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US Army Medical Command, Assistant Chief of Staff, Facilities
US Army Health Facility Planning Agency

Army Medicine G9 Facilities Corporate CONOPS

Safe Patient Handling and Mobility

In partnership with
Georgia Institute of Technology, SimTigrate Design Lab
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Section 1: Background

One of the Army Medicine's transformational goals is to transition from a "healthcare system to a System for Health," which is a deliberative shift from episodic care to a standardized, longitudinal health model. An essential component of the health delivery model is a physical environment that facilitates the delivery of health services to all of the US Army Medical Command's (MEDCOM) beneficiaries. Army Medicine health facility planners utilize a series of Concept of Operations (CONOPS) to translate the health delivery model into physical setting characteristics. CONOPS are the methodology used to communicate the care process and the relationship of the physical environment to the planning and design teams, as well as to support the Military Treatment Facility (MTF) operators as they activate and/or operate the new or renovated facility. Historically, CONOPS development has three specific levels: Strategic; Design; and Operational. The MEDCOM G9 Facilities Directorate has built on these CONOPS and developed a methodology that incorporates the overarching process into a facility-centric Corporate CONOPS. The Assistant Chief of Staff for Facilities (ACSFAC) and the Health Facilities Planning Agency (HFPA) are under the OneStaff G9 element. Throughout these documents the G9 Facilities Corporate CONOPS will be referred to as the Corporate CONOPS. The Corporate CONOPS are a translational bridge to project specific CONOPS; they inform strategic, design and operational CONOPS to create a clear framework for high-level systems of practice, incorporating guidance from Health Affairs, The Surgeon General, World-Class Facilities Checklist, evidence based design (EBD) and generally accepted best practices. This framework is identified in Figure 1. The four types of CONOPS are summarized below.

Corporate CONOPS are developed outside of specific projects to reflect best practices within and outside the Military Health System (MHS), and serve as a link between the delivery of care and the physical environment.

Strategic CONOPS are developed in the early planning stages and define the goals and scope of the overall project, which include volume projections, scope of services and planning assumptions.

Design CONOPS contain departmental level programming information that articulate best operational practices, EBD characteristics, process flow, and functional adjacencies.

Operational CONOPS are developed in coordination with transition planning and focus on the shift from existing facilities to new or renovated spaces focusing on the mission and operations to include equipping, training and facility activation.

