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2022 FGI *Guidelines* Benefit-Cost Analysis

Implications of changes to the 2022 Guidelines for Design and Construction *for hospitals, outpatient facilities, and residential care facilities*

by the 2022 FGI Benefit-Cost Committee

Changes incorporated into the Facility Guidelines Institute's (FGI) 2022 Hospital, Outpatient, and Residential *Guidelines for Design and Construction* documents improve program flexibility, reduce risk, and offer greater consistency between documents. A number of these improvements have the potential to reduce costs. Although some facility types may have a small increase in capital costs due to the changes in the 2022 *Guidelines*, the benefits to operational efficiency, patient care, and patient and staff safety largely outweigh any such impact. As well, changes in the 2022 edition may lead to reductions in facility operating costs, improved patient and material flows, and elimination of duplicate functions.

These conclusions were reached by the FGI Benefit-Cost Committee (BCC) after a detailed study comparing both the benefits and costs of changes from the 2018 to the 2022 edition of the *Guidelines*. The BCC received assistance in this process from other members of the 2022 Health Guidelines Revision Committee (HGRC) and outside subject matter experts. This report summarizes their findings.

Benefit-Cost Analysis Process

Since releasing its first cost analysis on the 2014 *Guidelines* documents, the BCC's goal has been to identify real-world benefits and costs of changes from one edition of the *Guidelines* to the next. During the 2018 and 2022 *Guidelines* revision cycles, the BCC identified both potential fiscal impacts and overall benefits of proposed changes to the documents. The HGRC used this information to inform its decisions as it considered proposals for change to the 2018 edition and comments on the draft 2022 edition. Once the *Guidelines* documents were ready for publication, the BCC reviewed the Hospital, Outpatient, and Residential documents to assess changes between the editions and analyze the impact of these changes when the 2022 *Guidelines for Design and Construction* documents are applied to the design and construction of a health or residential care facility.

To focus its review of the 2022 *Guidelines*, the BCC formed three subcommittees—hospital, outpatient, and residential—which thoroughly evaluated changes in each document. Committee members consulted independent architects, engineers, and contractors with health care expertise for assistance in preparing drawings and interpreting benefits and costs of new and revised requirements.

To accurately measure the monetary value of these changes, the BCC selected programs from six current health and residential care projects: a general hospital, a critical access hospital, a behavioral health hospital, a multi-specialty ambulatory care facility, and two nursing homes of different construction classification. Programs were acquired for projects in development that were designed based on the 2018 *Guidelines* and current industry practices. Detailed cost estimates, based on national averages for construction cost at the time of review, include multipliers for other typical capital development costs, such as design fees, permits, medical equipment, furnishings, and information technology equipment. Cost estimates in this report were developed with in-kind support from Turner Construction Company.

Changes in the 2022 *Guidelines* documents also feature intangible benefits to patients, staff, and visitors that are difficult to quantify in a way that's equivalent to cost. Accordingly, benefits have been described

in the hospital, outpatient, and residential overview sections of this report rather being summarized in a table.

It is important to note that the BCC and the HGRC believe a primary benefit of using the 2022 *Guidelines* in lieu of earlier editions is its inclusion of much-needed standards for new patient and resident care spaces. The 2022 Hospital *Guidelines* features minimum design and construction requirements for inpatient units (e.g., burn trauma, hospice, and geriatric patient care units) that previously did not exist. Both the Hospital and Outpatient documents provide minimum requirements for a new behavioral health crisis unit, and the reorganized Residential *Guidelines* has added design criteria for individuals receiving palliative care outside of a hospice facility.

Although inclusion of these spaces is not required by the *Guidelines*, where they are provided the requirements would need to be met. When assessing the cost impact of such spaces, the BCC noted these are "if/then" requirements for which added costs would be driven by the functional program rather than required first costs. When these "if/then" requirements were included in sample programs used for this study, the costs were applied.

The impact on design and construction costs revealed through the BCC's analysis is summarized in the table below. The "Basic Cost Impacts" column represents the minimum cost increase for newly added requirements as applied to the sample programs used for this study. It's important to note that the sample programs represent typical health and residential care projects. As such, they capture a broad range of requirements but not every change in the 2022 *Guidelines*. As well, potential cost increases from ASHRAE 170: *Ventilation of Health Care Facilities* and the *U.S. Pharmacopeia* are not included as these referenced standards do not fall under the control of the HGRC.

Facility Type	Basic Cost Impacts[1]
Hospitals	
160-bed general hospital	1.4%
12-bed critical access hospital	2.7%
122-bed behavioral health hospital	1.0%
Outpatient facilities	
Multi-specialty ambulatory care facility	0.7–1.3%[2]
Residential facilities	
180-resident nursing home (multiple-story of non-combustible construction)	0.2%
180-resident nursing home (single-story of combustible construction)	0.4%

[1]The numbers shown are percentages of construction cost for the facility programs reviewed.

[2]The low end of the cost range for this item reflects the cost increase for the base model facility analyzed for this paper. The high end reflects the additional cost if changes for all of the optional services and program elements not included in the base analysis program were applied.

