require replacement of the damaged door.

Antibarricade strategies are available that utilize advanced door systems that can be opened outward in an emergency situation.

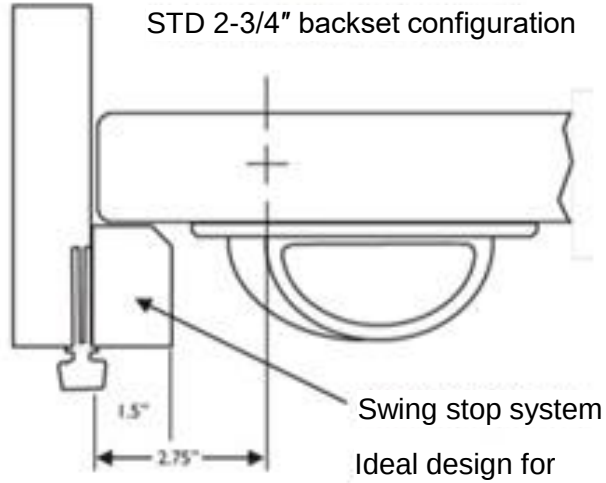
Antibarricade: Swing Stop

Antibarricade door systems feature special swing stops that allow doors to reverse their swing.

The swing stops have larger, nonstandard depths that interfere with lock trims.

Swing stops allow door to swing in reverse

STD 2-3/4″ backset configuration



Swing stop system

Ideal design for retrofit applications

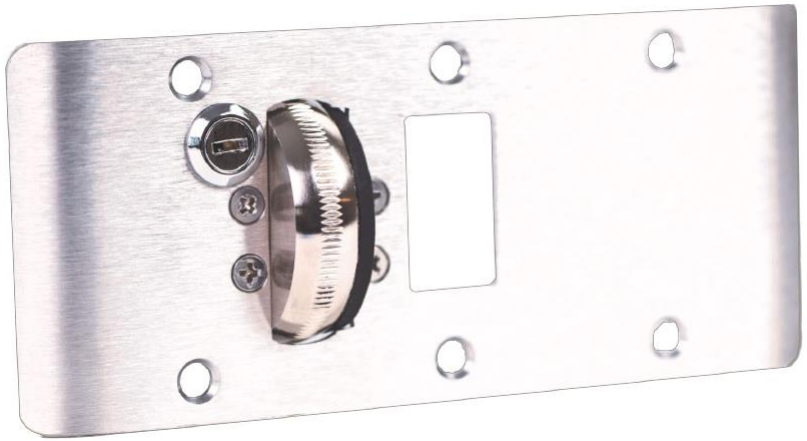
Antibarricade Door System

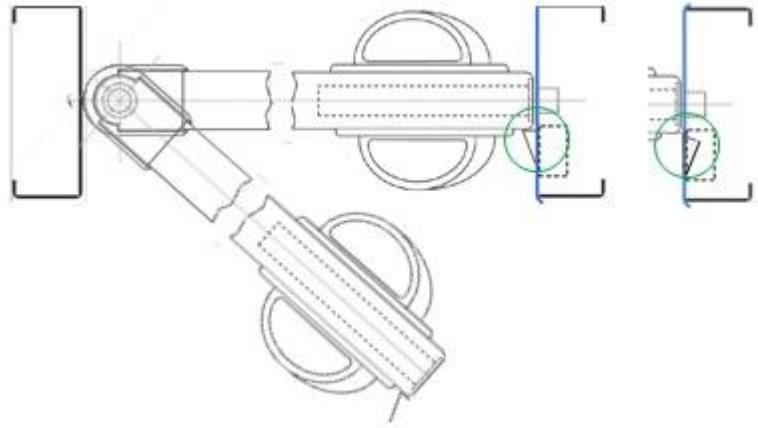
A “wicket” door refers to a door within a door that allows staff to open the door into the hallway and gain entry.

Cautionary note: Door slamming can promote latch edge failure (right image).

Antibarricade: Keyed Emergency Stop

A double lip strike with a keyed emergency stop is designed to restrict and protect against unauthorized outswinging doors. It features a heavy-duty stop to absorb the impact of slamming doors. A key locks the emergency stop into a projected position and unlocks the stop, allowing the stop to be retracted. Keyed or emergency stops allow most patient safety hardware designs to swing in reverse, giving staff access to a barricaded inswinging door.





