



Behavioral and Mental Health Room Annotation

Design Elements, Related Outcomes, and Design Strategies

Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Landscaping	Layout (Overall); Space Configuration	Room for mindfulness activities (e.g., yoga, meditation, etc.)		HDR, Inc., 2019
	Caregiver health/support/respice	View to nature/natural landscapes		Frumkin, 2001; Liddicoat, 2019a; Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich et al., 2012.
	Improved job satisfaction	Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
	Minimize patient stress/anxiety	Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
		View to nature/natural landscapes		Frumkin, 2001; Liddicoat, 2019a; Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich et al., 2012.
		Outdoor spaces and views of nature		Karlin & Zeiss, 2006; Shepley, et al., 2022.
	Patient recovery	Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
		Outdoor spaces and views of nature		Karlin & Zeiss, 2006; Shepley, et al., 2022.
	Patient satisfaction	Smoking areas		Shepley, et al., 2022
		View to nature/natural landscapes		Frumkin, 2001; Liddicoat, 2019a; Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich et al., 2012.
	Improved patient healthy behaviors	Room for mindfulness activities (e.g., yoga, meditation, etc.)		HDR, Inc., 2019
	A healthy environment (reduced negative health effects)	View to nature/natural landscapes		Frumkin, 2001; Liddicoat, 2019a; Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich et al., 2012.
Safety; air quality	Smoking areas		Shepley, et al., 2022	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Handrail	Minimize stigma	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Accessibility; ease of use	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Improved access/wayfinding	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Caregiver safety; minimize risk of physical injury	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Efficient delivery of care	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Safe delivery of care	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Improved job satisfaction	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Patient control/ independence	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Safety; fall/injury prevention and improved mobility	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Safety; minimize risk of injury	Avoid handrails		Liddicoat, 2019b



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Handrail	Safety; reduce risk of harm to self or harm to others	Avoid handrails		Liddicoat, 2019b
		Anti-ligature items (e.g., safe sliding doors, continuous grab bars) and eliminate ligature points (e.g., standard doors, showerheads, bathroom fixtures, etc.)	S	HGA, 2020
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
Layout (Overall); Space Configuration	Change-readiness/ future-proofing	Ligature-resistant tactics (e.g., eliminate grab bars, fixture pipes, door hinges, etc.)	S	Beebe, 2018
		The design should reflect the organization's goals (e.g., population, rehabilitation, funding, risk tolerance, etc.)		Hunt & Sine, 2015
		Maximize therapeutic design potential by involving diverse groups of stakeholders		Hunt & Sine, 2015
		Organization's risk tolerance effects design (e.g., safest possible setting, home-like ambience, upgraded finishes, etc.)		Hunt & Sine, 2015
		Weigh the benefits of uniform features against differing patient requirements		Hunt & Sine, 2015
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		Sachs, 2020
	Minimize stigma	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Layout (Overall); Space Configuration	Minimize stigma	Well-organized, orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022.	
		Symbolic meaning and messages reinforce treatment goals and expectations		Karlin & Zeiss, 2006	
		Maximize therapeutic design potential by involving diverse groups of stakeholders		Hunt & Sine, 2015	
		Provide opportunities for social interaction		Shepley, et al., 2022	
	Accessibility; ease of use	Ligature-resistant tactics (e.g., eliminate grab bars, fixture pipes, door hinges, etc.)		S	Beebe, 2018
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)			Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Improved access/ wayfinding	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)			Karlin & Zeiss, 2006
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)			Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Enhanced security	Required safety/security features are concealed or as discreet as possible			Lundin, 2020
		Private and/or large shared rooms based on patient acuity/diagnoses and model of care			Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Space needed for additional staff when required to accompany a patient			The Center for Health Design, 2019
		Maximize direct visual observation of patients from security/staffing areas			Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout (Overall); Space Configuration	Caregiver health/ support/respite	Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
		Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
	Caregiver safety; minimize risk of physical injury	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Clear/consistent line of sight throughout the entire room (e.g., no blind corners or hiding places; first means of egress, etc.)		HGA, 2020; Karlin & Zeiss, 2006.
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Communication/ interaction with care provider/ emergency care	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Staff-patient consulting areas		Shepley, et al., 2022.
	Communication; staff to staff	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Efficient delivery of care	Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Well-organized, orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022.
		Weigh the benefits of uniform features against differing patient requirements		Hunt & Sine, 2015
		Indoor therapy (PT, OT, music, etc.)		Shepley, et al., 2022
		Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		Sachs, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout (Overall); Space Configuration	Safe delivery of care	Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Space needed for additional staff when required to accompany a patient		The Center for Health Design, 2019
		Ligature-resistant tactics (e.g., eliminate grab bars, fixture pipes, door hinges, etc.)	S	Beebe, 2018
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		Sachs, 2020
	Improved job satisfaction	Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Symbolic meaning and messages reinforce treatment goals and expectations		Karlin & Zeiss, 2006
		Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
	Minimize patient stress/anxiety	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Personal bathrooms dependent on patient acuity (shared bathrooms may be appropriate for higher acuity patients)		Liddicoat, 2019b; Sheehan et al., 2013; Shepley et al., 2016.
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Reasonable accommodations for service animal		Lambert et al., 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout (Overall); Space Configuration	Minimize patient stress/anxiety	Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Well-organized, orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022.
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Separate and secure women and vulnerable patient bedrooms from men and provide view from nursing station		VA Office of Construction & Facilities Mgmt, 2014
		Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
	Minimize undue strain during recovery	Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
	Patient control/ independence	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Well-organized, orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022.
		Access to options for acoustics		Shepley & Pasha, 2013
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Layout (Overall); Space Configuration	Patient recovery	Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.	
		Weigh the benefits of uniform features against differing patient requirements		Hunt & Sine, 2015	
		Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021	
	Patient satisfaction	Non-institutional/homelike spaces that feel welcoming and secure			Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Personal bathrooms dependent on patient acuity (shared bathrooms may be appropriate for higher acuity patients)			Liddicoat, 2019b; Sheehan et al., 2013; Shepley et al., 2016.
		Required safety/security features are concealed or as discreet as possible			Lundin, 2020
		Reasonable accommodations for service animal			Lambert et al., 2020
		Private and/or large shared rooms based on patient acuity/diagnoses and model of care			Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Well-maintained high-quality features and environment			Shepley & Pasha, 2013; Shepley et al., 2016.
		Well-organized, orderly spaces			Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022.
		Opportunities to personalize the room			Shepley & Pasha, 2013
		Symbolic meaning and messages reinforce treatment goals and expectations			Karlin & Zeiss, 2006
		Staff zones support performing routines in a professional and respectful manner			Olausson et al., 2021
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment			Sachs, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout (Overall); Space Configuration	Patient comfort	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Personal bathrooms dependent on patient acuity (shared bathrooms may be appropriate for higher acuity patients)		Liddicoat, 2019b; Sheehan et al., 2013; Shepley et al., 2016.
		Reasonable accommodations for service animal		Lambert et al., 2020
		Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Maximize therapeutic design potential by involving diverse groups of stakeholders		Hunt & Sine, 2015
		Separate and secure women and vulnerable patient bedrooms from men and provide view from nursing station		VA Office of Construction & Facilities Mgmt, 2014
		Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
		Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		Sachs, 2020
	Psychosocial support	Reasonable accommodations for service animal		Lambert et al., 2020
		Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout (Overall); Space Configuration	Improved patient engagement	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Maximize therapeutic design potential by involving diverse groups of stakeholders		Hunt & Sine, 2015
	Improved family presence and engagement in patient care	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
	Enhanced privacy	Personal bathrooms dependent on patient acuity (shared bathrooms may be appropriate for higher acuity patients)		Liddicoat, 2019b; Sheehan et al., 2013; Shepley et al., 2016.
		Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
	Improved patient healthy behaviors	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		No access to roofs or high places, open stairs, screen porches or elevator shafts		Liddicoat, 2019b
		Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Well-maintained high-quality features and environment		Shepley & Pasha, 2013; Shepley et al., 2016.
		Room for mindfulness activities (e.g., yoga, meditation, etc.)		HDR, Inc., 2019
		Indoor therapy (PT, OT, music, etc.)		Shepley, et al., 2022



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout (Overall); Space Configuration	Improved sleep quality	Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
	A healthy environment (reduced negative health effects)	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
		Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
	Reduced noise	Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Safety; fall/injury prevention and improved mobility	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Reduced risk of contamination	Personal bathrooms dependent on patient acuity (shared bathrooms may be appropriate for higher acuity patients)		Liddicoat, 2019b; Sheehan et al., 2013; Shepley et al., 2016.
	Safety; minimize risk of injury	No access to roofs or high places, open stairs, screen porches or elevator shafts		Liddicoat, 2019b
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Location of room should limit or provide no access to uncontrolled exits	S	The Center for Health Design, 2019
		Features supportive of social interaction, onlooker observation and physical retreat		The Center for Health Design, 2019



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout (Overall); Space Configuration	Safety; minimize risk of injury	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Safety; reduce risk of harm to self or harm to others	No access to roofs or high places, open stairs, screen porches or elevator shafts		Liddicoat, 2019b
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Private and/or large shared rooms based on patient acuity/diagnoses and model of care		Degl' Innocenti et al., 2020; Shepley & Pasha, 2013; Ulrich et al., 2012; The Center for Health Design, 2019.
		Space needed for additional staff when required to accompany a patient		The Center for Health Design, 2019
		Location of room should limit or provide no access to uncontrolled exits	S	The Center for Health Design, 2019
		Features supportive of social interaction, onlooker observation and physical retreat		The Center for Health Design, 2019
		Clear/consistent line of sight throughout the entire room (e.g., no blind corners or hiding places; first means of egress, etc.)		HGA, 2020; Karlin & Zeiss, 2006.
		Consider outboard toilet for staff visibility		HGA, 2020
		Ligature-resistant tactics (e.g., eliminate grab bars, fixture pipes, door hinges, etc.)	S	Beebe, 2018
		Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018
		No drop ceilings		Beebe, 2018
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		The design should reflect the organization's goals (e.g., population, rehabilitation, funding, risk tolerance, etc.)		Hunt & Sine, 2015