Hospital Overview

The following summary—organized similarly to the structure of the 2022 Hospital *Guidelines*—outlines significant changes from the 2018 edition. Some of these changes may increase costs and some may reduce costs. Also mentioned are the benefits of changes, which may or may not affect cost.

Part 1: General

Disaster, Emergency, and Vulnerability Assessment

This new component of the safety risk assessment was added based on the recommendation of the FGI Emergency Conditions Committee, which developed a white paper in 2021. While the assessment is intended to build on the Centers for Medicare & Medicaid Services (CMS)-required hazard vulnerability assessment, it adds a layer of operational guidance that may have minor soft cost impacts. However, when balanced against threats from weather, terrorist acts, and other emergency conditions, the benefit of conducting the assessment may be invaluable.

Hospital Programs Used in the Study

160-bed general hospital – includes emergency department and observation unit; imaging department; surgical services and perioperative unit; separate procedural suite; pathology labs; obstetrical unit with cesarean delivery rooms, labor/delivery/recovery/postpartum rooms, and nurseries; medical/surgical beds; pharmacy; central sterile processing; kitchen; loading/receiving; administration; and helistop.

12-bed critical access hospital – includes emergency services, medical/surgical beds, surgery (including endoscopy and pre- and post-operative patient care stations), laboratory, pharmacy, support services, and administration.

122-bed behavioral health inpatient facility – includes 12 adolescent beds, 56 adult beds, 54 geriatric beds, dining, kitchen, administration, and support services.

Exterior Environment

Several changes were made to exterior wayfinding requirements for hospitals. Many of these are focused on improving access and patient satisfaction. A new requirement for a duress alarm outside the emergency department (ED) was added to increase staff awareness of need and prevent patient harm. These changes result in a site that's safer and more navigable with negligible cost increase.

Patient-Focused Considerations

Several changes in the 2022 *Guidelines* were introduced to address the needs of specific segments of the patient population when making choices about facility design. One such change is a directive to consider the needs of the elderly when designing specific units. Another is the requirement to provide clear color differentiation between floors, walls, and handrails. Color contrast between surfaces helps patients, staff, and visitors with reduced vision recognize these features more quickly and therefore navigate an environment with more confidence and fewer falls. These patient-centered concepts were first introduced in the Residential document.

Acoustic Design

The Acoustics Proposal Review Committee continued its work to ensure noise reduction criteria are appropriately described for all important components and adjacencies in a hospital. New in the 2022 edition is the requirement to provide a room, as opposed to a bay or cubicle, when providing telemedicine services. Where a facility provides a dedicated room for telemedicine, the change will have a cost impact, but the benefits of enhanced patient privacy and sound transmission support this fast-evolving technology.

Part 2: Hospital Types

Common Elements for Hospitals

Increased flexibility. The HGRC approved several changes that improve flexibility in the design of hospitals. A case in point is specialty hospitals, facilities that provide a limited range of services (e.g., surgery) and do not have the full complement of services expected in a general hospital. To acknowledge

this, the Hospital *Guidelines* now allows a flexible approach to applying the *Guidelines*, similar to the one described in the Outpatient *Guidelines*, that pulls the relevant service lines into the design requirements based on the functional program. This flexible approach has the potential to reduce costs for new hospitals.

Other proposals addressed options for using existing space in new ways. For example, the number of pre- and post-procedure care stations required for certain operating rooms (ORs) and procedure rooms can be reduced from two to 1.5 per procedure or operating room.

Changes like these, which add minimal costs or yield actual savings, provide significant new options for health care organizations and designers.

Place for meditation, bereavement, and/or prayer. In the 2018 edition of the *Guidelines,* each patient care unit was required to have such a space. While the intent of the HGRC was to make this support space available for each type of unit, stating this in the requirements for each unit led *Guidelines* users to believe this space could not be shared by multiple units. The 2022 edition clarifies that a "space for meditation, bereavement, and prayer" is the minimum requirement. In a children's hospital, this space is required to be in the same building as the pediatric intensive care unit.

Lactation room. After considerable debate by the HGRC, the Hospital *Guidelines* now requires a dedicated room for lactation support that can be used by staff and volunteers. An additional lactation room for visitors is recommended but not required. This provides a significant benefit to nursing mothers on staff at the cost of one small room per facility.

Nurse call systems. Requirements for specific staff duty stations and other hard-wired call system components that were previously mandated have been reduced in recognition of the increased use of evolving alternative forms of staff communication. Construction costs are therefore reduced, eliminating communication system redundancies while still allowing for more traditional systems where appropriate.

Laminar flow ceiling systems in ORs. Advancements in prefabricated ceiling systems for the surgical setting have created options for ceiling construction in the OR. Advantages such as laminar supply air plenums that simplify duct distribution, an integrated structure for light and boom assemblies, and off-site fabrication can improve installations while reducing construction schedules (and therefore cost). These installations offer logistical advantages particularly for renovation projects. To allow access to these benefits, the *Guidelines* now permits use of modular or prefabricated laminar flow ceiling systems, which may result in reduced costs.