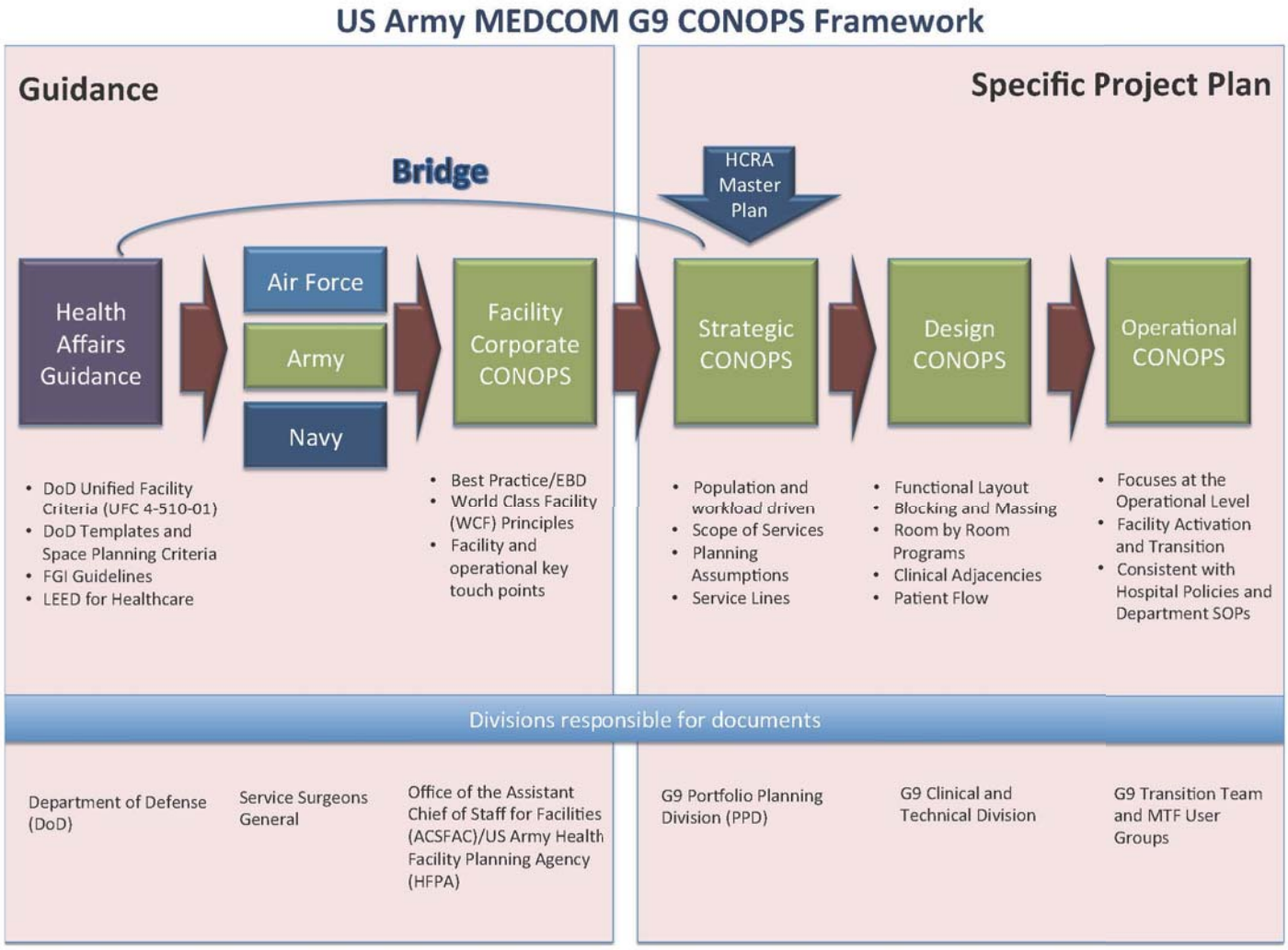

Figure 1: Relationship of G9 Facilities Corporate CONOPS to Strategic, Design and Operational CONOPS

Section 2: Purpose

The purpose of this document is to support safe patient handling and mobility (SPHM) in Army MEDCOM clinical settings by addressing the necessary facility planning and design considerations. While effective implementation of safe patient handling involves multiple specialty areas, this document provides only high-level guidance.

The key audience for this document includes:

- The G9
- The G4 Logistics
- Public Health Command
- MTF: Clinicians (OT, PT, Safety Officers, Rehabilitation Services)
- Nursing Education
- Occupational Health
- Environmental Services

The guidelines in this document are not all inclusive and other DoD or MEDCOM health facility guidance applies, including the World-Class Facilities Checklist. This document provides guidance on the specific design considerations that need to be addressed to support SPHM, beyond what is considered good standard practice for all clinical settings.

Section 3: Care Delivery Overview

The provision of healthcare often necessitates moving, repositioning and supporting early mobilization of patients who require varying degrees of assistance. Ensuring that movement for both staff and the patients is safe is the primary role of a Safe Patient Handling Program. The implementation of safe patient handling programs includes education, equipment and standard operating procedures all working together towards for a common goal.

Knowing the population to be served and the resources available is key to a successful integrated approach to ergonomic support and health. The National Institute of Occupational safety and Health (NIOSH) issued a revised lifting equation that provides documentation that no worker should lift more than 51 pounds and notes that the calculations do not apply to Health Care Workers because they do not lift stable loads, those with handles or that can be held close to the body (Waters, Putz-Anderson, & Garg, 1994). Because of the unique nature of patient handling and mobilization, Waters (2007) determined that Health Care Workers are at increased risk for Musculoskeletal Disorders when lifting, pushing, pulling or carrying more than 35 pounds. The 35-pound limit/ ceiling should be further reduced if the Health Care Worker is lifting in a restricted space, while sitting or kneeling, near the floor, twisting, one handed or with arms extended. The 35-pound limit should also be reduced if the Health Care Worker is working longer than an eight hour shift, or if the Health Care Recipient is combative, cannot follow directions or has physical or medical conditions that impact lifting and moving them (Waters L, 2007). Consequentially, according to the Bureau of Labor Statistics, nursing remains at the top of the list for nonfatal musculoskeletal work-related injuries. As the population ages and becomes more overweight as a whole, and the average age of nursing staff grows older, this problem has the potential to become even greater if it is not addressed systemically. The importance of safe patient handling and mobility reaches across many departments so the impact it has to the greater system is significant. When properly implemented, a Safe Patient Handling Program has direct and indirect impacts on the system.