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout (Overall); Space Configuration	Safety; reduce risk of harm to self or harm to others	Maximize therapeutic design potential by involving diverse groups of stakeholders		Hunt & Sine, 2015
		Organization’s risk tolerance effects design (e.g., safety first, residential ambience, hospitality finishes, etc.)		Hunt & Sine, 2015
		Weigh the benefits of uniform features against differing patient requirements		Hunt & Sine, 2015
		Avoid features typical of hospital (e.g., 2’x4’ light fixtures, paddle-style hardware, gas outlets, nurse call systems, etc.)		Hunt & Sine, 2015
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Mock-up’s to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		Sachs, 2020
	Enhanced durability	Well-maintained high-quality features and environment		Shepley & Pasha, 2013; Shepley et al., 2016.
Layout-Caregiver/ Clinical Staff Zone	Change-readiness/ future-proofing	Mock-up’s to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		Sachs, 2020
	Minimize stigma	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
	Enhanced security	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
	Caregiver health/ support/respice	Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
	Caregiver safety; minimize risk of physical injury	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Clearly define staff zones (e.g., charting, hand-washing, storage, sitters, etc.)		HGA, 2020
		Promote surveillance and first means of egress from charting and observation spaces		HGA, 2020
Communication/ interaction with care provider/ emergency care	Staff-patient consulting areas		Shepley, et al., 2022	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout-Caregiver/ Clinical Staff Zone	Efficient delivery of care	Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		Sachs, 2020
	Safe delivery of care	Maximum of two adult patients per bedroom depending upon preference and population characteristics		Hunt & Sine, 2015
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
		Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		Sachs, 2020
	Improved job satisfaction	Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
	Minimize patient stress/anxiety	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
	Patient control/independence	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
	Patient recovery	Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
	Patient satisfaction	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		Sachs, 2020
	Patient comfort	Staff zones support performing routines in a professional and respectful manner		Olausson et al., 2021
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		Sachs, 2020
	Improved patient engagement	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
Safety; minimize risk of injury	Required safety/security features are concealed or as discreet as possible		Lundin, 2020	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout-Caregiver/ Clinical Staff Zone	Safety; reduce risk of harm to self or harm to others	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Clearly define staff zones (e.g., charting, hand-washing, storage, sitters, etc.)		HGA, 2020
		Maximum of two adult patients per bedroom depending upon preference and population characteristics		Hunt & Sine, 2015
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al., 2020; HGA, 2020; Hunt & Sine, 2015.
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		Sachs, 2020
Layout-Patient Zone	Change-readiness/ future-proofing	Acuity-adaptable rooms to accommodate medical and behavioral comorbidities to reduce transfers and errors		Adams et al., 2020; HGA, 2020.
		Customize design to fit patient's needs		HDR, Inc., 2019
		Private bedrooms		Shepley, et al., 2022
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Minimize stigma	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Well-organized, maintained, and orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022; Shepley, et al. 2021.
		Continuous "chaise longue" sloped angle surface between top of 18-inch bench and a 27-inch desk		Sachs, 2020
		Doorless storage cubbies for clothing and personal items		Sachs, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Layout-Patient Zone	Minimize stigma	Movable furniture that increases control without sacrificing safety		Sachs, 2020	
		Therapeutic furniture that patients can rock slightly (e.g., ottoman)		Sachs, 2020	
		Safe features in patient toilets (e.g., solid-surface countertops, integral sinks, ligature-resistant faucets, recessed cabinet pulls, and securely locked doors that enclose under-counter pipes)	S	Hunt & Sine, 2015	
		Access to daylight		HDR, Inc., 2019	
		Patient control		HDR, Inc., 2019	
		Multipurpose built-in's (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019	
		Bedroom personalization with patient's items (e.g., photos, gifts, bedding, etc.)		Olausson et al., 2021	
		Maximize the number of single-occupancy patient rooms and bathrooms		Olausson et al., 2021	
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.	
		Accessibility; ease of use	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
			Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Enhanced security	Required safety/security features are concealed or as discreet as possible		Lundin, 2020	
		Space for additional staff when required to accompany a patient		The Center for Health Design, 2019	
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.	
		Easy and quick visibility without hidden corners or clutter		HDR, Inc., 2019	
	Caregiver health/support/respice	Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout-Patient Zone	Caregiver safety; minimize risk of physical injury	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Curved angles and concealed, pull-out equipment and furniture		HGA, 2020
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
	Communication/ interaction with care provider/ emergency care	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Communication; staff to staff	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Efficient delivery of care	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Well-organized, maintained, and orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022; Shepley, et al. 2021.
		Clearance of 6 feet in toilet room for inclusive accommodation of all patient populations and staff assistance		HGA, 2020
		Private toilet accessible from patient room without transitioning through a corridor		Hunt & Sine, 2015
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout-Patient Zone	Safe delivery of care	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Space for additional staff when required to accompany a patient		The Center for Health Design, 2019
		ADA-compliant bedroom and bathroom		Sachs, 2020
		Ligature-free furniture and fixtures	S	Sachs, 2020
		Bi-directional swinging doors		Sachs, 2020
		Sliding doors should have stainless-steel recessed pull and concealed track		Sachs, 2020
		Continuous “chaise longue” sloped angle surface between top of 18-inch bench and a 27-inch desk		Sachs, 2020
		Doorless storage cubbies for clothing and personal items		Sachs, 2020
		Movable furniture that increases control without sacrificing safety		Sachs, 2020
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Light fixtures with substantial lenses securely anchored in place and frames secured with tamper-resistant screws		Hunt & Sine, 2015
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
		Easy and quick visibility without hidden corners or clutter		HDR, Inc., 2019.
		Mock-up’s to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Built-in furniture that maximizes safety and minimizes institutional aesthetics		Sachs, 2020	
	Improved job satisfaction	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Single-patient rooms and toilets for those with medical and behavioral comorbidities		Adams et al, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout-Patient Zone	Improved job satisfaction	Curved surfaces (e.g., walls, casework, counters, etc.) to minimize dust and debris		Adams et al, 2020
	Minimize patient stress/anxiety	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Well-organized, maintained, and orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022; Shepley, et al. 2021.
		Positive distractions (e.g., outdoor views, art, television, information wall, etc.)		HGA, 2020
		Bed positioned for direct view out window		HGA, 2020
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
		Places for withdrawal and reflection		Olausson et al., 2021
	Patient control/independence	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Well-organized, maintained, and orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022; Shepley, et al. 2021.
		Continuous “chaise longue” sloped angle surface between top of 18-inch bench and a 27-inch desk		Sachs, 2020
		Doorless storage cubbies for clothing and personal items		Sachs, 2020
		Movable furniture that increases control without sacrificing safety		Sachs, 2020
		Therapeutic furniture that patients can rock slightly (e.g., ottoman)		Sachs, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout-Patient Zone	Patient control/ independence	Patient control		HDR, Inc., 2019
		Affordances for autonomy/spontaneity		Shepley, et al., 2022
		Places for withdrawal and reflection		Olausson et al., 2021
		Bedroom personalization with patient’s items (e.g., photos, gifts, bedding, etc.)		HDR, Inc., 2019; Olausson et al., 2021.
		Maximize the number of single-occupancy patient rooms and bathrooms		Olausson et al., 2021; Shepley, et al., 2022.
		Built-in furniture that maximizes safety and minimizes institutional aesthetics		Sachs, 2020
		Built-in’s support various activities (e.g., lounge slope between bench and desk, pass-through cubbies, etc.)		Sachs, 2020
	Patient recovery	Acuity-adaptable rooms to accommodate medical and behavioral comorbidities to reduce transfers and errors		Adams et al, 2020; HGA, 2020.
		Access to daylight		HDR, Inc., 2019
		Patient control		HDR, Inc., 2019
		Multipurpose built-in’s (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019
	Patient satisfaction	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Well-organized, maintained, and orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022; Shepley, et al. 2021.
		Single-patient rooms and toilets for those with medical and behavioral comorbidities		Adams et al, 2020; HGA, 2020.
		Curved surfaces (e.g., walls, casework, counters, etc.) to minimize dust and debris		Adams et al, 2020
		Mock-up’s to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout-Patient Zone	Patient comfort	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Positive distractions (e.g., outdoor views, art, television, information wall, etc.)		HGA, 2020
		Bed positioned for direct view out window		HGA, 2020
		Customize design to fit patient’s needs		HDR, Inc., 2019
		Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
		Patient control		HDR, Inc., 2019
		Multipurpose built-in’s (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019
		Bedroom personalization with patient’s items (e.g., photos, gifts, bedding, etc.)		HDR, Inc., 2019; Olausson et al., 2021.
		Mock-up’s to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Built-in’s support various activities (e.g., lounge slope between bench and desk, pass-through cubbies, etc.)		Sachs, 2020
	Psychosocial support	Maximize the number of single-occupancy patient rooms and bathrooms		Olausson et al., 2021; Shepley, et al., 2022.
		Areas for reflection or spiritual practices		Olausson et al., 2021
	Improved patient engagement	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Private bedrooms or non-dormitory style occupancy		Karlin & Zeiss, 2006



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout-Patient Zone	Improved family presence and engagement in patient care	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Safely accommodate visitors with secure storage outside patient room and first egress access from inside patient room		Adams et al, 2020
		Places for withdrawal and reflection		Olausson et al., 2021
		Maximize the number of single-occupancy patient rooms and bathrooms		Karlin & Zeiss, 2006.; Olausson et al., 2021; Shepley, et al., 2022.
	Improved patient healthy behaviors	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Room for mindfulness activities (e.g., yoga, meditation, etc.)		HDR, Inc., 2019.
	Improved sleep quality	Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
	A healthy environment (reduced negative health effects)	Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
	Safety; fall/injury prevention and improved mobility	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Safety; medication safety	Acuity-adaptable rooms to accommodate medical and behavioral comorbidities to reduce transfers and errors		Adams et al, 2020; HGA, 2020.
	Safety; minimize risk of injury	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Features supportive of social interaction, onlooker observation and physical retreat		The Center for Health Design, 2019
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout-Patient Zone	Safety; reduce risk of harm to self or harm to others	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Space for additional staff when required to accompany a patient		The Center for Health Design, 2019
		Features supportive of social interaction, onlooker observation and physical retreat		The Center for Health Design, 2019
		Curved angles and concealed, pull-out equipment and furniture		HGA, 2020
		Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018
		Ligature-free or resistant transitions between patient rooms and bathrooms	S	Beebe, 2018
		ADA-compliant bedroom and bathroom		Sachs, 2020
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Private toilet accessible from patient room without transitioning through a corridor		Hunt & Sine, 2015
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
		Acuity-adaptable rooms to accommodate medical and behavioral comorbidities to reduce transfers and errors		Adams et al, 2020; HGA, 2020.
		Safely accommodate visitors with secure storage outside patient room and first egress access from inside patient room		Adams et al, 2020
		Easy and quick visibility without hidden corners or clutter		HDR, Inc., 2019
		Multipurpose built-in's (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
Built-in furniture that maximizes safety and minimizes institutional aesthetics		Sachs, 2020		



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout-Patient Zone	Safety; reduce risk of harm to self or harm to others	Built-in's support various activities (e.g., lounge slope between bench and desk, pass-through cubbies, etc.)		Sachs, 2020
Layout-Family Zone	Change-readiness/ future-proofing	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Minimize stigma	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Accessibility; ease of use	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Enhanced security	Visiting areas in the room should be visible and easily accessible by staff		The Center for Health Design, 2019
	Efficient delivery of care	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Patient satisfaction	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Patient comfort	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Psychosocial support	Visiting areas in the room should support family participation		The Center for Health Design, 2019
	Improved patient engagement	Visiting areas in the room should support family participation		The Center for Health Design, 2019
	Improved family presence and engagement in patient care	Provide lockers where families can lock up belongings prior to entering patient areas		HGA, 2020
		Dedicated family zone located near door for first egress		HGA, 2020
		Design visiting areas for privacy		Karlin & Zeiss, 2006
	Enhanced privacy	Design visiting areas for privacy		Karlin & Zeiss, 2006



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Layout-Family Zone	Safety; reduce risk of harm to self or harm to others	Provide lockers where families can lock up belongings prior to entering patient areas		HGA, 2020
		Dedicated family zone located near door for first egress		HGA, 2020
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
Privacy Curtain/Screen/Barrier	Safety; minimize risk of injury	Features supportive of social interaction, onlooker observation and physical retreat		The Center for Health Design, 2019
	Safety; reduce risk of harm to self or harm to others	Avoid materials that are breakable, toxic, flame retardant, or can cause suffocation	S	The Center for Health Design, 2019
		Features supportive of social interaction, onlooker observation and physical retreat		The Center for Health Design, 2019
Sound-Masking Equipment	Improved access/wayfinding	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Communication/interaction with care provider/ emergency care	High performance sound-absorbing ceiling		Liddicoat, 2019b
		High performance sound-absorbing floor		Liddicoat, 2019b
	Improved job satisfaction	Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
	Minimize patient stress/anxiety	High performance sound-absorbing ceiling		Liddicoat, 2019b
		High performance sound-absorbing floor		Liddicoat, 2019b
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Patient control/independence	Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
		White noise generator with patient-controlled volume to curb unwanted noise		Sachs, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Sound-Masking Equipment	Patient recovery	Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
	Patient satisfaction	High performance sound-absorbing ceiling		Liddicoat, 2019b
		High performance sound-absorbing floor		Liddicoat, 2019b
	Psychosocial support	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Enhanced privacy	High performance sound-absorbing ceiling		Liddicoat, 2019b
		High performance sound-absorbing floor		Liddicoat, 2019b
	A healthy environment (reduced negative health effects)	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Reduced noise	High performance sound-absorbing ceiling		Liddicoat, 2019b
		High performance sound-absorbing floor		Liddicoat, 2019b
		White noise generator with patient-controlled volume to curb unwanted noise		Sachs, 2020
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
Safety; reduce risk of harm to self or harm to others	Avoid materials that are breakable, toxic, flame retardant, or can cause suffocation		S	The Center for Health Design, 2019
Flooring	Change-readiness/future-proofing	Safe and durable familiar furnishings and finishes instead of trendy décor		Karlin & Zeiss, 2006
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Minimize stigma	Secured, homelike, non-breakable artwork, marker board, etc.		VA Office of Construction & Facilities Mgmt, 2014
		Wood grain pattern sheet vinyl flooring and molding profile rubber base		VA Office of Construction & Facilities Mgmt, 2014
		Durable secured non-glare flooring material		VA Office of Construction & Facilities Mgmt, 2014