Plumbing. A significant change in requirement has been introduced that reduces non-recirculated fixture branch piping for heated potable water from 25 feet to 10 feet. This change aligns with plumbing code updates and is based on National Institutes of Health research to limit the legionella risk in plumbing distribution systems. Cost impacts could be significant, depending on facility specifications and design solutions, with an even greater cost impact when renovating existing facilities with toilets located on exterior walls. Nonetheless, the benefit to patient and staff safety and improved patient outcomes is clear.

Commissioning of special systems. A requirement to test special systems before occupancy was moved to the appendix as a recommendation because it was believed to be an operational requirement. This may reduce cost but could increase risk regarding commissioning of these systems. Although these commissioning requirements have been removed from the *Guidelines*, it is likely that state and local AHJs will require documentation of initial and, in some cases, ongoing certification and training for these systems; therefore, care should be taken to confirm the specific requirements necessary for every project. Without such enforcement at the local agency level, removal of these commissioning requirements could pose a risk to patient and staff safety and effective systems operation once the facility comes online.

Specific Requirements for General Hospitals

In addition to the items discussed above from the chapter on common elements for hospitals, a few other changes in the general hospital chapter may provide benefits and/or affect costs.

***New service units in the 2022 Hospital* Guidelines**

Burn trauma ICU. Although burn units have been designed and built for many years, a baseline for appropriate design elements and features did not previously exist. To support the functional programming process, the burn trauma intensive care unit (ICU) section has been added to the *Guidelines* to inform users of the minimum standards necessary should such a unit be included in a facility. Highlights of the new section include:

- Radiant heat panels are required over the patient bed.
- In new construction, an OR must be readily accessible to the burn unit.
- Burn trauma patient rooms must be designed as protective environment rooms.
- Direct access between the patient room and a patient toilet room is required; in other words, use of a human waste disposal room in lieu of a toilet room is not permitted.

Recognizing the sensitivity and specific patient care requirements of the burn trauma ICU, this new section provides enormous benefit for aligning the physical environment with clinical best practices and supporting positive patient outcomes.

Hospice patient care unit and hospice/palliative care patient rooms. Like the burn trauma ICU, a new section has been included to provide minimum standards for hospice/palliative care units should they be included in a facility. In addition to the minimum requirements, the appendix offers guidance on patient room design considerations and patient and family amenities on the unit as well as provisions for the needs of patients, families, and staff within this specialty care environment.

Intensive care unit/room. Continuing to refine the minimum standards for improved infection prevention and patient outcomes, the 2022 *Guidelines* provides for the addition of one sink in every intensive care unit toilet room/human waste disposal room. While this adds cost, it provides a necessary sanitary benefit in the intensive care setting.

Neonatal intensive care unit (NICU). Room sizes and types in a NICU have been updated, reflecting the increasing complexity of equipment and care in the NICU environment and the range of special needs that may be necessary to provide appropriate care. Specific changes intended to improve patient outcomes that may have cost implications include the following:

- Single-infant rooms: increase in size to a minimum clear floor area of 180 square feet
- Multiple-infant rooms: increase in size to a minimum clear floor area of 150 square feet per infant
- Neonatal couplet care room, where provided: requires a minimum clear floor area of 300 square feet (150 square feet for bed + 150 square feet for infant)
- Neonatal couplet care room combined with LDRP: requires a minimum clear floor area of 435 square feet
- Broadened acoustic considerations

Cesarean delivery suite. Updates to the requirements for a cesarean delivery suite enhance clinical care and safety as well as flexibility when cesarean delivery is performed in an OR. Specifically, a long overdue clarification has been made confirming that a cesarean delivery room, if provided, must meet the requirements of an OR, which adds some cost for devices but aligns with appropriate infection prevention and patient safety protocols in the industry. In addition, the requirement for an infant resuscitation area

when an OR is used for cesarean deliveries has been clarified; it is now clearly stated that an 80-square-foot infant resuscitation space is required in the OR, as it is in the cesarean delivery room. This eliminates the option for a separate 150-square-foot infant resuscitation room.

Emergency care facilities. Many improvements have been included in the text to address trends and recent experiences in the field, particularly during the height of the COVID-19 pandemic:

Video surveillance at public entrances and duress alarms at lockable entrances. A response to Laura's Law in Massachusetts, this change adds minimal cost but reduces risks to patient safety and well-being and enhances the situational awareness of staff.

Flexible use of trauma/resuscitation rooms. These rooms are permitted to be subdivided to accommodate multiple patients if each subdivision meets all the requirements for a patient care station in a multiple-patient exam/treatment room. This option enhances the flexibility of patient care spaces in an ED.

Exam/treatment room for individuals of size. This room may be subdivided into two patient care stations when not in use for an individual of size as long as each meets the medical gas and electrical requirements for a patient care station in a multiple-patient room. While this makes the room slightly more expensive to build, it provides operational flexibility.

Increased size for a human decontamination room. The size of these spaces was increased from 80 to 100 square feet, with added electrical requirements, in response to the operational needs for initial care delivery in this critical intake space.