Antibarricade: Continuous Hinge

During a barricade event, staff release and slide the door away from the latch—freeing the door.

This allows the hinge to swivel in reverse, providing staff access to the patient.

Compared to other antibarricade options, a continuous hinge solution is a more robust and aesthetically pleasing design.

Antibarricade: Key Override of Thumbturn

Nonlocking door hardware is commonly installed on patient doors and in-suite bathroom doors as a means to reduce self-harm risks. However, this does not offer the patient true privacy, falling short of the goal of providing dignity to patients. Providing privacy allows doors to be locked and introduces risk for patient barricades or worse: sequestering another patient against their will.

Antiligature thumbpieces were developed to allow privacy functions combined with a special lock equipped with a cylinder and key that overrides the thumbturn, even when forcibly held. Staff simply retract the latch by key to gain entry. Staff can also lock out patients from in-suite or common hall bathrooms during overnight hours or other quiet times. An outside occupancy indicator lets others know the room is occupied or locked. A reset feature automatically unlocks the door once it is closed.

A key retracts the latch as an independent function of the thumbturn to allow retraction if the thumbturn is forcibly held in a locked position.

High Security / Vandal Proof

Recall that Grade 1 commercial locking hardware should be specified to meet safety requirements for low-, medium-, and high-risk areas.

However, there are high-security applications that require much greater resistance to physical attack and abuse, such as time-out rooms, ward entrances, stairwell doors, courtyard gates, and housing unit entrances.

For these types of applications, detention-grade locks should be specified. Detention-grade locks must resist 600 impacts of 200 ft-lb and still operate, per ASTM F1577-05. To put that into context, a police battering ram operated by two trained officers exerts approximately 200 ft-lb of force.

Detention-grade lock

High Security / Vandal Proof

In terms of time-out rooms, it is important to note there is a trend to move away from patient restraint and seclusion. Care staff seek to avoid restraining patients, and the practice is used only in severe patient safety situations. When staff attempt to correct a patient acting out, it often leads to more violent behavior and eventually, restraint.

Instead, the patient is left alone to find self-control. There is a cause and effect on the built environment. For example, patients are allowed to slam doors repeatedly, providing no self-harm or harm to other patients is observed. The door and hardware are expected to hold up under this abuse.

However, there are events that cause a need for restraint and seclusion. In these instances, the patient is sequestered by staff, forcibly restrained, and moved to a padded time-out room. A time-out room is used to ensure staff and patient safety when a patient is perceived to be in a psychiatric crises. The doors of a time-out room are subject to violence and should be built to high-security, Grade 1 detention standards (ASTM F1577-05).

Review Question

How does an antiligature thumbpiece with a key override feature accommodate both patient privacy and safety?

Answer

Antiligature thumbpieces were developed to allow privacy functions combined with a special lock equipped with a cylinder and key that overrides the thumbturn, even when forcibly held. Staff simply retract the latch by key to gain entry. Staff can also lock out patients from in-suite or common hall bathrooms during overnight hours or other quiet times. An outside occupancy indicator lets others know the room is occupied or locked. A reset feature automatically unlocks the door once it is closed.

Matching the Hardware Solution to the Application

Matching the Hardware Solution to the Application

In this next section, we look at matching the hardware solution to the application.

Presented on the following slide is a table that lists the attributes and solutions for different areas of a psychiatric facility.

Following that, we look at the specifications for the following:

- Inpatient room bathroom
- Patient bedroom
- Time-out room
- Sally port
- Retrofits

Application / Solution

Application	Attributes	Solution
Patient Room	• Free egress • Lock room from the outside by staff key	**Function:** Classroom **Trim:** Ligature-resistant lever
	• Free egress and ingress • Passage only	**Function:** Passage **Trim:** Ligature-resistant lever
Patient Bathroom	• Free egress and ingress • Passage only	**Function:** Passage x Beveled Safety Latch **Trim:** Ligature x paperclip-resistant lever
	• Free egress • Patient can lock door for privacy	**Function:** Institutional Privacy **Trim:** Ligature x paperclip-resistant lever
	• Free egress • Door can be locked from outside by staff only (keyed lock)	**Function:** Deadlock **Trim:** Ligature x paperclip-resistant flush pull
Time-out/Quiet Rooms	• No egress, no ingress • No trim on inside • Unlock from outside only (always locked)	**Function:** Asylum x high-security lock **Trim:** Ligature x paperclip-resistant rigid pull **Optional:** Add high-security deadbolt
Nurse's Station, Kitchen, Storage, Closets	• Free egress • Outside always locked • Enter by key only	**Function:** Storeroom **Trim:** Ligature-resistant lever