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Flooring	Minimize stigma	Attractive aesthetic space		Shepley, et al., 2022
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Accessibility; ease of use	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Improved access/ wayfinding	Differentiate areas through color, lighting, carpeting, wall graphics, and furnishings		Karlin & Zeiss, 2006
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Enhanced security	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Caregiver safety; minimize risk of physical injury	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Communication/ interaction with care provider/ emergency care	High performance sound-absorbing floor		Liddicoat, 2019b
	Efficient delivery of care	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Safe delivery of care	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Minimize patient stress/anxiety	High performance sound-absorbing floor		Liddicoat, 2019b
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Patient satisfaction	High performance sound-absorbing floor		Liddicoat, 2019b
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Flooring	Patient comfort	Safe and durable familiar furnishings and finishes instead of trendy décor		Karlin & Zeiss, 2006
		Attractive aesthetic space		Shepley, et al., 2022
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Psychosocial support	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Enhanced privacy	High performance sound-absorbing floor		Liddicoat, 2019b
	A healthy environment (reduced negative health effects)	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Reduced noise	High performance sound-absorbing floor		Liddicoat, 2019b
		Avoid highly reverberant spaces		Karlin & Zeiss, 2006
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Safety; fall/injury prevention and improved mobility	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Avoid highly polished floors or other reflecting surfaces because of glare		Karlin & Zeiss, 2006
	Safety; minimize risk of injury	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Safety; reduce risk of harm to self or harm to others	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Anchored furnishings and accessories without openings or sharp edges		ASHE, n.d.
		Safe and durable familiar furnishings and finishes instead of trendy décor		Karlin & Zeiss, 2006
		Avoid highly polished floors or other reflecting surfaces because of glare		Karlin & Zeiss, 2006
		Secured, homelike, non-breakable artwork, marker board, etc.		VA Office of Construction & Facilities Mgmt, 2014
		Slip resistant 2" x 2" [50.8 mm x 50.8 mm] ceramic tile for bathroom floor and slope-to-drain shower, but not for the walls		VA Office of Construction & Facilities Mgmt, 2014



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Flooring	Safety; reduce risk of harm to self or harm to others	Shower and bathroom floor drains for slab depressions of 2" [50.8 mm] or less; slope length of bathroom floor to shower drain for depressions 4" [101.6 mm] or greater		VA Office of Construction & Facilities Mgmt, 2014
		Durable secured non-glare flooring material		VA Office of Construction & Facilities Mgmt, 2014
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Enhanced durability	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Slip resistant 2" x 2" [50.8 mm x 50.8 mm] ceramic tile for bathroom floor and slope-to-drain shower, but not for the walls		VA Office of Construction & Facilities Mgmt, 2014
		Durable secured non-glare flooring material		VA Office of Construction & Facilities Mgmt, 2014
Walls	Change-readiness/ future-proofing	Safe and durable familiar furnishings and finishes instead of trendy décor		Karlin & Zeiss, 2006
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020
	Minimize Stigma	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid "institutional colors" (i.e., "institutional green")		The Center for Health Design, 2019
		Minimize "safe" design features		The Center for Health Design, 2019
		Recessed, wall-mounted screens with nature scenes supplement window views		Sachs, 2020
		Secured, homelike, non-breakable artwork, marker board, etc.		VA Office of Construction & Facilities Mgmt, 2014
		Secure trim, headboards and soothing colors contribute to the residential feel		VA Office of Construction & Facilities Mgmt, 2014
	Painted gypsum board for walls with at least one soothing warm color accent wall or wood grain texture wainscot panels		VA Office of Construction & Facilities Mgmt, 2014	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Walls	Minimize Stigma	Attractive aesthetic space		Shepley, et al., 2022
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Accessibility; ease of use	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Improved access/ wayfinding	Differentiate areas through color, lighting, carpeting, wall graphics, and furnishings		Karlin & Zeiss, 2006
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Enhanced security	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Mirrors made of stainless steel, acrylic, unbreakable glass, or polycarbonate		The Center for Health Design, 2019
		Affix finishes, molding, and other interior details to limit contraband hiding spaces		The Center for Health Design, 2019
		Artwork installation prevents hazards (e.g., non-breakable frame/covering, secured with tamper-resistant fasteners)		The Center for Health Design, 2019
	Caregiver safety; minimize risk of physical injury	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Efficient delivery of care	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Safe delivery of care	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid ligature points	S	Watts et al., 2012



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Walls	Safe delivery of care	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Avoid features typical of hospital (e.g., 2'x4' light fixtures, paddle-style hardware, gas outlets, nurse call systems, etc.)		Hunt & Sine, 2015
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Improved job satisfaction	Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
	Minimize patient stress/anxiety	Nature art and prints		Frumkin, 2001; Liddicoat, 2019a; Liddicoat 2019b.
		Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Positive distractions (e.g., outdoor views, art, television, information wall, etc.)		HGA, 2020
		Patient-based color selection (e.g., typically avoid monochromatic/blands and trendy/pastels, overstimulating bright colors, depressing blue-greens, and white/gray in seclusion rooms, etc.)		Karlin & Zeiss, 2006
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
		Positive distractions (e.g., outdoor views, art, television, information wall, etc.)		Adams et al, 2020
		Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
	Patient control/ independence	Access to options for acoustics		Shepley & Pasha, 2013
		Ligature-free bed with multiple locations and orientations along headwall(s)	S	Sachs, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Walls	Patient control/ independence	Patient selected artwork using wall-mounted screens with preselected images		Sachs, 2020
		Curb noise and promote auditory control (e.g., sound-absorbing plaster, patient-controlled white noise generator, etc.)		Sachs, 2020
	Patient recovery	Positive distractions (e.g., outdoor views, art, television, information wall, etc.)		Adams et al, 2020
		Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006.; Shepley, et al., 2022.
	Patient satisfaction	Nature art and prints		Frumkin, 2001; Liddicoat, 2019a; Liddicoat 2019b.
		Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Opportunities to personalize the room		Shepley & Pasha, 2013
		Artwork installation prevents hazards (e.g., non-breakable frame/covering, secured with tamper-resistant fasteners)		The Center for Health Design, 2019
		Avoid “institutional colors” (i.e., “institutional green”)		The Center for Health Design, 2019
		Mock-up’s to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Patient comfort	Minimize “safe” design features		The Center for Health Design, 2019
		Positive distractions (e.g., outdoor views, art, television, information wall, etc.)		HGA, 2020
		Safe and durable familiar furnishings and finishes instead of trendy décor		Karlin & Zeiss, 2006
		Patient-based color selection (e.g., typically avoid monochromatic/blands and trendy/pastels, overstimulating bright colors, depressing blue-greens, and white/gray in seclusion rooms, etc.)		Karlin & Zeiss, 2006



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Walls	Patient comfort	Attractive aesthetic space		Shepley, et al., 2022
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Psychosocial support	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
		Marker Boards for care and team information should be securely attached		VA Office of Construction & Facilities Mgmt, 2014
	Improved patient healthy behaviors	Art depicting realistic social engagement		Shepley & Pasha, 2013
	A healthy environment (reduced negative health effects)	Nature art and prints		Frumkin, 2001; Liddicoat, 2019a; Liddicoat 2019b.
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Reduced noise	Curb noise with durable sound-absorbing plaster wall and ceiling finish systems		Sachs, 2020
		Avoid highly reverberant spaces		Karlin & Zeiss, 2006
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
		Durable gypsum board walls with metal studs extending to structure above and sound attenuation features (e.g., batt insulation and least penetrations.)		VA Office of Construction & Facilities Mgmt, 2014
		Good acoustical control		Shepley, et al., 2022
		Curb noise and promote auditory control (e.g., sound-absorbing plaster, patient-controlled white noise generator, etc.)		Sachs, 2020
		Safety; fall/injury prevention and improved mobility	Avoid ligature points	S
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Safety; minimize risk of injury	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Avoid clothes hooks	S	Liddicoat, 2019b
		Avoid curtain rods	S	Liddicoat, 2019b



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Walls	Safety; minimize risk of injury	Avoid handrails	S	Liddicoat, 2019b	
		Ligature resistant shelves	S	Liddicoat, 2019b	
		Ligature resistant towel racks	S	Liddicoat, 2019b	
	Safety; reduce risk of harm to self or harm to others	Discreet security features that reinforce safety without compromising experience			Lenaghan et al., 2018
		Avoid ligature points			Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons			Watts et al., 2012
		Avoid clothes hooks	S		Liddicoat, 2019b
		Avoid curtain rods	S		Liddicoat, 2019b
		Avoid handrails	S		Liddicoat, 2019b
		Ligature resistant shelves	S		Liddicoat, 2019b
		Ligature resistant towel racks	S		Liddicoat, 2019b
		Avoid materials that are breakable, toxic, flame retardant, or can cause suffocation	S		The Center for Health Design, 2019
		Mirrors made of stainless steel, acrylic, unbreakable glass, or polycarbonate			The Center for Health Design, 2019
		Affix finishes, molding, and other interior details to limit contraband hiding spaces			The Center for Health Design, 2019
		Artwork installation prevents hazards (e.g., non-breakable frame/covering, secured with tamper-resistant fasteners)			The Center for Health Design, 2019
		Alternative to wall-mounted alcohol-based hand rub (ABHR) dispensers			ASHE, n.d.
		Alternative to non-recessed life safety devices (e.g., chimes, strobes, pull station, smoke detectors, sprinkler heads, fire extinguishers, hose cabinets, etc.)			ASHE, n.d.
		Alternative to wall-mounted equipment (e.g., medical devices, television, etc.)			ASHE, n.d.
Wall mounted items should avoid glass, protruding edges, or exposed corners			ASHE, n.d.		



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Walls	Safety; reduce risk of harm to self or harm to others	Alternative to non-recessed monitoring, communication, and access equipment (e.g., speakers, cameras, phone, access card readers, wireless access points, etc.)		ASHE, n.d.
		Cover plates and receptacles free from protruding edges, exposed corners, and screws that can be tampered with		ASHE, n.d.
		Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018
		Signage should be secured to structure		Allen et al., 2019
		Recessed, wall-mounted screens with nature scenes supplement window views		Sachs, 2020
		Curb noise with durable sound-absorbing plaster wall and ceiling finish systems		Sachs, 2020
		Safe and durable familiar furnishings and finishes instead of trendy décor		Karlin & Zeiss, 2006
		Avoid features typical of hospital (e.g., 2'x4' light fixtures, paddle-style hardware, gas outlets, nurse call systems, etc.)		Hunt & Sine, 2015
		Secured, homelike, non-breakable artwork, marker board, etc.		VA Office of Construction & Facilities Mgmt, 2014
		Marker Boards for care and team information should be securely attached		VA Office of Construction & Facilities Mgmt, 2014
		Wall-mounted ligature-resistant over-bed lighting with high strength acrylic lenses (not correctional type) securely fastened to the wall with tamper resistant screws	S	VA Office of Construction & Facilities Mgmt, 2014
		Clothing or towel hooks should be designed to collapse when any weight above 4 lbs [1.81 kg] is applied		VA Office of Construction & Facilities Mgmt, 2014
		Paper towel dispensers in patient bathrooms should be recessed		VA Office of Construction & Facilities Mgmt, 2014
		Soap dispensers should be wall-mounted with sloped tops to prevent anchor points		VA Office of Construction & Facilities Mgmt, 2014