Option to include low-acuity patient treatment stations. In response to years of research and multidisciplinary review, minimum standards for a low-acuity treatment station have been added for EDs. Where implemented, these stations serve patients who do not need a bed and require less space than bays and cubicles. Inclusion of low-acuity treatment stations has the potential to reduce overcrowding in an ED.

Elimination of the requirement for a sink at a medication dispensing station. Where medication dispensing units, stations, or carts are used, a hand sanitation station is now permitted in lieu of a handwashing station. This change results in cost savings, and the infection prevention impact is marginal.

Relaxation of the requirement for a directly accessible toilet room for the sexual assault forensic room. This change allowing the toilet room to be located adjacent to the sexual assault forensic exam room may reduce cost at the expense of patient comfort and well-being in this very sensitive clinical environment.

New space options for serving behavioral and mental health patients

- Behavioral and mental health crisis unit (BHCU). A new section with design requirements for this specialized space also provides guidance on the programmatic requirements of a BHCU. While the added cost of creating such a unit is clear, the positive impact on the care environment in the ED as well as in the crisis unit itself is great and the beneficial reduction in length of stay and improvement in patient and staff safety are considerable and can result in operational cost savings.
- Flexible secure treatment room. This room is designed to swing between a space suited for ED patients with medical emergencies and a space that meets secure holding room requirements for the safety of behavioral and mental health patients. When behavioral health patients are being served, headwalls and other features are secured for patient protection.
- Behavioral and mental health treatment room. This ED treatment room is designed with ligature-resistant features for patient and staff safety.

Improved patient safety considerations for behavioral and mental health patients in spaces also included in the 2018 Guidelines

- Clarified patient safety requirements for a secure holding room. The HGRC added clarity around patient safety considerations to reduce self-harm and sentinel events in these rooms.
- Ligature resistance in a patient toilet room serving a secure holding room. Provisions have been added for a ligature-resistant toilet room readily accessible to where behavioral and mental health patients are treated.

Surgical services. Provisions for clinical operations in the OR suite have been updated.

Addition of separate storage for transport beds or gurneys. This change responds to the requirements for patient movement, reduces equipment congestion, and supports life safety in the semi-restricted corridors of a surgical suite.

Clean equipment and clean and sterile supply storage room. Changes were made to respond to the increasing demands for clean and sterile clinical support space in the surgical suite.

- Clarified requirements for the clean core. Minimum criteria have been further defined to support clinical function when a health care organization opts for this model of clean and sterile storage.
- Increased amount of clean and sterile supply storage. Responding to the need for levels of supply storage sufficient to support effective clinical operation and efficient turnaround times for ORs, the required amount of clean and sterile supply storage was increased to 300 square feet or 100 square feet per OR, whichever is greater.

Imaging services. A number of updates reflect the technology and care innovation that continue to drive evolution in the imaging department. For example, some design restrictions were loosened due to advances in imaging technology such as the development of new MRI systems that do not need cryogen venting.

- Clarifying language was added to indicate the *Guidelines* requirements apply to both single- and multiple-modality imaging systems.
- Clearances have been added for Class 1 and Class 2 imaging rooms, although they do not apply to locations where small mobile ultrasound or similar imaging devices will be used.
- Clearances have also been added for an anesthesia work zone in imaging rooms of any class where an anesthesia machine will be used.
- Requirements for system component rooms have been reworked to allow more flexibility in design. The system component room can open into Class 1 imaging rooms and also into Class 2 imaging rooms as long as no procedures meeting the definition of "procedural fluoroscopy" will be performed there. System component rooms may also be shared by multiple imaging rooms where this is permitted by the imaging equipment manufacturer.
- Omission of the control room door is now permitted in any Class 2 or Class 3 imaging room where the control room serves only one imaging room and has the same architectural details and environmental controls as the imaging room. In the 2018 edition, omission of the control room door was only permitted in a hybrid OR or a Class 2 or Class 3 fluoroscopy room that met these conditions.
- Flexibility was added to permit sharing of some support spaces (e.g., soiled workroom or holding room, equipment and supply storage) between the imaging department and other departments.
- New requirements have been added to improve the patient experience where waiting and sub-waiting areas are provided for imaging patients. Included is an optional requirement for patient sub-waiting areas to isolate patients with low levels of radiation.

- MRI suite requirements
  - It has been clarified that these requirements apply only to permanent MRI installations, not to portable MRI equipment.
  - Suite requirements now distinguish between MRI equipment with a static magnetic field of 9 gauss that is contained within the equipment and equipment from which the 9-gauss field extends beyond the scanner device. Suites with equipment that contains the magnetic field must follow the manufacturer's siting guidance, while suites with equipment with an extended static magnetic field must meet the design requirements in the *Guidelines*. (Please note that a correction from 5 gauss to 9 gauss was published as an erratum to the 2022 Hospital and Outpatient documents based on updated language in IEC 60601-1-2-33:2022.)
  - Requirements for a cryogen vent (quench) pipe system, where provided, have been clarified.
  - Omission of the MRI entry vestibule (termed the "control vestibule" in the 2018 Hospital document) is now permitted when the 9-gauss static magnetic field is contained within the MRI device.