High Risk: Inpatient Room Bathroom Specification

Let’s look at specific applications and their recommended hardware specifications, beginning with an inpatient room bathroom.

This inpatient room has two beds with one in-suite bathroom. The bathroom door is solid wood, swings inward, and is equipped with a turnpiece that allows patient privacy. Staff allow patient access to the bathroom during daytime hours, but then lock it overnight.

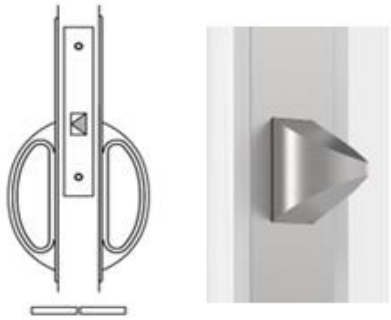
Hardware Specification for Inpatient Room Bathroom (options are presented on the following slide):

- Door: Solid core wood
- Safety hinge
- Institutional privacy locking hardware
    - Outside lever can be locked/unlocked by key
    - Inside turnpiece locks outside lever; inside lever always allows egress (even if outside is locked by key)
    - Opening door unlocks outside lever
    - Key overrides thumbturn if forcibly held
- Antibarricade keyed emergency stop

High Risk: Inpatient Room Bathroom: Options

Presented below are the safety hardware options for a high-risk inpatient room bathroom.

OPTION



PASSAGE x BEVELED SAFETY LATCH

Non-locking functions can be equipped with a beveled latch that prevents the latchbolt from being used as a ligature point. The latch will retract, even when the door is closed, when upward/downward ligature is attempted.

OPTION

INSTITUTIONAL PRIVACY x INDICATOR

Patient allowed privacy by inside turnpiece – locking outside lever with indicator alerting others. Key overrides patient attempt to forcibly hold turnpiece in locked position. Closing door always unlocks outside lever.

OPTION

KEYED DEADBOLT x FLUSH PULL x ROLLER LATCH

Daytime: patient has access to bathroom.

Nighttime: Staff can lock door by key.

OPTION

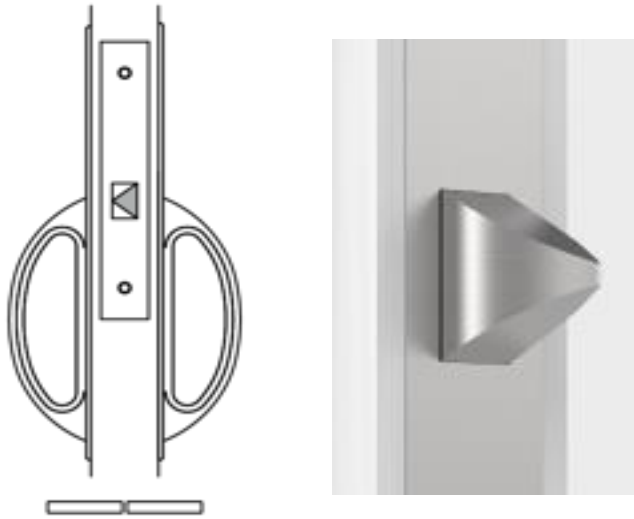
KEYED EMERGENCY STRIKE

Enables only staff, by key, to reverse swing of door when patient attempts to barricade themselves inside the bathroom.

Subject to abuse – stop must be able to hold up to door slamming. Detention grade lock.

High Risk: Inpatient Room Bathroom: Options

Shown below is a passage and beveled safety latch for a high-risk inpatient room bathroom.



Passage and beveled safety latch

High Risk: Inpatient Room Bathroom: Options

Below is institutional privacy and indicator safety hardware for a high-risk inpatient room bathroom.