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Walls	Safety; reduce risk of harm to self or harm to others	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Ligature-free bed with multiple locations and orientations along headwall(s)	S	Sachs, 2020
	Enhanced durability	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Affix finishes, molding, and other interior details to limit contraband hiding spaces		The Center for Health Design, 2019
		Durable gypsum board walls with metal studs extending to structure above and sound attenuation features (e.g., batt insulation and least penetrations.)		VA Office of Construction & Facilities Mgmt, 2014
	Ceiling	Change-readiness/future-proofing	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment	
Minimize Stigma		Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Attractive aesthetic space		Shepley, et al., 2022
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
Accessibility; ease of use		Limited-access ceilings for required utility servicing		Allen et al., 2019
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
Enhanced security		Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Ceiling	Enhanced security	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Affix finishes, molding, and other interior details to limit contraband hiding spaces		The Center for Health Design, 2019
	Caregiver safety; minimize risk of physical injury	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
	Communication/ interaction with care provider/ emergency care	High performance sound-absorbing ceiling		Liddicoat, 2019b
	Efficient delivery of care	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Safe delivery of care	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Avoid features typical of hospital (e.g., 2'x4' light fixtures, paddle-style hardware, gas outlets, nurse call systems, etc.)		Hunt & Sine, 2015
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Minimize patient stress/anxiety	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		High performance sound-absorbing ceiling		Liddicoat, 2019b
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Ceiling	Patient control/ independence	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Access to options for acoustics		Shepley & Pasha, 2013
		Curb noise and promote auditory control (e.g., sound-absorbing plaster, patient-controlled white noise generator, etc.)		Sachs, 2020
	Patient satisfaction	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		High performance sound-absorbing ceiling		Liddicoat, 2019b
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Patient comfort	Attractive aesthetic space		Shepley, et al., 2022
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Improved patient engagement	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
	Enhanced privacy	High performance sound-absorbing ceiling		Liddicoat, 2019b
	Reduced noise	High performance sound-absorbing ceiling		Liddicoat, 2019b
		Curb noise with durable sound-absorbing plaster wall and ceiling finish systems		Sachs, 2020
		Avoid highly reverberant spaces		Karlin & Zeiss, 2006
		Good acoustical control		Shepley, et al., 2022
		Curb noise and promote auditory control (e.g., sound-absorbing plaster, patient-controlled white noise generator, etc.)		Sachs, 2020
	Safety; fall/injury prevention and improved mobility	Avoid ligature points	S	Watts et al., 2012
Avoid objects, fixtures, and furniture which might be used as weapons		S	Watts et al., 2012	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Ceiling	Safety; minimize risk of injury	Avoid ligature points	S	Watts et al., 2012	
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012	
		Ligature resistant fire sprinklers	S	Liddicoat, 2019b	
		Ligature resistant ceiling lights	S	Liddicoat, 2019b	
		No exposed pipes, sprinkler heads, light fixtures, vents, or ducts		Liddicoat, 2019b	
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020	
	Safety; reduce risk of harm to self or harm to others	Discreet security features that reinforce safety without compromising experience			Lenaghan et al., 2018
		Avoid ligature points	S	Watts et al., 2012	
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012	
		Ligature resistant fire sprinklers	S	Liddicoat, 2019b	
		Ligature resistant ceiling lights	S	Liddicoat, 2019b	
		No exposed pipes, sprinkler heads, light fixtures, vents, or ducts		Liddicoat, 2019b	
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020	
		High ceilings		Dobrohotoff & Llewellyn-Jones, 2011	
		Collapsible curtain rails		Dobrohotoff & Llewellyn-Jones, 2011	
		Monolithic ceiling surface to restrict ceiling space access	S	The Center for Health Design, 2019	
		Avoid materials that are breakable, toxic, flame retardant, or can cause suffocation	S	The Center for Health Design, 2019	
		Affix finishes, molding, and other interior details to limit contraband hiding spaces		The Center for Health Design, 2019	
		Alternative to non-recessed life safety devices (e.g., chimes, strobes, pull station, smoke detectors, sprinkler heads, fire extinguishers, hose cabinets, etc.)		ASHE, n.d.	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Ceiling	Safety; reduce risk of harm to self or harm to others	Alternative to non-recessed monitoring, communication, and access equipment (e.g., speakers, cameras, phone, access card readers, wireless access points, etc.)		ASHE, n.d.
		Use alternative to suspended ceiling		ASHE, n.d.
		Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018
		Use solid ceilings in patient rooms and bathrooms		Beebe, 2018
		No drop ceilings		Beebe, 2018
		Limited-access ceilings for required utility servicing		Allen et al., 2019
		Use anti-ligature and vandal resistant lighting, ceiling systems and sprinklers	S	Allen et al., 2019
		Fire Alarm (e.g., strobes, horns, etc.) should be ceiling mounted or “hooded”	S	Allen et al., 2019
		Curb noise with durable sound-absorbing plaster wall and ceiling finish systems		Sachs, 2020
		Avoid features typical of hospital (e.g., 2’x4’ light fixtures, paddle-style hardware, gas outlets, nurse call systems, etc.)		Hunt & Sine, 2015
		Ceiling-mounted patient lifts should not be installed in patient rooms	S	VA Office of Construction & Facilities Mgmt, 2014
		Sprinklers should be vandal-resistant and not able to be used as an anchor point	S	VA Office of Construction & Facilities Mgmt, 2014
		Gypsum board or other inaccessible and durable ceiling system with tamper resistant fixtures and features		VA Office of Construction & Facilities Mgmt, 2014
	Mock-up’s to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.	
	Enhanced durability	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
Affix finishes, molding, and other interior details to limit contraband hiding spaces			The Center for Health Design, 2019	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Windows	Change-readiness/ future-proofing	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Minimize stigma	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Provide exterior window to access daylight		HGA, 2020
		Patient control of light, views, and privacy using windows with integral blinds		Sachs, 2020
		Windows that open to 4-inches		Sachs, 2020
		Window mini-blinds should be behind security glazing without stainless steel screens, exposed cords, chains, or wands		Hunt & Sine, 2015
		Avoid using correctional-style view panels in patient room doors		VA Office of Construction & Facilities Mgmt, 2014
		Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
		Large windows and niches that serve as shelves to store or display personal items		Olausson et al., 2021
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Accessibility; ease of use	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Windows	Improved access/ wayfinding	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Enhanced security	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Unbreakable glass in windows		Liddicoat, 2019b
	Caregiver health/ support/respice	View to nature/natural landscapes		Frumkin, 2001; Liddicoat, 2019a; Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich et al., 2012.
		Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
	Caregiver safety; minimize risk of physical injury	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Unbreakable glass in windows		Liddicoat, 2019b
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Clear/consistent line of sight throughout the entire room (e.g., no blind corners or hiding places; first means of egress, etc.)		HGA, 2020; ; Karlin & Zeiss, 2006.
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
		Efficient delivery of care	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)	
	Multiple, Large, low windows with laminated safety glass			Karlin & Zeiss, 2006



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Windows	Efficient delivery of care	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Safe delivery of care	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Improved job satisfaction	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Multiple, Large, low windows with laminated safety glass		Karlin & Zeiss, 2006
	Minimize patient stress/anxiety	View to nature/natural landscapes		Frumkin, 2001; Liddicoat, 2019a; Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich et al., 2012.
		Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Provide exterior window to access daylight		HGA, 2020
		Positive distractions (e.g., outdoor views, art, television, information wall, etc.)		HGA, 2020
		Multiple, Large, low windows with laminated safety glass		Karlin & Zeiss, 2006
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Windows	Minimize patient stress/anxiety	Positive distractions (e.g., outdoor views, art, television, information wall, etc.)		Adams et al, 2020.	
		Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.	
		Outdoor spaces and views of nature		Karlin & Zeiss, 2006; Shepley, et al., 2022.	
		Good daylight		Shepley, et al., 2022.	
		Windows should have integral blinds and be operable to a maximum of 4"		Sachs, 2020	
	Patient control/independence	Windows with controlled operability (i.e., sash openings limited to 4" or less)			The Center for Health Design, 2019; Ulrich et al., 2018
		Window shades between glass that are cordless, remotely controlled or restricted	S		BETA Healthcare Group and Emergency Medicine Council, 2018
		Patient control of light, views, and privacy using windows with integral blinds			Sachs, 2020
		Windows that open to 4-inches			Sachs, 2020
		Large windows and niches that serve as shelves to store or display personal items			Olausson et al., 2021
	Patient recovery	Large, low windows			Shepley & Pasha, 2013
		Fresh air, good ventilation, and neutral odors is recommended			Karlin & Zeiss, 2006
		Multiple, Large, low windows with laminated safety glass			Karlin & Zeiss, 2006
		Positive distractions (e.g., outdoor views, art, television, information wall, etc.)			Adams et al, 2020
		Maximize daylight and nature within shared and private spaces			Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
		Outdoor spaces and views of nature			Karlin & Zeiss, 2006; Shepley, et al., 2022.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Windows	Patient satisfaction	View to nature/natural landscapes		Frumkin, 2001; Liddicoat, 2019a; Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich et al., 2012.
		Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Bed oriented for direct view through window with consideration for size, sill height, daylight control, privacy, etc.		Adams et al, 2020.
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Patient comfort	Large, low windows		Shepley & Pasha, 2013
		Provide exterior window to access daylight		HGA, 2020
		Positive distractions (e.g., outdoor views, art, television, information wall, etc.)		HGA, 2020
		Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Large, low windows		Shepley & Pasha, 2013
	Psychosocial support	Ample natural daylight		Karlin & Zeiss, 2006
		Multiple, Large, low windows with laminated safety glass		Karlin & Zeiss, 2006
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Enhanced privacy	Avoid using correctional-style view panels in patient room doors		VA Office of Construction & Facilities Mgmt, 2014
		Windows should have integral blinds and be operable to a maximum of 4"		Sachs, 2020
	Improved sleep quality	Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Windows	A healthy environment (reduced negative health effects)	View to nature/natural landscapes		Frumkin, 2001; Liddicoat, 2019a; Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich et al., 2012.
		Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Avoid curtain rods	S	Liddicoat, 2019b
		Unbreakable glass in windows		Liddicoat, 2019b
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
		Maximize daylight and nature within shared and private spaces		Evans, 2003; Ulrich et al., 2012; Shepley & Pasha, 2013; Shepley et al. 2016; HDR, Inc., 2019.
	Safety; air quality	Fresh air, good ventilation, and neutral odors is recommended		Karlin & Zeiss, 2006
	Reduced noise	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Safety; fall/injury prevention and improved mobility	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Safety; minimize risk of injury	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Avoid curtain rods	S	Liddicoat, 2019b
		Unbreakable glass in windows		Liddicoat, 2019b
		Window shades between glass that are cordless, remotely controlled or restricted	S	BETA Healthcare Group and Emergency Medicine Council, 2018
	Safety; reduce risk of harm to self or harm to others	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Avoid curtain rods		Liddicoat, 2019b
Unbreakable glass in windows			Liddicoat, 2019b	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Windows	Safety; reduce risk of harm to self or harm to others	Window shades between glass that are cordless, remotely controlled or restricted	S	BETA Healthcare Group and Emergency Medicine Council, 2018
		Use an alternative to non-institutional window hardware and treatments	S	ASHE, n.d.
		Clear/consistent line of sight throughout the entire room (e.g., no blind corners or hiding places; first means of egress, etc.)		HGA, 2020; ; Karlin & Zeiss, 2006.
		Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018
		Use windows that prevent elopement		Allen et al., 2019
		Use secure window/glazing with limited-access patient operation		Allen et al., 2019
		Patient control of light, views, and privacy using windows with integral blinds		Sachs, 2020
		Windows that open to 4-inches		Sachs, 2020
		Multiple, Large, low windows with laminated safety glass		Karlin & Zeiss, 2006
		Use shatterproof windows with breakaway curtain rods	S	Karlin & Zeiss, 2006
		Shard/shatter proof windows and safe treatments (e.g., no curtains, drapes, or vertical blinds)		Hunt & Sine, 2015
		Window mini-blinds should be behind security glazing without stainless steel screens, exposed cords, chains, or wands		Hunt & Sine, 2015
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
		Exterior windows should have integral blinds and laminated glass on interior face		VA Office of Construction & Facilities Mgmt, 2014
Heavy gauge commercial strength windows with insulated double glazing and other safety features (e.g., custodial locks, integral blinds, laminated glass, 4" maximum opening, etc.)	S	VA Office of Construction & Facilities Mgmt, 2014		