Hemodialysis treatment area. Updates responding to the requirements for effective and safe care promulgated by CMS include:

- Space has been added for dedicated equipment and supply storage and a patient scale.
- Fluid disposal sink requirements have been added.
- Requirements have been added for a dedicated room for patients with special precaution needs to provide a space where contact transmission of infectious agents (e.g., hepatitis B) can be avoided.

Specific Requirements for Critical Access Hospitals and Other Small Hospitals

Clarification has been added that the requirements in this chapter apply to all hospitals with 35 beds or fewer, resulting in savings in both first cost and operational costs for small facilities providing essential services, often in underserved areas.

Increased flexibility has been provided by permitting inclusion of universal care rooms for diagnostic and treatment services. These rooms allow a combination of room types in one space to accommodate multiple levels of patient acuity as long as each room is designed for its most restrictive use. This flexible approach to patient care spaces can maximize room utilization and preserve staffing resources.

A cesarean delivery room is no longer required in a critical access or other small hospital, which allows cost savings for hospitals that do not provide obstetric services. Where obstetric services are provided, the location for the cesarean delivery room or an OR used for cesarean deliveries has been made more flexible; the minimum requirement is now for these facilities to be on the same floor as, rather than adjacent to, the LDR/LDRP-capable rooms.

Text requiring provision of a non-refrigerated body-holding room has been added to this chapter, which previously did not mention morgue service facilities. The lack of requirements in earlier *Guidelines* editions may have led to construction of full morgue facilities; adding this lesser requirement eliminates the cost of these more elaborate specialty rooms and systems where they are not necessary for the services provided.

Specific Requirements for Behavioral and Mental Health Hospitals

As part of a focus on sentinel event reduction, revisions and updates have been made to reduce ligature points and enhance patient and staff safety considerations throughout the hospital.

Geriatric patient care unit. Responding to the specific needs of an aging patient cohort and the provisions needed for appropriate care of these behavioral and mental health patients, this new section outlines

minimum requirements for a behavioral and mental health patient care unit designed for the provision of geriatric care.

Transcranial magnetic stimulation room. In response to the availability of this new therapy, guidance for designing this optional treatment room has been added in the appendix.

Facilities for intensive outpatient and partial hospitalization programs. These programs offer behavioral and mental health hospitals the flexibility to reduce inpatient length of stay and provide appropriate care settings for patients to continue treatment and return to daily life in a supportive and normalizing environment. Design requirements have been added for these optional spaces.

Specific Requirements for Mobile/Transportable Medical Units

Mobile and transportable units are a vital tool in providing access to appropriate care in many underserved communities, and the changes to this chapter reflect provisions needed to enhance the role of these units in delivering care to a community.

- To prevent long-term use of units that are not code-compliant, a definition of "temporary basis" was added to clarify which types of mobile units must comply with the requirements in the *Guidelines*. The definition states that "temporary" means the unit is on-site for no more than 6 months in any 12-month period. Requirements for mobile units that remain on site for less than 96 hours have been eliminated.
- Flexibility for Class 1 mobile/transportable units was enhanced by the following changes:
  - A mobile unit is permitted to have self-contained site utilities where the mobile unit will not be connected to a host facility.
  - Provision of hand sanitation stations is permitted in lieu of handwashing stations.
  - A cabinet or closet can be provided to meet the requirements for a clean workroom, a clean supply room, or a soiled workroom.
  - Clear corridor widths have been reduced to 2 feet 8 inches, and the minimum ceiling height has been reduced to 6 feet 8 inches.

Outpatient Overview

The following summary—organized similarly to the structure of the 2022 Outpatient document—outlines significant changes made in the 2022 edition when applied to the studied facility programs (see sidebar). Some of these changes may increase costs and some may reduce costs. Also mentioned are the benefits of these changes, which will not necessarily affect costs.

Outpatient Facility Program Used in the Study

Multi-specialty ambulatory care facility – includes primary and specialty care, neuroscience/occupational health, orthopedics/podiatry/sports medicine, infusion, vision, behavioral health, physical therapy/occupational therapy with activities of daily living suite, urgent care, imaging (radiology, mammography, computerized tomography, and ultrasound), ambulatory surgery center, dermatology, pharmacy (both hospital and retail), laboratory, sterile processing, and administration and other building support and public services.

Many changes were made with the intention of increasing design flexibility and reducing costs. However, it was found that—for the programs studied—design flexibility in ambulatory spaces does not always result in direct cost savings. Nonetheless, flexibility can provide benefits such as alternative design solutions and more efficient operational performance. Many of the changes meant to increase flexibility are noted in this report.

Part 1: General

Safety Risk Assessment

The primary change in this section is the addition of the disaster, emergency, and vulnerability assessment (DEVA) as part of the SRA. Built on the hazard vulnerability assessments many health care organizations already must perform, the new DEVA requirement may add a small amount of consultant cost but assures a comprehensive facility vulnerability assessment is performed rather than one based only on minimum requirements.

Acoustic Design

The HGRC added acoustic requirements for telemedicine rooms and updated required criteria in the tables for sound absorption, background noise, and sound isolation to improve communication and speech privacy.