Institutional privacy and indicator

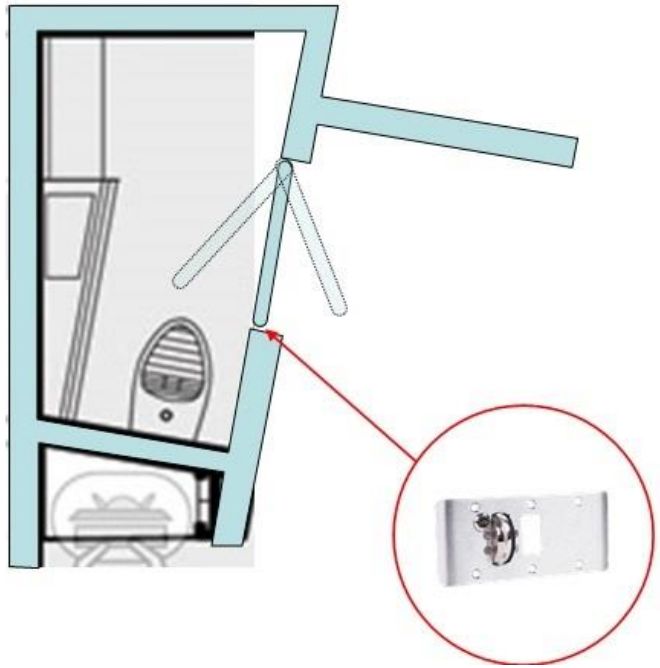
High Risk: Inpatient Room Bathroom: Options

Here is an example of a keyed deadbolt/flush pull/roller latch for a high-risk inpatient room bathroom.

Keyed deadbolt x flush pull x roller latch

High Risk: Inpatient Room Bathroom: Options

Shown here is a keyed emergency strike for a high-risk inpatient room bathroom.



Click the video icon above to view this video on YouTube (with audio)

Time-Out Room: Specification

Hardware Specification for Time-Out Room

- Reinforced hollow metal door, outswinging
- Heavy-duty safety hinge
  - High-security (detention grade), self-latching deadlock (closing door automatically secures door—no need to throw a deadbolt)
  - No hardware inside
  - Rigid pull outside x mortise cylinder
  - Cylinder key retracts latch to pull door open
  - Note: latch and strike must be strong enough to resist violent kicking from inside room

Std. Grade-1 ANSI A 156	High Security Grade-1 ASTM F1577
2 blows @60 ft/lbs	√
2 blows @90 ft/lbs	√
2 blows @120 ft/lbs	√
2 blows @150 ft/lbs	√
x	600 blows @ 200 ft/lbs (latch only)
x	2400 blows @ 200 ft/lbs (with deadbolt)

DEADLATCH

Door locked by key outside, throws high-security deadlatch (autolatching: no key required to throw latch).

Doors are typically outswinging, thus deadlatch must be strong enough to resist violent body and kicking impacts.

Sally Port (aka Man Trap)

Entrance into and out of the psychiatric inpatient ward requires a means to prevent patients from escaping. This is accomplished with a “man trap” setup, which is basically two sets of corridor doors approximately 10 feet apart that cannot be opened simultaneously—thus the trap. Staff enter via an access control credential and have to wait for the door to close behind them before they can open the second door that allows entry into the ward.

Hardware Specification for Sally Port:

- First door:
  - Heavy-duty hollow metal door, outswinging
  - Detention grade x double cylinder x electromechanical mortise lock with security monitoring features
  - Both levers are rigid until the proper credential is accepted, allowing the levers to open the door; once the doors close, the levers are locked again, both sides
  - No egress without key or authorized credential
  - Access control system; card readers; power supplies; security monitoring
- Second door: same configuration as first door