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Windows	Safety; reduce risk of harm to self or harm to others	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Windows should have integral blinds and be operable to a maximum of 4"		Sachs, 2020
	Enhanced durability	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Unbreakable glass in windows		Liddicoat, 2019b
Doors	Change-readiness/future-proofing	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Minimize stigma	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Minimize "safe" design features		The Center for Health Design, 2019
		Warm light gray paint with cool blue accent wall, woodgrain built-in's and doors, solid surfaces, stainless steel fixtures and hardware		Sachs, 2020
		Sliding bathroom doors (not pocket) with a wall-inset top sliding track and a receiving wall on the patient room side		VA Office of Construction & Facilities Mgmt, 2014
		Stained wood doors are strongly recommended over hollow metal doors for their aesthetic appeal		VA Office of Construction & Facilities Mgmt, 2014
		Avoid using correctional-style view panels in patient room doors		VA Office of Construction & Facilities Mgmt, 2014
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Doors	Accessibility; ease of use	Non-protruding wing doorknobs that do not allow patient to maintain grasp to prohibit staff from entering the room		Liddicoat, 2019b; BETA Healthcare Group and Emergency Medicine Council, 2018	
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.	
		Retrofit inward-opening doors with Wicket door-within-a-door systems		Allen et al., 2019	
		Doors should open out to facilitate emergency access		Allen et al., 2019	
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.	
	Enhanced security	Discreet security features that reinforce safety without compromising experience			Lenaghan et al., 2018
		Avoid ligature points	S		Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S		Watts et al., 2012
		All lockable patient doors allow emergency access			The Center for Health Design, 2019
		Eliminate doors entirely if patient privacy can be maintained			The Center for Health Design, 2019
		Eliminate doors with hold-open devices and self-closers			The Center for Health Design, 2019
	Caregiver safety; minimize risk of physical injury	Maximize direct visual observation of patients from security/staffing areas			Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Discreet security features that reinforce safety without compromising experience			Lenaghan et al., 2018
		Avoid objects, fixtures, and furniture which might be used as weapons	S		Watts et al., 2012
		Doors open in both directions			Liddicoat, 2019b
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)			Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Doors	Caregiver safety; minimize risk of physical injury	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.	
	Communication/ interaction with care provider/ emergency care	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.	
	Communication; staff to staff	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.	
	Efficient delivery of care	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)			Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Doors should swing out to prevent barricading or blocking room access			Hunt & Sine, 2015
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment			HDR, Inc., 2019; Sachs, 2020.
	Safe delivery of care	Discreet security features that reinforce safety without compromising experience			Lenaghan et al., 2018
		Avoid ligature points		S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons		S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)			Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Bi-directional swinging doors			Sachs, 2020
		Sliding doors should have stainless-steel recessed pull and concealed track			Sachs, 2020
		Avoid features typical of hospital (e.g., 2'x4' light fixtures, paddle-style hardware, gas outlets, nurse call systems, etc.)			Hunt & Sine, 2015
		Maximize direct visual observation of patients from security/staffing areas			Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Doors	Safe delivery of care	Doors should swing out to prevent barricading or blocking room access		Hunt & Sine, 2015
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Improved job satisfaction	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Minimize patient stress/anxiety	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Patient satisfaction	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Patient comfort	Minimize "safe" design features		The Center for Health Design, 2019
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Enhanced privacy	Solid core wood door		Liddicoat, 2019a
		Avoid using correctional-style view panels in patient room doors		VA Office of Construction & Facilities Mgmt, 2014
	Safety; fall/injury prevention and improved mobility	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Safety; minimize risk of injury	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Doors	Safety; minimize risk of injury	Non-protruding wing doorknobs that do not allow patient to maintain grasp to prohibit staff from entering the room		Liddicoat, 2019b; BETA Healthcare Group and Emergency Medicine Council, 2018	
		Ligature resistant door hinges (e.g., continuous “piano” style that extend from top to bottom)	S	Liddicoat, 2019b; The Center for Health Design 2019	
		Doors open in both directions		Liddicoat, 2019b	
		Door closing devices, if used, should be on the public-facing side of the door		The Center for Health Design, 2019	
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.	
	Safety; reduce risk of harm to self or harm to others	Discreet security features that reinforce safety without compromising experience			Lenaghan et al., 2018
		Avoid ligature points	S	Watts et al., 2012	
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012	
		Non-protruding wing doorknobs that do not allow patient to maintain grasp to prohibit staff from entering the room		Liddicoat, 2019b; BETA Healthcare Group and Emergency Medicine Council, 2018.	
		Ligature resistant door hinges (e.g., continuous “piano” style that extend from top to bottom)	S	Liddicoat, 2019b; The Center for Health Design 2019.	
		Doors open in both directions		Liddicoat, 2019b	
		All lockable patient doors allow emergency access		The Center for Health Design, 2019	
		Ligature resistent bathroom door	S	The Center for Health Design, 2019	
		Eliminate doors entirely if patient privacy can be maintained		The Center for Health Design, 2019	
		Eliminate doors with hold-open devices and self-closers		The Center for Health Design, 2019	
		Door closing devices, if used, should be on the public-facing side of the door		The Center for Health Design, 2019	
		Alternative to non-institutional door closure, hardware and hinges		ASHE, n.d.	
		Cut top of doors (e.g., avoid anchor point when closed against frame)		ASHE, n.d.	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Doors	Safety; reduce risk of harm to self or harm to others	Anti-ligature items and elimination of ligature points (e.g., patient-safe sliding doors, continuous grab bars, standard doors, bathroom fixtures, etc.)	S	HGA, 2020
		Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018
		Use ligature-resistant door hardware (e.g., hinges, handles and locks)	S	Beebe, 2018
		Retrofit inward-opening doors with Wicket door-within-a-door systems		Allen et al., 2019
		Doors should open out to facilitate emergency access		Allen et al., 2019
		Anti-ligature bathroom doors that lower to 45-degree angle with pressure on top	S	Allen et al., 2019
		Continuous tamper-resistant door hinges		Allen et al., 2019
		Exit door locks meets OBC/LSC criteria		Allen et al., 2019
		Bi-directional swinging doors		Sachs, 2020
		Sliding doors should have stainless-steel recessed pull and concealed track		Sachs, 2020
		Warm light gray paint with cool blue accent wall, woodgrain built-in's and doors, solid surfaces, stainless steel fixtures and hardware		Sachs, 2020
		Avoid features typical of hospital (e.g., 2'x4' light fixtures, paddle-style hardware, gas outlets, nurse call systems, etc.)		Hunt & Sine, 2015
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
Avoid door swing conflicts (e.g., inward-swinging door from corridor and an outward-swinging bathroom door)		Hunt & Sine, 2015		
Doors should swing out to prevent barricading or blocking room access		Hunt & Sine, 2015		



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Doors	Safety; reduce risk of harm to self or harm to others	Ligature-resistant doors and hardware (e.g., closed-door clearances, continuous geared hinges, knobs, levers, pulls, deadbolts, classroom-function lock sets, tapered door tops, etc.)	S	Hunt & Sine, 2015
		Bathroom doors with pressure sensitive alarm at door head, continuous hinge and anti-ligature lever with magnetic latch	S	VA Office of Construction & Facilities Mgmt, 2014
		Bedroom doors should have anti-ligature hardware and continuous out-swinging hinges to prevent barricading	S	VA Office of Construction & Facilities Mgmt, 2014
		Bathroom doors with continuous hinges open outward with door-top pressure sensitive alarms or sloped top and anchor-point resistant hardware		VA Office of Construction & Facilities Mgmt, 2014
		Sliding bathroom doors (not pocket) with a wall-inset top sliding track and a receiving wall on the patient room side		VA Office of Construction & Facilities Mgmt, 2014
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Enhanced durability	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Solid core wood door		Liddicoat, 2019a
Interior doors should be 1¾" [44 mm] thick, solid-core, flush-panel wood doors in hollow metal frames			VA Office of Construction & Facilities Mgmt, 2014	
HVAC	Improved access/wayfinding	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Enhanced security	Avoid ligature points	S	Watts et al., 2012
	Efficient delivery of care	Temperature controls allow for heating and cooling per patient preference		Liddicoat, 2019b
	Safe delivery of care	Avoid ligature points	S	Watts et al., 2012
	Minimize patient stress/anxiety	Temperature controls allow for heating and cooling per patient preference		
Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)				Karlin & Zeiss, 2006



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
HVAC	Patient control/ independence	Patient lighting and temperature control		HGA, 2020
	Patient recovery	Fresh air, good ventilation, and neutral odors is recommended		Karlin & Zeiss, 2006
	Patient satisfaction	Temperature controls allow for heating and cooling per patient preference		Liddicoat, 2019b
		Patient lighting and temperature control		HGA, 2020
	Patient comfort	Temperature controls allow for heating and cooling per patient preference		Liddicoat, 2019b
		High-quality air filtration systems		Shepley & Pasha, 2013
	Psychosocial support	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	A healthy environment (reduced negative health effects)	Avoid ligature points	S	Watts et al., 2012
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Safety; air quality	High-quality air filtration systems		Shepley & Pasha, 2013
		Fresh air, good ventilation, and neutral odors is recommended		Karlin & Zeiss, 2006
	Reduced noise	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Safety; fall/injury prevention and improved mobility	Avoid ligature points	S	Watts et al., 2012
	Safety; minimize risk of injury	Avoid ligature points	S	Watts et al., 2012
		Serviceable components of HVAC terminal devices and covers, thermostats, vents, and grilles should be located outside room	S	The Center for Health Design, 2019
	Safety; reduce risk of harm to self or harm to others	Avoid ligature points	S	Watts et al., 2012
		Serviceable components of HVAC terminal devices and covers, thermostats, vents, and grilles should be located outside room		The Center for Health Design, 2019
		Secure in-room HVAC units, diffusers, and grilles		ASHE, n.d.
		Restrict size of HVAC in-room unit, diffuser, and grill holes or slots		ASHE, n.d.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
HVAC	Safety; reduce risk of harm to self or harm to others	Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018
		HVAC covers with limited-access		Allen et al., 2019
		Locked or tamper-resistant mechanical units with secured air grilles that have perforated openings no larger than 3/16" in diameter		Hunt & Sine, 2015
		Mechanical supply and return diffusers should have small perforations behind the louvers and be located in the ceiling		VA Office of Construction & Facilities Mgmt, 2014
Electrical	Safety; minimize risk of injury	Ligature resistant ceiling lights	S	Liddicoat, 2019b
		AFCI (Arc Fault Circuit Interrupter) & GFCI (Ground Fault Circuit Interrupter) outlets specified whenever possible		The Center for Health Design, 2019
	Safety; reduce risk of harm to self or harm to others	Ligature resistant ceiling lights	S	Liddicoat, 2019b
		AFCI (Arc Fault Circuit Interrupter) & GFCI (Ground Fault Circuit Interrupter) outlets specified whenever possible		The Center for Health Design, 2019
		Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018
		Use tamper-proof electrical outlets		Karlin & Zeiss, 2006
Lighting	Change-readiness/future-proofing	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Minimize stigma	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Avoid "institutional lighting"		HDR, Inc., 2019; The Center for Health Design, 2019
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Accessibility; ease of use	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Lighting	Accessibility; ease of use	Rooms for older patients have accessible bathrooms and higher lighting levels		VA Office of Construction & Facilities Mgmt, 2014
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Improved access/ wayfinding	Differentiate areas through color, lighting, carpeting, wall graphics, and furnishings		Karlin & Zeiss, 2006
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Enhanced security	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Caregiver safety; minimize risk of physical injury	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Efficient delivery of care	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Night lighting in all patient rooms and bathrooms		VA Office of Construction & Facilities Mgmt, 2014
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Safe delivery of care	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Avoid features typical of hospital (e.g., 2'x4' light fixtures, paddle-style hardware, gas outlets, nurse call systems, etc.)		Hunt & Sine, 2015



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Lighting	Safe delivery of care	Light fixtures with substantial lenses securely anchored in place and frames secured with tamper-resistant screws		Hunt & Sine, 2015
		Good electric lighting		Shepley, et al., 2022
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Improved job satisfaction	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Minimize patient stress/anxiety	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Soft, indirect, and pervasive or full-spectrum lighting		Karlin & Zeiss, 2006
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Patient control/independence	Good electric lighting		Shepley, et al., 2022
	Patient recovery	Soft, indirect, full-spectrum lighting with sparingly used and carefully placed spotlight-type recessed lighting		Karlin & Zeiss, 2006
	Patient satisfaction	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Soft, indirect, and pervasive or full-spectrum lighting		Karlin & Zeiss, 2006
		Avoid "institutional lighting"		The Center for Health Design, 2019
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Lighting	Patient comfort	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Soft, indirect, and pervasive or full-spectrum lighting		Karlin & Zeiss, 2006
		Lighting supportive of healing and positive distraction		BETA Healthcare Group and Emergency Medicine Council, 2018
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Psychosocial support	Soft, indirect, full-spectrum lighting with sparingly used and carefully placed spotlight-type recessed lighting		Karlin & Zeiss, 2006
		Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006
	Improved patient engagement	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
	Improved family presence and engagement in patient care	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
	Improved patient healthy behaviors	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
	Improved sleep quality	Night lighting in all patient rooms and bathrooms		VA Office of Construction & Facilities Mgmt, 2014
A healthy environment (reduced negative health effects)	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006	
Reduced noise	Regulate sensory stimulation (e.g., glare, noise, light, familiarity, orientation, etc.)		Karlin & Zeiss, 2006	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Lighting	Safety; fall/injury prevention and improved mobility	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Night lighting in all patient rooms and bathrooms		VA Office of Construction & Facilities Mgmt, 2014
	Safety; minimize risk of injury	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Ligature resistant ceiling lights	S	Liddicoat, 2019b
	Safety; reduce risk of harm to self or harm to others	Avoid ligature points		Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons		Watts et al., 2012
		Ligature resistant ceiling lights	S	Liddicoat, 2019b
		Light fixtures that cannot be damaged		ASHE, n.d.
		Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018
		Avoid features typical of hospital (e.g., 2'x4' light fixtures, paddle-style hardware, gas outlets, nurse call systems, etc.)		Hunt & Sine, 2015
		Lighting must limit patient access to light bulbs and electrical contacts (e.g, table lamps should generally be avoided)		Hunt & Sine, 2015
		Light fixtures with substantial lenses securely anchored in place and frames secured with tamper-resistant screws		Hunt & Sine, 2015
		Wall-mounted ligature-resistant over-bed lighting with high strength acrylic lenses (not correctional type) securely fastened to the wall with tamper resistant screws	S	VA Office of Construction & Facilities Mgmt, 2014
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Enhanced durability	Avoid objects, fixtures, and furniture which might be used as weapons	S