The minimum absorption rating requirement for several room types and areas was increased from 0.15 to 0.20. Depending on how the finishes for partitions and ceilings are designed, this could result in a minimal cost increase. However, this change is considered helpful in reducing overall noise levels and protecting patients' health information.

For site exterior noise, acoustic requirements were relaxed and moved from the main text to the appendix. Although this doesn't necessarily provide direct cost savings, the HGRC recognized that compliance with exterior noise classifications and related requirements need not apply in outpatient settings in which there is often no control of the surrounding environment or, in some cases, the exterior façade construction.

Part 2: Outpatient Facilities

Common Elements for Outpatient Facilities

Accommodations for care of individuals of size. A modification to the requirements for grab bars in toilet rooms designated for individuals of size now requires these to be adjustable/foldable and mounted on a horizontally movable track. This cost increase is justified by the benefit of giving individuals of size the ability to independently place the grab bars where needed.

Imaging services. For the 2022 edition, clarifying language and design flexibility have been added to the requirements for imaging facilities. As in the 2018 edition, the requirements for imaging facilities in the Hospital and Outpatient documents are nearly identical with a few minor tweaks where these facilities are in an outpatient setting. The requirements continue to apply only where specific imaging services are provided. See the description of changes to the imaging requirements in the Specific Requirements for General Hospitals section above.

Support areas. No modifications with a cost impact were made to this section in the common elements chapter. However, new references to the section from the urgent care center and infusion center chapters provide for improved staff support facilities. Sharing of these spaces with other services is permitted, although new space requirements may add minor costs in some cases.

Pharmacy. Minor changes were made to the requirements for compounding areas and related staff changing areas for sterile compounding in these higher-functioning outpatient pharmacy spaces. These changes will result in small cost increases but provide safer work environments for staff.

As hazardous drugs must be stored separately from non-hazardous drugs, a dedicated room for hazardous drug storage is now required where these items are part of outpatient pharmacy services.

In addition, other *Guidelines* requirements for pharmacy areas in outpatient facilities have been clarified, including where relevant *U.S. Pharmacopeia* or local requirements are to be followed.

Architectural details. Revisions made in the architectural details section in the common elements chapter provide clarity, support project flexibility, strengthen infection prevention measures, and foster patient safety.

The requirement for monolithic floor and wall base assemblies has been extended to soiled workrooms and soiled holding rooms, pharmacy compounding rooms and anterooms, and trauma rooms in freestanding emergency facilities. This small cost increase for flooring material improves the infection prevention measures for these spaces.

Previously monolithic ceilings were required in all restricted areas, but a revision has been made to allow use of a modular or prefabricated laminar (or controlled) flow ceiling system in operating rooms and Class 3 imaging rooms where certain conditions are met.

Special attention to requirements that support patient safety led to the addition of appendix table A2.1-c (Resources for Grab Bar Configurations), which provides information on the placement of grab bars.

Finally, revisions were made in the appendix to clarify the association between falls and flooring materials and characteristics (e.g., flooring transitions, floor patterns, floor contrast, floor reflectivity).

General and Specialty Medical Services Facilities

A section on special ventilation and exhaust systems was added to clarify the requirements for rooms where processes involving hazardous particulates or material grinding or cutting will be performed that could result in minor cost increases where these procedures are included in a facility.

Urgent Care Centers

The triage area must include access to language translation services and means to alert staff or local authorities if assistance is needed, potentially resulting in an operational/staffing impact.

At least one of the two patient care stations required as a minimum must be a single-patient exam room, yielding some minor facility cost increases.

More detail is provided for design of a multiple-patient exam room, but this information should not affect costs for the space and may provide opportunities for more efficient layouts and operations.

Design flexibility is offered through permission to share some spaces for different purposes; for example, a nurse station may share space with a reception and information area and initial patient interviews may take place in a triage area, a patient care station, or a consultation room. While the flexibility will reduce the impact of these changes, new staff support area requirements that add changing areas and needed space for storage will increase costs slightly.

Outpatient Surgery Facilities

Several changes were made to support flexibility in design:

- Omission of a clinical sink in a soiled workroom is permitted where an alternative method of fluid waste disposal is provided.
- Storage for clean equipment and clean and sterile supplies is permitted in one room or area or a combination of rooms and/or areas. The clean workroom of a sterile processing facility in the semi-restricted area is allowed to serve this purpose.

Language was clarified to allow for design of a clean equipment and clean and sterile supply storage room or area that is directly accessible to operating rooms arranged around it (this arrangement is often called the clean core). This should not affect costs but clarifies how these facilities can be designed.

Optional Services and Program Elements

Certain changes in the 2022 text of the Outpatient *Guidelines* affect optional programming decisions and services provided, so they would not apply to all facilities. Despite not being mandated in every outpatient facility, these changes would become required if the services or program elements were added in the functional program for a facility. The impact of adding such elements is reflected in the higher end of the cost range shown in the Basic Cost Impacts column of the table at the beginning of this document.

For a summary of major changes in the Outpatient document that do not appear in the functional program for the multi-specialty ambulatory care facility analyzed for this report, see the major additions and revisions essay in the 2022 Outpatient *Guidelines*.