Retrofit Considerations

Question	Considerations
New or existing doors?	If **NEW**, more options available with **mortise** style lock: Beveled safety latch, high-security, breakaway anti-barricade swing stops, existing key system compatibility. If **EXISTING** doors, determine type of door, swing, and lock already installed: • Non-ligature resistant **mortise** style hardware can be converted with patient safety versions with escutcheon plates to hide old prep holes. Reduce patient self-harm risk by specifying paperclip-resistant lever trim. • Key-in-lever type locks are easiest to retrofit with new **cylindrical** anti-ligature hardware requiring new through-bolt holes only. Specify paperclip-resistant lever trim for reduced trim. • Hospital push/pull latches can be converted with **tubular** style anti-ligature lever trim whose escutcheon plates will cover over old prep holes. Specify paperclip resistance for reduced risk.
Anti-barricade needs?	Often, existing openings require tear out, replaced by new doors and frames that allow reverse door swings. There are options to convert existing openings without replacing frames. Wicket doors, surface-mounted hinges to change swing outward, and special retractable pivot hinges which allow door to be opened at the hinge side.
Other existing hardware placement constraints?	Door lites, swing-stops, mullions, edge-guards, wrap-plates, exit devices, gates, sliding doors, and other existing door and hardware applications can be upgraded to meet stringent patient safety guidelines, without affecting fire labeled doors. It is recommended to seek manufacturers who furnish hardware in the United States as these companies have the unique ability to provide custom solutions that meet patient safety guidelines.

Case Studies

Metropolitan Hospital Center, East Harlem

One of the country's oldest public hospitals, the Metropolitan Hospital Center in East Harlem has five inpatient psychiatric units in addition to outpatient areas with access to a gymnasium, outdoor patio, classrooms for adolescent patients, and activity therapy rooms. It is an older facility with office suites built within the inpatient areas, providing caregivers immediate access to patients.

Ever-evolving patient safety guidelines mandated improvement to the inpatient facility physical environment, with specific attention to doors and hardware. Both mortise and cylindrical knob locks were in service at the time of the initial audit. The older mortise knob locks (heavy-duty iron lock cases) were installed in the 1960s and still in service.

Source: Creative Commons, Beyond My Ken
https://commons.wikimedia.org/wiki/File:Harlem_Hospital_Center_Lenox_Avenue_facade.jpg

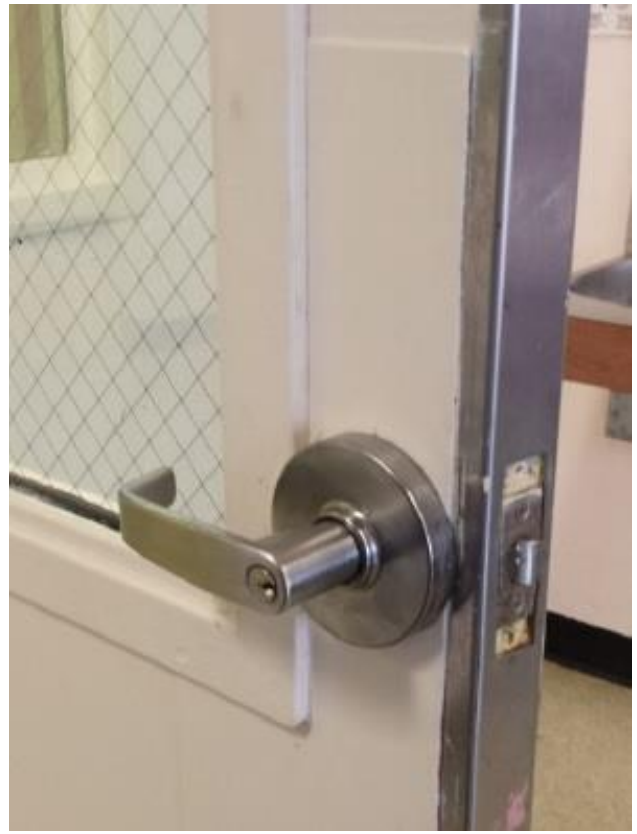
Metropolitan Hospital Center, East Harlem

Recent additions and function changes were key-in knob/lever cylindrical locks, sometimes installed above the original mortise locks.

As a functioning hospital housing 122 inpatient beds, providing new hardware in this active environment presented many challenges. The goal was to keep disruption to a minimum while achieving a completion deadline in advance of inspection by the state and federal agencies. The facility made it clear that the existing hollow metal doors, hanging since the 1960s, were to remain in place. Thus, the new hardware had to:

- meet new patient safety guidelines
- work with existing doors, and
- integrate with existing key systems.

Grade 1 mortise and cylindrical patient safety hardware (approved by NYS-OHM) was selected for its ability to maintain the master key system, thus allowing the hospital to reuse the existing doors.