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Fixtures/ Equipment/ Appliances/ Accessories	Change-readiness/ future-proofing	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Minimize stigma	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Warm light gray paint with cool blue accent wall, woodgrain built-in's and doors, solid surfaces, stainless steel fixtures and hardware		Sachs, 2020
		Safe features in patient toilets (e.g., solid-surface countertops, integral sinks, ligature-resistant faucets, recessed cabinet pulls, and securely locked doors that enclose under-counter pipes)	S	Hunt & Sine, 2015
		Porcelain toilets (not stainless steel) with fixed seats, push-button flush actuators, concealed piping, and flushing and flooding controls		VA Office of Construction & Facilities Mgmt, 2014
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Accessibility; ease of use	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)	
	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment			HDR, Inc., 2019; Sachs, 2020.
	Improved access/ wayfinding	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Enhanced security	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Fixtures/ Equipment/ Appliances/ Accessories	Caregiver safety; minimize risk of physical injury	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Efficient delivery of care	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Safe delivery of care	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Avoid features typical of hospital (e.g., 2'x4' light fixtures, paddle-style hardware, gas outlets, nurse call systems, etc.)		Hunt & Sine, 2015
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Improved job satisfaction	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Patient control/ independence	Unincorporated waste receptacles should be lightweight, non-weight-bearing, and free from liners		BETA Healthcare Group and Emergency Medicine Council, 2018
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Patient satisfaction	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Fixtures/ Equipment/ Appliances/ Accessories	Patient comfort	Heavy-duty platform beds with rounded edges and provisions for restraints are dimensionally sized for mobility limitations		VA Office of Construction & Facilities Mgmt, 2014
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Safety; fall/injury prevention and improved mobility	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Safety; infection control and hand sanitation	Toilet paper dispensers should consist of a soft spindle (recessed holders without spindles pose infection control concerns)		VA Office of Construction & Facilities Mgmt, 2014
	Safety; minimize risk of injury	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Ligature resistant towel racks		Liddicoat, 2019b
		Conceal plumbing		Liddicoat, 2019b
		Unincorporated waste receptacles should be lightweight, non-weight-bearing, and free from liners	S	BETA Healthcare Group and Emergency Medicine Council, 2018
	Safety; reduce risk of harm to self or harm to others	Avoid ligature points		Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Ligature resistant towel racks	S	Liddicoat, 2019b
		Conceal plumbing		Liddicoat, 2019b
		Unincorporated waste receptacles should be lightweight, non-weight-bearing, and free from liners		BETA Healthcare Group and Emergency Medicine Council, 2018
		Alternative to wall-mounted alcohol-based hand rub (ABHR) dispensers		ASHE, n.d.
		Alternative to non-recessed life safety devices (e.g., chimes, strobes, pull station, smoke detectors, sprinkler heads, fire extinguishers, hose cabinets, etc.)		ASHE, n.d.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Fixtures/ Equipment/ Appliances/ Accessories	Safety; reduce risk of harm to self or harm to others	Restrict access to cords		ASHE, n.d.
		Alternative to wall-mounted equipment (e.g., medical devices, television, etc.)		ASHE, n.d.
		Alternative to non-recessed monitoring, communication, and access equipment (e.g., speakers, cameras, phone, access card readers, wireless access points, etc.)		ASHE, n.d.
		Durable plumbing fixtures and concealed piping		ASHE, n.d.
		Anti-ligature items and elimination of ligature points (e.g., patient-safe sliding doors, continuous grab bars, standard doors, bathroom fixtures, etc.)	S	HGA, 2020
		Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018
		Standard toilet seats with a hinged seat and lid are not a significant risk for suicide attempts or self-harm		Beebe, 2018
		Lockable cabinets and carts (e.g., housekeeping, laundry, dietary, etc.)		Allen et al., 2019
		Liner-free equipment and accessories (e.g., waste receptacles)		Allen et al., 2019
		If present, dumbwaiter controls and access need to be secure from patients		Allen et al., 2019
		Warm light gray paint with cool blue accent wall, woodgrain built-in's and doors, solid surfaces, stainless steel fixtures and hardware		Sachs, 2020
		Lockable water taps		Karlin & Zeiss, 2006
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Avoid features typical of hospital (e.g., 2'x4' light fixtures, paddle-style hardware, gas outlets, nurse call systems, etc.)		Hunt & Sine, 2015



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Fixtures/ Equipment/ Appliances/ Accessories	Safety; reduce risk of harm to self or harm to others	Shard/shatter-proof, ligature-resistant, securely anchored bathroom fixtures (e.g., concealed plumbing, sloped top flush valves and piping, pushbutton-activated valves, tight-fitting pipe covers, tempered glass distortion-free mirrors with security film and stainless steel, tamper-resistant frames, recessed towel shelves, etc.)	S	Hunt & Sine, 2015
		Safe features in patient toilets (e.g., solid-surface countertops, integral sinks, ligature-resistant faucets, recessed cabinet pulls, and securely locked doors that enclose under-counter pipes)	S	Hunt & Sine, 2015
		Showers without curtains instead of bathtubs with valves and spouts		Hunt & Sine, 2015
		Heavy-duty platform beds with rounded edges and provisions for restraints are dimensionally sized for mobility limitations		VA Office of Construction & Facilities Mgmt, 2014
		Shower and bathroom floor drains for slab depressions of 2" [50.8 mm] or less; slope length of bathroom floor to shower drain for depressions 4" [101.6 mm] or greater		VA Office of Construction & Facilities Mgmt, 2014
		Porcelain toilets (not stainless steel) with fixed seats, push-button flush actuators, concealed piping, and flushing and flooding controls		VA Office of Construction & Facilities Mgmt, 2014
		Solid surface lavatories with integral sinks and sensor activated faucets temperature mix of 110° F [43.34° C] with concealed piping and tamper-resistant screws		VA Office of Construction & Facilities Mgmt, 2014



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Fixtures/ Equipment/ Appliances/ Accessories	Safety; reduce risk of harm to self or harm to others	Accessible, attractive and durable showers with solid surface panels and pans, recessed stainless steel panels with anchor proof dual-head assemblies and controls that prevent the need for shower curtains (where necessary, recessed tracks with plastic clips or Velcro tabs that collapse under more than 4 lbs [1.81kg] of weight)		VA Office of Construction & Facilities Mgmt, 2014
		Wall-anchored reflective polycarbonate mirror with shelf-less stainless-steel frame		VA Office of Construction & Facilities Mgmt, 2014
		Toilet paper dispensers should consist of a soft spindle (recessed holders without spindles pose infection control concerns)		VA Office of Construction & Facilities Mgmt, 2014
		Fixed grab bars (not swinging) with a welded horizontal bottom plate		VA Office of Construction & Facilities Mgmt, 2014
		Securely attached drains with tamper-resistant screws		VA Office of Construction & Facilities Mgmt, 2014
		Paper towel dispensers in patient bathrooms should be recessed		VA Office of Construction & Facilities Mgmt, 2014
		Soap dispensers should be wall-mounted with sloped tops to prevent anchor points		VA Office of Construction & Facilities Mgmt, 2014
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
Furniture/ Accessories	Enhanced durability	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Change-readiness/ future-proofing	Safe and durable familiar furnishings and finishes instead of trendy décor		Karlin & Zeiss, 2006
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
Minimize stigma	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Furniture/ Accessories	Minimize stigma	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Avoid “institutional colors” (i.e., “institutional green”)		The Center for Health Design, 2019
		Minimize “safe” design features		The Center for Health Design, 2019
		Continuous “chaise longue” sloped angle surface between top of 18-inch bench and a 27-inch desk		Sachs, 2020
		Doorless storage cubbies for clothing and personal items		Sachs, 2020
		Movable furniture that increases control without sacrificing safety		Sachs, 2020
		Therapeutic furniture that patients can rock slightly (e.g., ottoman)		Sachs, 2020
		Secured, homelike, non-breakable artwork, marker board, etc.		VA Office of Construction & Facilities Mgmt, 2014
		Secure trim, headboards and soothing colors contribute to the residential feel		VA Office of Construction & Facilities Mgmt, 2014
		Durable furnishings and finishes that are residential in character		VA Office of Construction & Facilities Mgmt, 2014
		Multipurpose built-in’s (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019
		Attractive aesthetic space		Shepley, et al., 2022
		Attractive furniture		Shepley, et al., 2022
		Mock-up’s to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Built-in furniture that maximizes safety and minimizes institutional aesthetics		Sachs, 2020
	Accessibility; ease of use	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
			Mock-up’s to evaluate efficacy, safety, layouts, finishes, furniture, and equipment	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Furniture/ Accessories	Improved access/ wayfinding	Differentiate areas through color, lighting, carpeting, wall graphics, and furnishings		Karlin & Zeiss, 2006
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Enhanced security	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Caregiver safety; minimize risk of physical injury	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
	Efficient delivery of care	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Safe delivery of care	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Use furnishings that limit use as weapon (e.g., heavy, weighted, etc.)	S	Allen et al., 2019
		Ligature-free furniture and fixtures	S	Sachs, 2020
Continuous "chaise longue" sloped angle surface between top of 18-inch bench and a 27-inch desk			Sachs, 2020	
Doorless storage cubbies for clothing and personal items			Sachs, 2020	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Furniture/ Accessories	Safe delivery of care	Movable furniture that increases control without sacrificing safety		Sachs, 2020
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Built-in furniture that maximizes safety and minimizes institutional aesthetics		Sachs, 2020
	Improved job satisfaction	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
	Minimize patient stress/anxiety	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Nature art and prints		Frumkin, 2001; Liddicoat, 2019a; Liddicoat 2019b.
		Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006.; Shepley, et al., 2022.
		Attractive furniture		Shepley, et al., 2022
	Patient control/ independence	Possibility to adapt furnishings and décor to personal preferences		Degl' Innocenti et al., 2020; Shepley & Pasha; Ulrich, 2018
		Continuous “chaise longue” sloped angle surface between top of 18-inch bench and a 27-inch desk		Sachs, 2020
		Doorless storage cubbies for clothing and personal items		Sachs, 2020
		Movable furniture that increases control without sacrificing safety		Sachs, 2020
		Therapeutic furniture that patients can rock slightly (e.g., ottoman)		Sachs, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Furniture/ Accessories	Patient control/ independence	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Built-in furniture that maximizes safety and minimizes institutional aesthetics		Sachs, 2020
		Built-in's support various activities (e.g., lounge slope between bench and desk, pass-through cubbies, etc.)		Sachs, 2020
		Ligature-free bed with multiple locations and orientations along headwall(s)	S	Sachs, 2020
	Patient recovery	Multipurpose built-in's (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019
		Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
	Patient satisfaction	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Damage-resistant furnishings that are easily repaired or replaced		Liddicoat, 2018; Shepley & Pasha, 2013; Shepley et al., 2016.
		Nature art and prints		Frumkin, 2001; Liddicoat, 2019a; Liddicoat 2019b.
		Well-maintained high-quality features and environment		Shepley & Pasha, 2013; Shepley et al., 2016.
		Avoid "institutional colors" (i.e., "institutional green")		The Center for Health Design, 2019
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Patient comfort	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Minimize "safe" design features		The Center for Health Design, 2019
		Safe and durable familiar furnishings and finishes instead of trendy décor		Karlin & Zeiss, 2006