The direct impacts include:

- Reduced worker musculoskeletal injury
- Reduced incident reports at the facility
- Improved and earlier patient mobility
- Reduced patient falls
- Reduced staff time to transfer a patient (process)

The indirect impacts with positive system effects include:

- Reduced skin sheers
- Increased compliance with equipment use
- Reduced lost time from injured staff
- Improved recruiting and retention of staff

Section 4: Functional and Design Implications

Patient: Patient processes will vary based on the nature of their visit as well as the patient's level of functioning. All care encounters will include initial introduction to the SPHM policies and procedures at the point of registration or check in to the unit. This will include an explanation of the patient's rights and responsibilities for ensuring their safety as well as the safety of the staff. Potential scenarios describing patient experiences are as follows:

a. A patient using a wheelchair arrives at the outpatient clinic for an annual physical. Exterior signage directs the patient to the parking lot closest to the clinic, and the patient navigates from the parking lot to the registration desk using the main walkways and entrance. After checking in the patient is escorted to a standard exam room where the staff have already placed a floor-based lift. The nurse explains to the patient that for their own safety and the safety of the staff s/he will be lifted onto the exam table using the lift with a sling. The patient is given the opportunity to ask questions about how the lift works. Once the patient is comfortable with the use of the lift, the patient assists the nurse to properly position the sling and the nurse connects it to the floor based lift. The patient is gently lifted out of their wheelchair, positioned over the height adjustable exam table, lowered onto the exam table and the sling is left in place, unless the exam requires it to be removed. After the doctor completes the exam, the nurse comes back into the room to assist the patient in re-positioning and attaching the sling and uses the lift to move from the table back to the wheelchair.

b. A bariatric patient suffering from a leg injury is driven to the entrance of the Emergency Department by a family member. Due to the injury, the patient is unable to independently get out of the car. A medical attendant uses a

bariatric sling with the overhead ceiling lift in the Emergency Department entrance overhang to safely ease the patient out of the car and into a wheelchair. Inside an exam room, the exam bed is already outfitted with a sling and bariatric rated ceiling lift is used to lift the patient from the wheelchair onto the bed. Once the patient is placed on the sling the patient can now be transferred using the ceiling lifts throughout the facility.

c. A Soldier recovering from lower extremity amputation at an inpatient rehabilitation unit benefits from early mobilization under constant supervision from their therapist. Soon after the surgery, the Soldier is comfortable assisting the nursing and rehabilitation staff with the ambulation sling and ceiling lift. The Soldier is able to balance on the side of the bed and increase weight bearing with the new prosthetic leg. Not long after that, the Soldier masters using the ceiling lift to go from sitting on the edge of the bed to standing and is able to walk into the bathroom and down the hall to the physical therapy department without risking a fall by using the ambulation track installed throughout the corridors.

Staff Flow: During the morning safety huddle, the SPHM program unit champion reviews the current patient handling and mobility needs on the unit and reviews the procedures to follow with the care team. The unit champion works with the care teams to ensure they have the appropriate slings and equipment based on the individual needs of their patients for that shift. At the end of the shift, the unit champion surveys the unit, returning one overhead motor to its charging station and ensures that the nurse servers in the patient rooms have been restocked with appropriate clean slings and repositioning sheets. Potential scenarios describing staff experiences are as follows:

a. A new nurse joins the care team, and the unit champion has them work alongside an experienced nurse while they select the appropriate sling. The new nurse is guided through correctly positioning the patient in the sling and connects it to the ceiling lift to take a dependent patient out of the bed and into the bathroom for toileting.

b. A nurse needs to clean a wound on a patient's leg and retrieves a limb support sling from the nurse server. Attaching the sling to the ceiling lift to elevate the leg the nurse cleans the patient's wound and replaces the dressing without having to hold up the limb.

Design Implications: SPHM can be integrated into the built environment during a new building project or as part of a renovation project. The first step is to conduct an assessment of the existing facility or to analyze the anticipated patient and staffing populations for the new facility or clinical area. The available resources and specific needs should be clearly defined in order to ensure that the proposed solutions will support the implementation of the SPHM

procedures. The scale and type of facility (large medical center, community hospital or clinic) will also impact the design decisions for SPHM.