Part 3: Ventilation of Outpatient Facilities

Included in the 2022 *Guidelines for Design and Construction of Outpatient Facilities* is the 2021 edition of ANSI/ASHRAE/ASHE 170: *Ventilation of Health Care Facilities*, dated November 2021, which incorporates addenda c and d. The 2021 edition of Standard 170 is the first to present distinct ventilation requirements for outpatient facilities, divided into tables for general and specialized spaces.

Previous *Guidelines* documents and Standard 170 editions required only a few outpatient facility types to meet the requirements of Standard 170 and only in some spaces. For most outpatient facility types, the 2018 *Guidelines* referred to local codes for HVAC requirements.

The cost impacts of the changes to the ventilation requirements in the 2022 Outpatient *Guidelines* and 2021 edition of Standard 170 have not been evaluated as part of this study.

Residential Overview

This summary overview—organized similarly to the structure of the 2022 Residential *Guidelines*—outlines significant changes made in the 2022 edition when applied to the facility programs for 180-resident nursing homes using different types of construction. Some of these changes increase costs and some reduce costs. Also mentioned are the benefits of changes, which will not necessarily affect costs.

Many changes in the Residential document were made with the intention of increasing design flexibility and the hope of reducing costs. However, flexibility in residential spaces was not always found to have direct cost savings for the nursing home programs studied, although it can provide benefits such as alternative design solutions and more efficient operational performance and could provide savings in the right circumstances.

Residential Facility Programs Used in the Study

180-resident nursing home (multi-story of non-combustible construction) – includes 180 private resident rooms with in-suite shower and toilet. Each resident floor will contain a 60-resident nursing unit with dining, multi-purpose, and activity areas. Rehabilitation therapy facilities and a dialysis clinic on the first floor provide both inpatient and outpatient services.

180-resident nursing home (single-story of combustible construction) – includes 180 private resident rooms with in-suite shower and toilet. The layout has been organized into five nursing units of 36 residents, each with dining and activity areas. Multi-purpose, therapy, and dialysis clinic areas similar to those described just above are included.

Changes to requirements for renovations in nursing homes offer significant reductions in cost as they increase the allowable maximum occupancy to four residents in multiple-resident rooms. This change is intended to remove significant impediments from efforts to improve the quality of life for residents in existing multiple-resident accommodations.

Most of the changes in the 2022 Residential document were part of the effort to improve consistency across the *Guidelines* documents. A significant number of the changes clarify text, and many items provide guidance for optional program components.

Based on the limited number of changes that directly affect required programs, the BCC used an abbreviated methodology to determine the costs associated with changes. In this approach, the changes were analyzed based on the proportional percentage of the base program affected. This allowed cost percentiles to be calculated without developing a cost model for the entire base program structure. The benefit-cost analysis of a specific facility type was limited to the evaluation of Chapter 3, Specific Requirements for Nursing Homes, as this is the facility type in the Residential *Guidelines* that has been adopted by the greatest number of jurisdictions.

Nursing homes with non-combustible construction and those with combustible construction were analyzed separately because use of these construction methods varies considerably across the country, with greater use of combustible construction in areas with more available land. This difference predominantly affected analysis of the methods employed to address the acoustic requirements for nursing homes with smaller dining areas (i.e., those that accommodate 40 or fewer occupants).

Part 1: General

Safety Risk Assessment

The primary change in this section is the addition of the disaster, emergency, and vulnerability assessment (DEVA) as part of the SRA. The DEVA is built on the hazard vulnerability assessments that many residential care organizations already must perform.

Acoustic Design

The HGRC added requirements for telemedicine rooms and updated required noise reduction coefficients in other spaces. The minimum absorption rating requirement for several room types and areas has increased from 0.15 to 0.20. This minimal change is considered helpful in reducing overall noise levels, protecting resident privacy, and improving speech intelligibility.

Requirements for dining rooms are now divided between those serving more than 40 occupants and those for 40 or fewer occupants. Requirements for smaller dining rooms were modified based on the different space use characteristics and acoustic performance needed in smaller spaces. Improved acoustic environments provide a particularly important benefit in residential environments as they facilitate communication and thus improve resident engagement and satisfaction.

In smaller dining areas in nursing homes using combustible construction, additional interventions are needed to achieve the required acoustic rating when compared to non-combustible construction, in which structural fireproofing is independent of the ceiling finish. The major cost factor in combustible construction is the need to provide an additional acoustic ceiling finish to the fire-rated drywall assembly. This can be accomplished either by using an additional acoustic tile ceiling system or—where residential aesthetics are a priority—an acoustic plaster treatment; acoustic tile was used in this cost analysis. In non-combustible construction, where acoustic tile ceilings are typically provided below the ceiling structure, there is a minimal anticipated cost increase.

Part 2: Common Elements for Residential Health, Care, and Support Facilities

Support Areas for Dining, Recreation, and Activity Areas

A public handwashing station was added as a requirement for each dining room and activity room in a residential care facility. Easy access to handwashing facilities for residents will contribute to improved infection control in these larger group activity locations with minimal increase in cost.