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Furniture/ Accessories	Patient comfort	Heavy-duty platform beds with rounded edges and provisions for restraints are dimensionally sized for mobility limitations		VA Office of Construction & Facilities Mgmt, 2014
		Multipurpose built-in's (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019
		Comfortable furniture		Shepley, et al., 2022
		Attractive aesthetic space		Shepley, et al., 2022
		Maximize bed comfort		Olausson et al., 2021
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Built-in's support various activities (e.g., lounge slope between bench and desk, pass-through cubbies, etc.)		Sachs, 2020
	Improved patient engagement	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
	Improved family presence and engagement in patient care	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
	Improved patient healthy behaviors	Non-institutional/homelike spaces that feel welcoming and secure		Shepley & Pasha, 2013; Shepley et al., 2016; Ulrich, Bogren, Lundin, 2012; Shepley, et al., 2022.
		Well-maintained high-quality features and environment		Shepley & Pasha, 2013; Shepley et al., 2016.
		Built-in furniture to delineate room zones		Shepley & Pasha, 2013
	A healthy environment (reduced negative health effects)	Nature art and prints		Frumkin, 2001; Liddicoat, 2019a; Liddicoat 2019b.
	Safety; fall/injury prevention and improved mobility	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
Safety; fall/injury prevention and improved mobility	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Furniture/ Accessories	Safety; minimize risk of injury	Avoid ligature points	S	Watts et al., 2012	
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012	
		Avoid bedrails		Liddicoat, 2019b	
		Tamper-proof bed with minimal leverage points and no sheets/blankets		Lambert et al., 2020; Liddicoat, 2019b.	
		Fire-resistant bed		Liddicoat, 2019b	
		Features supportive of social interaction, onlooker observation and physical retreat		The Center for Health Design, 2019	
		No furnishings or objects that provide ceiling access		The Joint Commission, 2017b	
	Safety; reduce risk of harm to self or harm to others	Damage-resistant furnishings that are easily repaired or replaced			Liddicoat, 2018; Shepley & Pasha, 2013; Shepley et al., 2016.
		Avoid ligature points	S	Watts et al., 2012	
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012	
		Avoid bedrails		Liddicoat, 2019b	
		Tamper-proof bed with minimal leverage points and no sheets/blankets		Lambert et al., 2020; Liddicoat, 2019b.	
		Fire-resistant bed		Liddicoat, 2019b	
		Avoid materials that are breakable, toxic, flame retardant, or can cause suffocation	S	The Center for Health Design, 2019	
		Features supportive of social interaction, onlooker observation and physical retreat		The Center for Health Design, 2019	
		No furnishings or objects that provide ceiling access		The Joint Commission, 2017b	
		Anchored furnishings and accessories without openings or sharp edges		ASHE, n.d.	
		Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018	
		Liner-free equipment and accessories (e.g., waste receptacles)		Allen et al., 2019	
		Use weight-sensitive collapsible “break away” hooks		Allen et al., 2019	
Select furnishings (e.g., chairs, beds, nightstands, etc.) that cannot be used to block or barricade doors		Allen et al., 2019			



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Furniture/ Accessories	Safety; reduce risk of harm to self or harm to others	Use furnishings that limit use as weapon (e.g., heavy, weighted, etc.)	S	Allen et al., 2019	
		Ligature-free furniture and fixtures	S	Sachs, 2020	
		Continuous “chaise longue” sloped angle surface between top of 18-inch bench and a 27-inch desk		Sachs, 2020	
		Doorless storage cubbies for clothing and personal items		Sachs, 2020	
		Movable furniture that increases control without sacrificing safety		Sachs, 2020	
		Therapeutic furniture that patients can rock slightly (e.g., ottoman)		Sachs, 2020	
		Safe and durable familiar furnishings and finishes instead of trendy décor		Karlin & Zeiss, 2006	
		Use shatterproof windows with breakaway curtain rods		S	Karlin & Zeiss, 2006
		Stainless-steel mirrors			Karlin & Zeiss, 2006
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)			Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Color, texture, and natural materials that provide a more residential feel			Hunt & Sine, 2015
		Soft, upholstered, durable furniture with wood accents that can be anchored in place			Hunt & Sine, 2015
		Sturdy durable furniture anchored in place (no table lamps)			Hunt & Sine, 2015
		Facilitate staff surveillance, egress, protection, teamwork and tasks			Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
		Secured, homelike, non-breakable artwork, marker board, etc.			VA Office of Construction & Facilities Mgmt, 2014
		Heavy-duty platform beds with rounded edges and provisions for restraints are dimensionally sized for mobility limitations			VA Office of Construction & Facilities Mgmt, 2014
Ligature-free durable desk chairs with arms and rounded edges			S	VA Office of Construction & Facilities Mgmt, 2014	



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Furniture/ Accessories	Safety; reduce risk of harm to self or harm to others	Built-in or furniture-based open shelving units with provisions for safety (e.g., spring loaded hooks, gypsum board soffit, etc.)		VA Office of Construction & Facilities Mgmt, 2014
		Clothing or towel hooks should be designed to collapse when any weight above 4 lbs [1.81 kg] is applied		VA Office of Construction & Facilities Mgmt, 2014
		Durable furnishings and finishes that are residential in character		VA Office of Construction & Facilities Mgmt, 2014
		Multipurpose built-in's (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019
		Damage-resistant furniture		Shepley, et al., 2022
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Built-in furniture that maximizes safety and minimizes institutional aesthetics		Sachs, 2020
		Built-in's support various activities (e.g., lounge slope between bench and desk, pass-through cubbies, etc.)		Sachs, 2020
		Ligature-free bed with multiple locations and orientations along headwall(s)	S	Sachs, 2020
	Enhanced durability	Damage-resistant furnishings that are easily repaired or replaced		Liddicoat, 2018; Shepley & Pasha, 2013; Shepley et al., 2016.
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Fire-resistant bed		Liddicoat, 2019b
		Well-maintained high-quality features and environment		Shepley & Pasha, 2013; Shepley et al., 2016.
		Damage-resistant furniture		Shepley, et al., 2022
	Enhanced sustainability	Damage-resistant furnishings that are easily repaired or replaced		Liddicoat, 2018; Shepley & Pasha, 2013; Shepley et al., 2016.
	Reduced resource consumption	Damage-resistant furnishings that are easily repaired or replaced		Liddicoat, 2018; Shepley & Pasha, 2013; Shepley et al., 2016.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Casework/ Storage	Change-readiness/ future-proofing	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.	
	Minimize stigma	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.	
		Well-organized, maintained, and orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022; Shepley, et al. 2021.	
		Equipment should be built-in/hidden		HGA, 2020	
		Warm light gray paint with cool blue accent wall, woodgrain built-in's and doors, solid surfaces, stainless steel fixtures and hardware		Sachs, 2020	
		Safe features in patient toilets (e.g., solid-surface countertops, integral sinks, ligature-resistant faucets, recessed cabinet pulls, and securely locked doors that enclose under-counter pipes)	S	Hunt & Sine, 2015	
		Attractive and secure built in desks and shelving units		VA Office of Construction & Facilities Mgmt, 2014	
		Multipurpose built-in's (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019	
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.	
	Accessibility; ease of use	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.	
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.	
	Enhanced security	Avoid ligature points		S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons		S	Watts et al., 2012



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Casework/ Storage	Caregiver safety; minimize risk of physical injury	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012	
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.	
	Efficient delivery of care	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.	
		Well-organized, maintained, and orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022; Shepley, et al. 2021.	
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.	
	Safe delivery of care	Avoid ligature points		S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons		S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)			Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment			HDR, Inc., 2019; Sachs, 2020.
	Improved job satisfaction	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)			Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Minimize patient stress/anxiety	Well-organized, maintained, and orderly spaces			Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022; Shepley, et al. 2021.
		Equipment should be built-in/hidden			HGA, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Casework/ Storage.	Patient control/ independence	Well-organized, maintained, and orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022; Shepley, et al. 2021.
		Built-in's support various activities (e.g., lounge slope between bench and desk, pass-through cubbies, etc.)		Sachs, 2020
	Patient recovery	Multipurpose built-in's (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019
	Patient satisfaction	Well-maintained high-quality features and environment		Shepley & Pasha, 2013; Shepley et al., 2016.
		Well-organized, maintained, and orderly spaces		Shepley & Pasha, 2013; Shepley et al., 2016; Shepley, et al., 2022; Shepley, et al. 2021.
		Opportunities to personalize the room		Shepley & Pasha, 2013
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Patient comfort	Multipurpose built-in's (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Built-in's support various activities (e.g., lounge slope between bench and desk, pass-through cubbies, etc.)		Sachs, 2020
	Improved family presence and engagement in patient care	Safely accommodate visitors with secure storage outside patient room and first egress access from inside patient room		Adams et al, 2020
	Improved patient healthy behaviors	Well-maintained high-quality features and environment		Shepley & Pasha, 2013; Shepley et al., 2016
	Safety; fall/injury prevention and improved mobility	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Safety; minimize risk of injury	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Avoid clothes hooks		Liddicoat, 2019b
		Ligature resistant shelves	S	Liddicoat, 2019b



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Casework/ Storage	Safety; minimize risk of injury	Ligature resistant towel racks	S	Liddicoat, 2019b
		Conceal plumbing		Liddicoat, 2019b
		No furnishings or objects that provide ceiling access		The Joint Commission, 2017b
		Avoid clothing rods and hangers		The Center for Health Design, 2019
	Safety; reduce risk of harm to self or harm to others	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Avoid clothes hooks		Liddicoat, 2019b
		Ligature resistant shelves	S	Liddicoat, 2019b
		Ligature resistant towel racks	S	Liddicoat, 2019b
		Conceal plumbing		Liddicoat, 2019b
		Fixed, non-adjustable shelves or hooks that support no more than 4 pounds (and no rods or hangers)		The Center for Health Design, 2019
		No furnishings or objects that provide ceiling access		The Joint Commission, 2017b
		Avoid clothing rods and hangers		The Center for Health Design, 2019
		Anchored furnishings and accessories without openings or sharp edges		ASHE, n.d.
		Wall mounted items should avoid glass, protruding edges, or exposed corners		ASHE, n.d.
		Ligature-resistant features (e.g., lacking points for looped or tied attachments)	S	Beebe, 2018
		Warm light gray paint with cool blue accent wall, woodgrain built-in's and doors, solid surfaces, stainless steel fixtures and hardware		Sachs, 2020
		Color, texture, and natural materials that provide a more residential feel		Hunt & Sine, 2015
		Locked doors and drawers with flush pulls and recessed hinges prevent access		Hunt & Sine, 2015
		Securely anchored non-adjustable shelves in cabinets without doors and drawers (no hanging rods)		Hunt & Sine, 2015