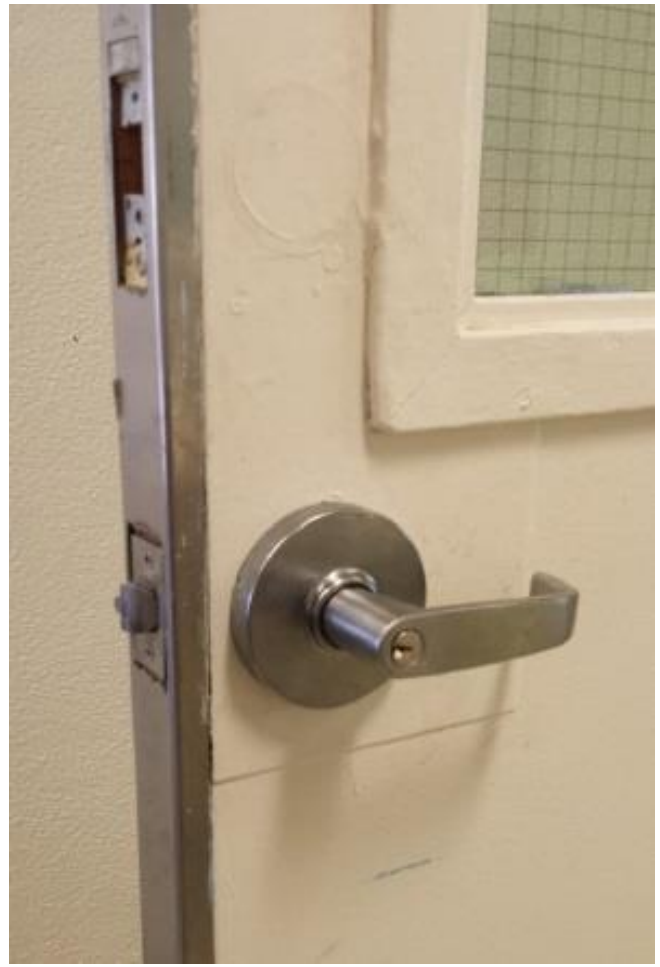
Example of door requiring new patient safety hardware. It is actually installed higher than ADA guidelines allow.

Metropolitan Hospital Center, East Harlem

Working alongside caregivers and patients required constant collaboration. Noise, dangerous tools, and disruption to patient routines were managed door by door.

Mortise lock retrofits were somewhat routine, but many cylindrical lock retrofits proved to be a challenge as their installation was sometimes unconventional. Flush, hollow metal doors with oversized windows were perhaps the biggest challenge to the no-new-door mandate. Originally equipped with mortise locks, these doors had cylindrical locks installed above the original locks, thanks to some handy metal shop work. The new lock height was above ADA guidelines and left little room for newer hardware with special ligature-resistant lever trim. These locks were moved back to the original height, with filler plates covering up the old location.

There were similar doors with lever-style cylindrical locks that once housed mortise locks. Again, a metal shop fabricated cover plates that allowed the retrofit.



Example of a door needing new patient safety hardware

Metropolitan Hospital Center, East Harlem

A classroom function ligature-resistant lever set is shown that is installed back to proper height and with minimal door modification. Paint crews applied the final touches on the doors (not shown).

About 20% of the doors required cylindrical locks versus mortise.

The installer was able to retrofit 250 doors on schedule and allowed the hospital to reuse and provide new purpose to old doors while meeting today's safety regulations.

New ligature-resistant cylindrical lock

Please remember the test **password FUNCTION.** You will be required to enter it in order to proceed with the online test.

Erie County Medical Center

As the number of patients in need of trauma and emergency care continued to rise, the Erie County Medical Center (ECMC) needed a new, larger facility that would allow them to handle an ever-growing volume of patients.

The new $25 million Behavioral Healthcare Center of Excellence at the ECMC houses a comprehensive psychiatric emergency program, outpatient areas, and inpatient facilities to serve mental health patients across Western New York. The center expanded their emergency behavioral health facility from 6,500 to 18,000 square feet. The project included the consolidation of both ECMC and Buffalo General's outpatient programs, resulting in 180 mental health inpatient beds.