	Design Implications
1.	Design adequate storage space into every nursing unit to store a supply of clean slings and repositioning sheets convenient to patient areas
2.	If floor based lifts will be used, provide adequate and accessible storage space so that lifts can be easily accessed and charged
3.	Use traverse track arrangements in all patient and treatment rooms where possible
4.	Bathroom door and patient bed should be aligned and sized in a way that facilitates unobstructed movement of patients along a lift track
5.	Determine the priority accessibility points in the patient bathroom (toilet, sink and shower) and design the layout of the track to provide access to the priority areas while maintaining privacy and safety
6.	Lift track placement in the ceiling needs to be done in concert with placement of the headwall, boom, bed position and other ceiling mounted items to ensure that they do not interfere
7.	Electrical outlets for charging or continuous charging lifts need to be located at a convenient height for ergonomics for lift motors and in storage areas for floor based lifts
8.	Plan for the lift motor and daily sling supply to be housed in the staff zone of the patient room for point of care delivery
9.	Even if budgets do not allow for lift motors for every room, ceiling tracks should be installed during initial construction to achieve track coverage in 100% of the rooms
10.	Ensure that lift equipment does not interfere with other fixed or mobile equipment, especially in diagnostic and treatment spaces such as radiology and catheterization labs
11.	In multi-bed spaces, such as the PACU, consider installing a straight track over the row of beds to serve all beds with one motor
12.	Provide storage space for wheelchairs and lifts, if not ceiling mounted, at the Emergency Department and other entry points for safe vehicle extraction and transfers
13.	Provide overhead clearance for floor-based lifts at the Emergency Department entrance
14.	Sizes of rooms and door openings into patient rooms and bathrooms need to accommodate bariatric patients
15.	Minimize transitions or thresholds in flooring between different rooms
16.	Consider the rolling resistance of flooring surfaces and the impact on moving patients

Table 1: Design Implications of Safe Patient Handling and Movement

Section 5: Key Touch Points

There are 8 types of patient handling activities that occur at different stages of the care process and must be addressed in a SPHM program:

1. Lateral transfers
2. Ambulation
3. Limb support
4. Hygiene (toilet/shower)
5. Repositioning
6. Car transfers (ED)
7. Sit to stand
8. Activities of daily living rehabilitation.

The table below describes the full range of patient handling activities for both patients and staff by looking at the critical touch points that happen in 3 phases of the care process: offsite accessibility; onsite arrival and onsite clinical encounters.

	Patient and Families	Staff
1. Offsite Accessibility		
Operational	•Educate on safe patient handling policy, procedures and patient rights	•Educate staff on no-lift policy and impacts of improper patient handling •Train staff on all equipment (fixed or mobile)
Facility		•Provide training spaces outfitted with all types of lifting equipment and devices used in the facility
2. Onsite Arrival and Access		
Operational	•Ability to transfer from the **car** to a wheelchair and the ED •General entry point for all visitors and staff needs to be accessible for all people, including those arriving with ambulatory assistive devices	•Provide lift or procedure to lift patient out of vehicle when needed

	Patient and Families	Staff
2. Onsite Arrival and Access		
Facility	•Ambulance drop off will accommodate supportive transfer of patient to move into the facility •Wheelchair storage provided at entry points	•Designate appropriate lifting equipment for use at ED and other patient entrances for getting patients safely out of their vehicles, and provide storage nearby
3. Onsite Clinical Engagement		
Operational	•Safely supporting patient movement at different points in the care delivery: Lateral Transfers, Ambulation, Limb Support, Hygiene(Toilet/ Shower), Repositioning, Sit to Stand, ADL Rehabilitation	•Provide staff with operationally efficient systems to safely move patients to locations or positions for clinical encounters
Facility	• Ensure adequate lifting equipment and supplies in areas with the greatest likelihood of moving and handling patients: Patient Room, Diagnostics, Emergency Department	• Provide lift aides, storage and room sizes that can accommodate an uninterrupted patient care process. Lifts may include: mobile lift, floor lift, H track, or straight track. Consideration needs to be given to designing adequate door clearances and appropriate storage

Table 2: SPHaM Key Touch Points

Section 6: Physical Environment Examples and Analysis

This section reviews how SPHM practice has been physically supported in Army medical facilities as well as in other government and private sector locations. The case studies have been selected to highlight a variety of solutions around key challenges to provide guidance for a range of applications. These facility reviews are based on the goals identified in the relevant World-Class Facilities Checklist strategies. The Assistant Secretary of Defense, Health Affairs, developed the Military Health System World-Class Facilities Checklist, which identifies key components of a successful World-Class Facility (WCF). Appendix A provides a list of the key strategies excerpted from the full checklist, based on their relevance to implementing SPHM. These analyses demonstrate the variety of ways that SPHM can be supported by the physical environment and are not intended to be fully comprehensive evaluations. The following case studies are based on interviews with the safe patient handling champions within the facilities.