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Casework/ Storage	Safety; reduce risk of harm to self or harm to others	Safe features in patient toilets (e.g., solid-surface countertops, integral sinks, ligature-resistant faucets, recessed cabinet pulls, and securely locked doors that enclose under-counter pipes)	S	Hunt & Sine, 2015
		Safely accommodate visitors with secure storage outside patient room and first egress access from inside patient room		Adams et al, 2020
		Built-in or furniture-based open shelving units with provisions for safety (e.g., spring loaded hooks, gypsum board soffit, etc.)		VA Office of Construction & Facilities Mgmt, 2014
		Multipurpose built-in's (e.g., seat height shelf for storage, seating or lounging).		HDR, Inc., 2019
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Built-in's support various activities (e.g., lounge slope between bench and desk, pass-through cubbies, etc.)		Sachs, 2020
	Enhanced durability	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Well-maintained high-quality features and environment		Shepley & Pasha, 2013; Shepley et al., 2016.
Patient Handling/ Movement Equipment	Minimize stigma	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Accessibility; ease of use	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Enhanced security	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Patient Handling/ Movement Equipment	Caregiver safety; minimize risk of physical injury	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Efficient delivery of care	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Safe delivery of care	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Improved job satisfaction	Accommodate the elderly and impaired (e.g., closed-bottom handrails, seating for rising, equipment/aides, visible toilet, etc.)		Degl' Innocenti et al., 2020; Karlin & Zeiss, 2006.
	Safety; minimize risk of injury	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Safety; reduce risk of harm to self or harm to others	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Ceiling-mounted patient lifts should not be installed in patient rooms	S	VA Office of Construction & Facilities Mgmt, 2014
	Enhanced durability	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
	Technology/ Internet/ Communication/ Monitoring Equipment	Change-readiness/ future-proofing	Design to incorporate new technology as it develops	
Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment				HDR, Inc., 2019; Sachs, 2020.
Minimize stigma		Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:	
Technology/ Internet/ Communication/ Monitoring Equipment	Minimize stigma	Minimize “safe” design features		The Center for Health Design, 2019	
		Mock-up’s to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020;	
	Accessibility; ease of use	Mock-up’s to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020;	
	Enhanced security	Discreet security features that reinforce safety without compromising experience			Lenaghan et al., 2018
		Avoid ligature points	S		Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S		Watts et al., 2012
		Required safety/security features are concealed or as discreet as possible			Lundin, 2020
		Avoid over-reliance on technology provisions to address safety			The Center for Health Design, 2019; BETA Healthcare Group and Emergency Medicine Council, 2018
		Maximize direct visual observation of patients from security/staffing areas			Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Caregiver safety; minimize risk of physical injury	Discreet security features that reinforce safety without compromising experience			Lenaghan et al., 2018
		Avoid objects, fixtures, and furniture which might be used as weapons			Watts et al., 2012
		Required safety/security features are concealed or as discreet as possible			Lundin, 2020
		Maximize direct visual observation of patients from security/staffing areas			Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Facilitate staff surveillance, egress, protection, teamwork and tasks			Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Technology/ Internet/ Communication/ Monitoring Equipment	Communication/ interaction with care provider/ emergency care	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		No nurse call buttons (not cords) in patient rooms and bathrooms		VA Office of Construction & Facilities Mgmt, 2014
	Communication; staff to staff	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Efficient delivery of care	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Safe delivery of care	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Avoid over-reliance on technology provisions to address safety		The Center for Health Design, 2019; BETA Healthcare Group and Emergency Medicine Council, 2018
	Improved job satisfaction	Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
		Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlín & Zeiss, 2006.; Shepley, et al., 2022.
	Minimize patient stress/anxiety	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Technology/ Internet/ Communication/ Monitoring Equipment	Minimize patient stress/anxiety	Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
	Patient control/ independence	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Access to options for acoustics		Shepley & Pasha, 2013
		Patient selected artwork using wall-mounted screens with preselected images		Sachs, 2020
		Curb noise and promote auditory control (e.g., sound-absorbing plaster, patient-controlled white noise generator, etc.)		Sachs, 2020
	Patient recovery	Positive distractions (e.g., indoor plants, garden views, and other nature elements)		Karlin & Zeiss, 2006; Shepley, et al., 2022.
	Patient satisfaction	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Opportunities to personalize the room		Shepley & Pasha, 2013
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Patient comfort	Minimize "safe" design features		The Center for Health Design, 2019
		Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Improved patient engagement	Required safety/security features are concealed or as discreet as possible		Lundin, 2020
	Reduced noise	Good acoustical control		Shepley, et al., 2022
		Curb noise and promote auditory control (e.g., sound-absorbing plaster, patient-controlled white noise generator, etc.)		Sachs, 2020



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Technology/ Internet/ Communication/ Monitoring Equipment	Safety; fall/injury prevention and improved mobility	Avoid ligature points	S	Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Safety; minimize risk of injury	Avoid ligature points		Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
	Safety; reduce risk of harm to self or harm to others	Discreet security features that reinforce safety without compromising experience		Lenaghan et al., 2018
		Avoid ligature points		Watts et al., 2012
		Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012
		Required safety/security features are concealed or as discreet as possible		Lundin, 2020
		Alternative to non-recessed life safety devices (e.g., chimes, strobes, pull station, smoke detectors, sprinkler heads, fire extinguishers, hose cabinets, etc.)		ASHE, n.d.
		Alternative to non-recessed monitoring, communication, and access equipment (e.g., speakers, cameras, phone, access card readers, wireless access points, etc.)		ASHE, n.d.
		Maximize direct visual observation of patients from security/staffing areas		Fay et al., 2016; Hunt & Sine, 2015; Lenaghan et al., 2018; Shepley, et al., 2022.
		Facilitate staff surveillance, egress, protection, teamwork and tasks		Adams et al, 2020; HGA, 2020; Hunt & Sine, 2015.
No nurse call buttons (not cords) in patient rooms and bathrooms		VA Office of Construction & Facilities Mgmt, 2014		



Design Element:	Desirable Outcome:	Design Strategies:	Safety (S)	Reference:
Technology/ Internet/ Communication/ Monitoring Equipment	Safety; reduce risk of harm to self or harm to others	Mock-up's to evaluate efficacy, safety, layouts, finishes, furniture, and equipment		HDR, Inc., 2019; Sachs, 2020.
	Enhanced durability	Avoid objects, fixtures, and furniture which might be used as weapons	S	Watts et al., 2012

References

- Adams, et al (2020). Designing the inclusive inpatient room: Advice for design teams on planning spaces to handle medical and behavioral health comorbidities.
- Allen et al. (2019). Transforming BH Environments. 245 pm. Ligature Reduction.pdf
- ASHE. (n.d.). ASHE_Patient-safety-and-ligature-risk-checklist.xlsx.
- Beebe, C. E. (2018, November 9). Ligature-risk requirements: Separating fact from fiction in Ligature risk. Patient Safety.
- BETA Healthcare Group & Emergency Medicine Council. (2018). Management of mental health patients in the ED toolkit. https://betahg.com/wp-content/uploads/2019/01/Section_1_Safety- EMC Toolkit Final.pdf
- BETA Healthcare Group and Emergency Medicine Council. (2018). Management of Mental Health Patients in the ED Toolkit. https://betahg.com/wp-content/uploads/2019/01/Section_1_Safety- EMC Toolkit Final.pdf
- Degl' Innocenti, A., Wijk, H., Kullgren, A., & Alexiou, E. (2020). The influence of evidence-based design on staff perceptions of a supportive environment for person-centered care in forensic psychiatry. *Journal of Forensic Nursing*, 16(3), E23. <https://doi.org/10.1097/JFN.0000000000000261>
- Dobrohotoff, J. T., & Llewellyn-Jones, R. H. (2011). Psychogeriatric inpatient unit design: A literature review. *International Psychogeriatrics*, 23(2), 174–189. <https://doi.org/10.1017/S1041610210002097>
- Eklund, M., & Hansson, L. (2001). Ward atmosphere, client satisfaction, and client motivation in a psychiatric work rehabilitation unit. *Community Mental Health Journal*, 37, 169–177. <https://doi.org/10.1023/A:1002765800180>
- Evans, G. (2003). The built environment and mental health. *Journal of Urban Health*, 80, 536–555. <https://doi.org/10.1093/jurban/jtg063>
- Fay, L., Carll-White, A., & Harrell, J. (2016). Coming Full Cycle: Linking POE Findings to Design Application. *HERD: Health Environments Research & Design Journal*, 10(3), 83–98. <https://doi.org/10.1177/1937586716672856>
- Frumkin, H. (2001). Beyond toxicity: Human health and the natural environment. *American Journal of Preventive Medicine*, 20(3), 234–240.



- HDR, Inc. (Host). (2019, August 13). Prototyping a Therapeutic Environment for Behavioral Health Treatment.
- HGA (2020, May 22). Health Facilities Management: Designing the Inclusive Inpatient Room.
- Hunt, J., & Sine, D. (2015). Common Mistakes in Designing Psychiatric Hospitals: An Update.
- Hunt, J., & Sine, D. (2015). Common Mistakes in Designing Psychiatric Hospitals: An Update.; Lenaghan et al., 2018;
- Hunt, J., & Sine, D. (2018). Behavioral Health Design Guide: Edition 7.3 [White Paper/Guidelines]. <http://www.bhfcllc.com/download-the-design-guide/>
- Karlin, B. E., & Zeiss, R. A. (2006). Best Practices: Environmental and therapeutic issues in psychiatric hospital design: Toward best practices.
- Karlin, B. E., & Zeiss, R. A. (2006). Best Practices: Environmental and therapeutic issues in psychiatric hospital design: Toward best practices. *Psychiatric Services*, 57(10), 1376–1378. PsycINFO. <https://doi.org/10.1176/appi.ps.57.10.1376>
- Lambert, K., Fischer-Sanchez, D., & Watson, W. T. (2020). ASHRM/AHA behavioral health white paper series behavioral health care in the emergency department setting [Review of ASHRM/AHA behavioral health white paper series behavioral health care in the emergency department setting, by M. Cooke, J. Howard, & B. Romero].
- Lenaghan, P. A., Cirrincione, N. M., & Henrich, S. (2018). Preventing Emergency Department Violence through Design. *Journal of Emergency Nursing*, 44(4), 322–323. <https://doi.org/10.1016/j.jen.2017.06.012>
- Liddicoat, S. (2018). Perceptions of spatiality: Supramodal meanings and metaphors in therapeutic environments. *Interiority*, 1(2), 91–111. <https://doi.org/10.7454/in.v1i2.17>
- Liddicoat, S. (2019a). Designing a supportive emergency department environment for people with self harm and suicidal ideation: A scoping review. *Australasian Emergency Care*, 22(3), 139–148. <https://doi.org/10.1016/j.auec.2019.04.006>
- Liddicoat, S. (2019b). Enhancing emergency care environments: Supporting suicidal distress and self-harm presentations through environmental safeguards and the built environment. *Patient Experience Journal*, 6(3), 91–104. <https://doi.org/10.35680/2372-0247.1361>
- Lundin, S. (2021). Can healing architecture increase safety in the design of psychiatric wards? *HERD: Health Environments Research & Design Journal*, 14(1), 106–117. <https://doi.org/10.1177/1937586720971814>
- National Association for Behavioral Healthcare. (2019). The high cost of compliance: Assessing the regulatory burden on inpatient psychiatric facilities. <https://www.nabh.org/nabh-releases-the-high-cost-of-compliance-assessing-the-regulatory-burden-on-inpatient-psychiatric-facilities/>
- Olausson, et al. (2021). Patients' experiences of place and space after a relocation to EBD forensic psychiatric hospitals.; Shepley, et al. (2021). Staff and resident perceptions of mental and behavioural health environments.
- Sachs, N. A., Shepley, M. M., Peditto, K., Hankinson, M. T., Smith, K., Giebink, B., & Thompson, T. (2020). Evaluation of a Veterans Administration mental and behavioral health patient room mockup. *HERD: Health Environments Research & Design Journal*, 13(2), 46–67. <https://doi.org/10.1177/1937586719856349>



- Sheehan, B., Burton, E., Wood, S., Stride, C., Henderson, E., & Wearn, E. (2013). Evaluating the Built Environment in Inpatient Psychiatric Wards. *Psychiatric Services*, 64(8), 789–795. <https://doi.org/10.1176/appi.ps.201200208>
- Shepley, M. M., & Pasha, S. (2013). Design Research and Behavioral Health Facilities (pp. 1–81) [Literature Review]. The Center for Health Design. https://www.healthdesign.org/sites/default/files/chd428_researchreport_behavioralhealth_1013-final_0.pdf
- Shepley, M. M., Peditto, K., Sachs, N. A., Pham, Y., Barankevich, R., Crouppen, G., & Dresser, K. (2022). Staff and resident perceptions of mental and behavioural health environments. *Building Research & Information*, 50(1–2), 89–104. <https://doi.org/10.1080/09613218.2021.1963653>
- Shepley, M. M., Watson, A., Pitts, F., Garrity, A., Spelman, E., Kelkar, J., & Fronsman, A. (2016). Mental and Behavioral Health Environments: Critical Considerations for Facility Design. *General Hospital Psychiatry*, 42, 15–21. <https://doi.org/10.1016/j.genhosppsy.2016.06.003>
- The Center for Health Design. (2019). Behavioral health: Mitigating risk in healthcare facility design—A module on a Safety Risk Assessment. https://www.healthdesign.org/system/files/res_files/Module_SRA_Behavioral%20Health_2019.pdf
- The Joint Commission. (2017). November 2017 Perspectives Preview: Special Report: Suicide Prevention in Health Care Settings. Joint Commission Online Article. <http://www.jointcommission.org/issues/article.aspx>
- Ulrich, R. S., Bogren, L., & Lundin, S. (2012). Towards a design theory for reducing aggression in psychiatric facilities. *ARCH*, 12, 12–14.
- Ulrich, R. S., Bogren, L., Gardiner, S. K., & Lundin, S. (2018). Psychiatric ward design can reduce aggressive behavior. *Journal of Environmental Psychology*, 57, 53–66. <https://doi.org/10.1016/j.jenvp.2018.05.002>
- VA Office of Construction & Facilities Management. (2014). Mental Health Design Guide. Department of Veterans Affairs
- Watts, B. V., Young-Xu, Y., Mills, P. D., DeRosier, J. M., Kemp, J., Shiner, B., & Duncan, W. E. (2012). Examination of the effectiveness of the Mental Health Environment of Care Checklist in reducing suicide on inpatient mental health units. *Archives of General Psychiatry*, 69(6), 588–592. <https://doi.org/10.1001/archgenpsychiatry.2011.1514>