Diagnostic and Treatment Areas

Where an exam/treatment room is provided for a population that includes individuals of size, clearances must now be provided based on the size of the equipment and furniture to be used. These requirements were included in the Residential *Guidelines* to be consistent with requirements in the Hospital and Outpatient *Guidelines*.

Support Areas for Diagnostic and Treatment Areas

A requirement for a handwashing station or hand sanitation dispenser was added at soiled holding locations. In the 2018 Residential *Guidelines*, handwashing stations were required in soiled utility rooms, but not at soiled holding locations. When a hand sanitation dispenser is the selected option, the infection prevention benefit of this change can be achieved with minimal cost.

Part 3: Residential Health Facilities

Nursing Homes

Doors and door hardware. This section requires that doors to rooms containing bathtubs, showers, or toilets have measures to minimize the potential for resident entrapment in the spaces. Where doors to common tub/shower rooms open onto a rated public corridor, the option of outward swinging doors allows compliance with both fire rating and safety considerations. However, outward swinging doors necessitate the addition of a recessed alcove in these locations, resulting in added floor area; the added cost has been factored into the results of this report.

Resident room

Space requirements. Minimum area and clearance requirements have been added for resident rooms. These prescriptive size requirements were requested by various authorities having jurisdiction and were initially facilitated through a 2020 interim amendment in response to federal regulatory requests for criteria to be used in determining Medicare and Medicaid compliance. Existing performance-based clearance requirements in the *Guidelines* were used to determine these minimum size criteria and therefore this change does not affect facility costs.

Renovation. To avoid discouraging renovation of existing multiple-resident rooms in nursing homes, the maximum capacity of a room being renovated has increased from two to four residents. This returns the room capacity to that allowed for renovation prior to the 2018 edition of the *Guidelines*. This change will allow renovation of facilities with three- and four-resident rooms to improve the environment without needing to reduce the facility's census. This modification will significantly reduce costs for renovations of such multiple-resident rooms, but it also is likely to inhibit resident comfort in facilities choosing to take advantage of this allowance. No attempt was made to quantify the magnitude of these potential savings or effects on resident safety and comfort due to the many variables involved in renovations.

Individuals of size. To assure care providers have enough room to maneuver residents using lift equipment, minimum clearances were added to the 2022 *Guidelines* to accommodate expanded-capacity

portable equipment (e.g., beds, wheelchairs, lifts) and fixed equipment (e.g., exam tables) designed for individuals of size. Rooms for these residents require the following minimums:

- Clear floor area of 200 square feet in single-resident rooms with a fixed overhead lift
- Clear floor area of 197 square feet per resident in multiple-resident rooms with a fixed overhead lift
- Clear floor area of 219 square feet in single-resident rooms where mobile lifts will be used
- Clear floor area of 216 square feet per resident in multiple-resident rooms where mobile lifts will be used
- Clear dimension of 13 feet 2 inches in all resident rooms for individuals of size to accommodate resident mobility and transfer

Cost impacts for this modification will occur only where care for individuals of size is provided. The 2020 interim amendment added similar minimum areas and clearances for resident rooms for individuals of size. Minimal cost increases are anticipated from this change in the 2022 Residential *Guidelines* as it contains only minor differences from the interim amendment.

Dialysis facilities. A dialysis treatment area, including minimum clearances, handwashing facilities, and fluid disposal and water supply requirements, has been added to support nursing homes where dialysis services will be provided. The dialysis treatment area requirements are abbreviated requirements consistent with the dialysis requirements in the Outpatient *Guidelines* as appropriate for the residential care population. The assumption is that prior to the 2022 edition the designer would have used the outpatient requirements for standard practice guidance, resulting in minimal or no cost increase from the addition of this clarifying language.

Hospice patient rooms. The 2022 edition supports the delivery of person-centered care and a focus on promoting patient privacy and dignity and enhancing quality of life for hospice patients, their family, and their friends. Both the 2022 edition and previous editions require hospice patient rooms to be designed for single occupancy; however, exceptions added in the 2022 edition allow for double-occupant rooms to accommodate married couples, partners, siblings, a parent and child, and other close relationships when the need is identified in the functional program. Space for a family support zone is also required in the hospice patient room.

Conclusion

During every *Guidelines* revision cycle, members of the HGRC, volunteer subject matter experts, and FGI staff put in thousands of hours to update the content of the *Guidelines*. This effort is diligently monitored by the Benefit-Cost Committee throughout the cycle as its members assess the benefit and cost implications of initial proposals, the draft documents and subsequent comments, and—finally—each new requirement in the published *Guidelines* documents.

The HGRC's decision to accept a proposal or comment may be influenced when the BCC identifies its cost as high and benefit as low. For this reason, it is imperative that all HGRC members and others who submit proposals and comments strive to create *Guidelines* requirements that balance a fundamental level of patient, staff, and visitor safety and overall usability of health and residential care spaces with concerns about the continually increasing costs facing the U.S. health care system and the people it serves.

As demonstrated in this report, the 2022 FGI *Guidelines for Design and Construction* documents offer comprehensive and current design and construction standards that balance patient and resident safety with a cost-effective care environment.

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