Madigan Army Medical Center

In 2008, the US Army Public Health Command conducted an ergonomic site assessment of the patient handling practices at Madigan Army Medical Center (MAMC) in Tacoma, Washington. Following the assessment recommendations, the facility was retrofitted, and a no-lift policy was established in 2010. MAMC provides an excellent example of a Safe Patient Handling Program Retrofit. This program covers all clinical areas of the hospital, as well as full coverage in complex areas such as the Cardiac Catheterization Lab and Radiology. The program also provides full coverage of both inpatient and outpatient physical therapy areas, now serving as a model for other facilities. The retrofitted ceiling mounted lifts in the Cardiac Catheterization Lab are shown below:

Ideal Design Elements	Reference	Challenges	Reference
An Assessment of the facility was done in SEP 2008; equipment purchased and program elements implemented in 2009; a no lift policy in place FEB 2010.	WCF 6	Initially ordered a limited supply of slings and repositioning sheets. Both are essential in accommodating all patients. Par level supply program not as effective as one with a pacing items approach.	WCF 60
The program includes tracking of all Safe Patient Handling training and continuous assessment to ensure that all staff maintain compliance.	WCF 6, 300	The existing conditions in the OR did not allow for ceiling mounted lifts. Since mobile lifts require more effort to access and operate, the compliance with the zero lift policy in the OR was lower.	WCF 5M
Lift specifications in all spaces were identical which helped to simplify staff training and compliance. Maintenance and sustainment was also streamlined.	WCF 6, 300	Based on the short length of stay, patients were not able to take advantage of the ambulation tracks in the hallways and the investment could return more benefits in other spaces.	WCF 5M
Lifts were installed in every adult and pediatric inpatient bedrooms as well as in PT, Radiology, Morgue, OR holding, Cardiac Catheterization Lab, PACU, and Education/Training Rooms. Majority of designs used the traverse track layout.	WCF 5M, 239	Only one room on each adult inpatient unit had bariatric lifts, which limits the ability to accommodate this patient population.	WCF 2029M

Table 3: Madigan Army Medical Center SPH Analysis

Figure 2: Lift in the Cardiac Catheterization Lab

VA Loma Linda Healthcare System

The VA Loma Linda Healthcare System in California has been improving upon their safe patient handling program during their renovation and new construction projects since 2008 when they received a commitment of funding focused on safe patient handling. While there was some existing patient handling equipment in place, there was little standardization across the facility making it difficult for nursing staff to gain familiarity and confidence with the equipment. Based on this previous experience, the team placed a high priority on using standard equipment in all the new projects. They put a lot of effort into anticipating the future patient handling needs in all the units so as to avoid costly and difficult to implement renovations. One of the biggest successes of their program is the design of the ceiling lift track and layout of the patient room that allows for patients to move from bed, to toilet and shower with one movement.

Ideal Design Elements	Reference	Challenges	Reference
All rooms are being retrofit to meet the FGI guidelines for patient handling.	WCF 6, 5M	Closing rooms down, for up to a week, for retrofit interfered with patient flow and admissions.	WCF 300
New construction designed to accommodate the anticipated bariatric patient population within the next 10 years	WCF 2029M	Limited solutions are available in the marketplace for bariatric suites.	WCF 300, 169
All acute care units should have at least one room designed to accommodate a patient who requires minimal lift using one piece of equipment from bed, to toilet, shower and ambulation activities. High risk areas benefit from 100% access for all patients, up to 770 lbs by ceiling lift without requiring a transfer or change of sling.	WCF 5M, 169, 374, 425, 428	Mock up rooms can be used to test equipment to minimize costly errors and integrate care providers into culture change and buy in.	WCF 300
Developing at minimum a triad team including engineering, SPH clinician and contracting officer for all retrofitting and future SPH designs facilitates continuum of care design to include outpatient clinics and home care setting.	WCF 300, 331, 374	Design, remodel and construction can be complex, so it is best to have staff continuity during design to maintain facility standardization efforts.	WCF 300

Table 4:Loma Linda Healthcare System SPH Analysis

Figure 3: Images from patient room to toilet and shower space with one continuous track

Figure 4: Images of toilet and shower space within patient room with one continuous track

Christiana Care Health System

Christiana is a not-for-profit two-hospital system in Delaware with 900 beds total. They are a level one trauma center and the largest birthing center on the East Coast. The facilities are a combination of new construction, where lifts were designed into the rooms and existing facilities that have been retrofit to add ceiling lifts. Since 2006 ceiling lifts have been incorporated into the cost of projects for all new construction. They have lifts in all Med Surge rooms as well as Labor and Delivery rooms including the Delivery Operating Rooms, there is at least one lift per unit for the perinatal beds and in the PACU, but there are no lifts in psychiatric unit or operating rooms.