To meet the latest safety standards and for the protection of the patients, Grade 1 cylindrical locks with crescent handles were specified for approximately 800 doorways.

Source: Creative Commons, D-Day
https://commons.wikimedia.org/wiki/File:ECMC.JPG

Bronx Behavioral Health Campus

In January 2016, the Bronx Behavioral Health Campus officially opened its doors at a cost of $350 million. The 436,310-square-foot development includes the Bronx Psychiatric Center (a 156-bed facility that provides both inpatient and outpatient services for adults), the NYC Children's Center-Bronx Campus for childcare (86 beds), and a 188-bed residential village.

The residential village comprises three buildings:

- One building is an entirely independent living facility with 48 beds.
- Another building is a 96-bed residence serving as "transitional living."
- The third facility has 44 beds for residents needed 24/7 crisis care.

To ensure the safety of the patients of the Bronx Psychiatric Center, mortise locks were installed in 500 doorways.

Summary

Important Points

- Patients of inpatient psychiatric facilities are considered at high risk for suicide. In US psychiatric facilities, the most common method of suicide is hanging, with 90% of inpatient suicides happening in the patient's bedroom, closet, or bathroom.
- Common areas of concern in psychiatric inpatient units are ligature attachment points that present a hanging risk, either from a sitting or kneeling position.
- Patient safety hardware is designed to mitigate the following risks: self-harm, harm to others, barricade, and contraband.
- A lockset can be used for ligature attachment in three ways: pulling down, pulling up and over the top of the door, and transverse attachment (tying something around the latch edge of the door, utilizing both the inside and outside handles).
- In 2014, NYS-OMH created a patient safety risk assessment by patient type. NYS-OMH recommends products to meet that risk level (low, medium, and high) for various areas within the facility.
- Advancements in design have led to the development of ligature-resistant patient safety hardware that meets ADA standards.
- Specification considerations and applications for safety hardware that need to be factored into the design of behavioral health environments include ADA compliance, ligature resistance (looping), contraband ligature resistance, safety latches, antibarricade applications, key override of thumbturns, and high-security/vandal-proof applications.
- Level of risk and function must be considered to select the best safety hardware options for each application.

References and Resources

Hunt, James M., and David M. Sine. “Design Guide for the Built Environment of Behavioral Health Facilities.” Facilities Guidelines Institute, 2017, https://www.fgiguidelines.org/wp-content/uploads/2017/03/DesignGuideBH_7.2_1703.pdf. Accessed Mar. 2021.

Knoll, James L. “Inpatient Suicide: Identifying Vulnerability in the Hospital Setting.” *Psychiatric Times*, vol. 30, no. 6, 2012, http://www.psychiatrictimes.com/suicide/inpatient-suicide-identifying-vulnerability-hospital-setting. Accessed Mar. 2021.

“Patient Safety Standards, Materials, and Systems Guidelines.” New York State Office of Mental Health, 2017, https://www.omh.ny.gov/omhweb/patient_safety_standards/guide.pdf. Accessed Mar. 2021.

“Special Report: Suicide Prevention in Health Care Settings.” *The Joint Commission Perspectives*, vol. 37, no. 11, 2017, https://www.jointcommission.org/-/media/tjc/documents/resources/patient-safety-topics/suicide-prevention/november_perspectives_suicide_risk_reduction.pdf?db=web&hash=236585A71D0B5B2D0DAB5DBBB8BA8EE6. Accessed Mar. 2021.

Williams, Scott, et al. “Incidence and Method of Suicide in Hospitals in the United States.” *The Joint Commission Journal on Quality and Patient Safety*, vol. 44, no. 11, 2018, 643-650, https://doi.org/10.1016/j.jcjq.2018.08.002. Accessed Mar. 2021.

Conclusion

If you desire AIA/CES, state licensing, or CE credits for another organization, please click on the button to commence your online test. A score of 80% or better will allow you to print your Certificate of Completion; you may also go to your AEC Daily Transcript to see your completed courses and certificates.

For additional knowledge and postseminar assistance, click on the Ask an Expert link.

If you have colleagues who might benefit from this seminar, please let them know. Feel free to revisit the AEC Daily website to download additional programs.

MORE ›

Questions? Ask an Expert – click here

Click Here to Take the Test

Exit