Figure 6: Hand controls and ED

Figure 7: Labor and Delivery Operating rooms

Ideal Design Elements	Reference	Challenges	Reference
All rooms are equipped with standardized motors with a minimum capacity of 550 pounds.	WCF 5M	Found that lifts were used less frequently when they were not standardized.	WCF 6, 300
A portion of rooms were outfitted with either 770 or 1,100 pound capacity motors (otherwise identical to the 550 pound motors) with hand controls for taking the patients weight. The doors to these rooms are 60 inches wide.	WCF 169	Operating rooms have air assist mattresses because the ceiling height and additional equipment in the room does not allow for a fixed lift to be used.	WCF 169
All Labor and Delivery rooms have lifts that are used through stage 2 of labor reducing the need for staff to support patient limbs. Operating rooms in the suite also have lifts while all other OR's do not.	WCF 5M		
Dialysis unit has lifts that run on a split rail system between 3 to 5 bays.	WCF 5M		

Table 5:Christiana SPH Analysis

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Section 10: References

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Appendix A: World-Class Facility Checklist (WCF)

The review of the World-Class Facility Checklist (WCF) was conducted to identify the strategies that support the **World-Class Strategies/Objectives:** Patient lifts relates to the following strategies/objectives: The strategies that have been designated as mandatory (M) by TMA strategies are indicated in bold typeface and with a 'M' following the strategy number italics.

#	STRATEGIES
5M	**Install ceiling or wall-mounted lifts in all mission appropriate acute and intensive care inpatient rooms and in other departments where appropriate, i.e. Emergency Department.**
6	Institute an integrated facility-wide Lift Program.
60	Decentralize staff support spaces (i.e., charting, supplies, medications) proximate to patient rooms while enabling appropriate staff collaboration and communication.
90	Perform interior transportation study for entire facility.
169	Provide assistive devices (e.g., headwall rails, larger bathroom doors, bathroom location)**.**
239	Design to accommodate future expansion.
300	Ensure that all caregivers and other staff are properly trained, equipped, fit and otherwise fully prepared to perform their assigned jobs.
327	Demonstrate superior performance for work-related injuries and illness against standardized industry metrics at greater than 90th percentile.
330	Routinely involve patients, patient families, and clinical staff in reviewing and determining the process of care.
331	Ensure patients are provided with complete information about their care that is appropriate for their level of healthcare literacy so they can make informed decisions and fully participate in all decisions about their care.
333	Respond openly, promptly, and honestly when patients are injured by informing the patient and/or patients designated representative, as appropriate, of what has happened and what will be done to remediate any injury and mitigate further injury.
334	Investigate the cause(s) of an adverse event and report the findings to the patient and/or patient's designated representative as appropriate.
374	Demonstrate proactive and relentless vigilance in avoiding preventable patient harm.
425	Implement the most recent set of "Safe Practices" endorsed by the National Quality Forum.
428	Comply with the most recent National Patient Safety Goals and related specific expectations set by The Joint Commission.
2004	Involve the clinicians, patients, and families in the facility development process.

#	STRATEGIES
2006	Use empirical research and other measures of best practice to guide the design and operation of the facility.
2025	Provide valet parking at main patient entrance.
188	Careful selection of materials with clean-ability a key consideration.
274	Ergonomically evaluate work areas.
357	Provide a physical barrier-free environment that exceeds minimum Architectural Barrier Act (ABA) requirements.
2001M	**Design patient room with family zone to support family involvement in care delivery.**
2020M	**Maximize the simplicity and minimize the number of steps, and effort needed to approach, arrive, drop off, park, enter, and find one's destination.**
2022M	**Minimize travel distance, path complexity, and open space without supports between bed and bathroom in patient rooms.**
2029M	**Design and organize infrastructure elements such as primary structural, mechanical, and circulation systems to accommodate changing program needs over time.**