# Clinical and Social Isolation of Patients with Highly Infectious Diseases: The Role of Design



Image source: https://philowilke.com/portfolio/the-university-of-texas-medical-branch-biocontainment-critical-care-unit/





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# **Learning Objectives**

Learn about the unique needs of patients treated for highly infectious diseases and their individual experiences of being placed in isolation.

Use a qualitative study to develop an enhanced understanding of the role of space in patients' experience in isolation units, both for healthcare designers and nursing staff.

Obtain evidence on how the built environment can support patients' physiological and psychological well-being and reduce the toll extended isolation can take.

Consider how healthcare systems can incorporate the proposed strategies into the design and operation of their isolation units to improve patients' experience during isolation.







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# The Unique Considerations of the Patient

# **Care in a Biocontainment Unit**









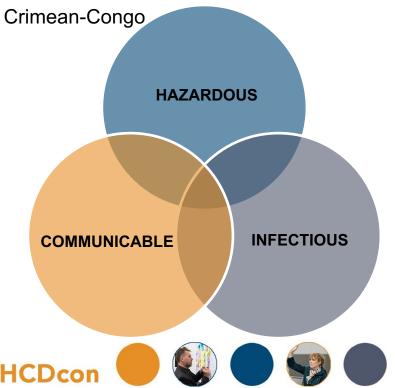




#### Special Pathogens that might require care in a biocontainment unit include:

- Viral hemorrhagic fevers: Ebola, Marburg, Lassa, Crimean-Congo
- Paramyxoviruses Hendra, Nipah
- Smallpox
- Novel respiratory pathogens
- Emerging pathogens
- **Bioterrorism threats**



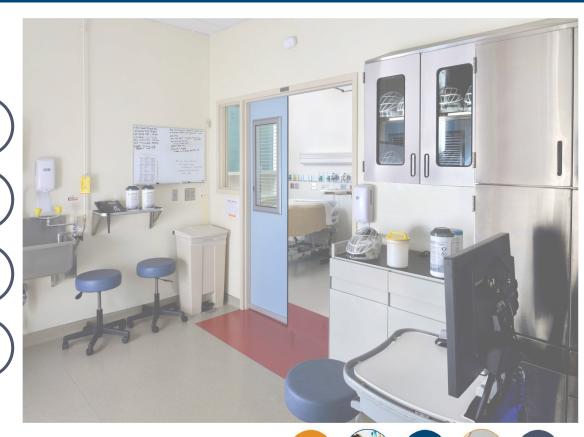


**2002 - 14**: 3 hospital-based units

**2014 - 20**: ~56 Regional or state designated centers

**2022**: 10: Regional centers, +3

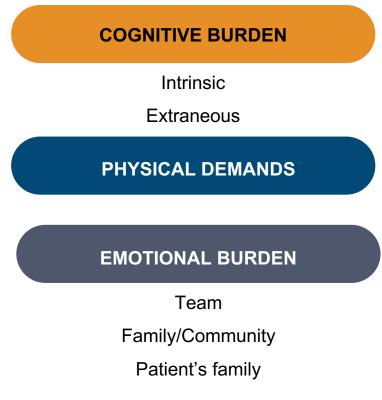
**Future**: National Special Pathogens System of Care





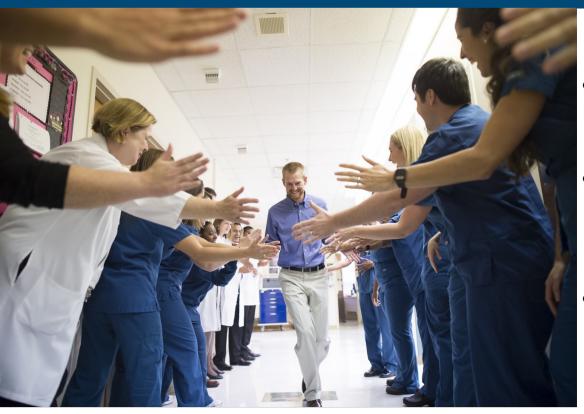












- We were all affected in some way by this experience.
- We changed the way science looks at the care of critically ill patients with special pathogens.
- To ensure that we "First, Do No Harm" to our patients and our team, we need to better understand the effect isolation had on all of us.



Photo: Emory School of Medicine





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# **Patients' Perception of Prolonged Isolation**





**Perception of the Physical Environment** 

"Too sick to care"

You know what, when you're so sick like that, those kinds of things **really don't matter**.









#### **Perception of the Physical Environment**

↑ Recovery

↑ Situational awareness

I remember, in cold nights and the dark with a little bit of light and that dialysis machine **beeping**.

I hated having [to smell] alcohol wipes, that feeling of your blood is about to get drawn; it almost was **agony**...









#### **Psychological and Physiological Effects of Isolation**

# Spatial and temporal disorientation



When I first woke up, it was a shock that that much **time has passed**. There was a whiteboard on the wall that had the day or number of days.

I remember my birthday happened while I was in the unit... I wasn't aware of this, but they had a cake, and I don't think I was fully conscious yet.







**Psychological and Physiological Effects of Isolation** 

Lack of agency









**Psychological and Physiological Effects of Isolation** 

"Being in a zoo"

*There was glass. One of the walls was like a window,* 

and people could **come in and kind of see** and **not really interact** with me but look at me.









**Psychological and Physiological Effects of Isolation** 

#### **Coping strategies**



#### Faith

Intellectual activities

Look for connection

Indications of progress

Personalizing the space

Activities to regain muscle tone











#### **Patients' Perception of Social Interactions**

#### Lack of privacy



Can you imagine having diarrhea and having to get up out of that bed, sit on a bedside commode, not only with **another human** in the room that **you don't know** but **other people out there**, looking in?

*Oh gosh, it's the sounds, it's the smells, it's the everything, it's terribly dehumanizing*.







**Patients' Perception of Social Interactions** 

Sense of connectedness (specially large groups)









**Patients' Perception of Social Interactions** 

"Never without gloves"

When [my loved one] came,

I walked to the window,

and we put our hands on the window,

and it was a really sweet moment ...









#### **Patients' Perception of Social Interactions**

#### **Conflicting feelings**

And at night... I hated it in some ways because it was freezing, and I was not sleeping.

But there was **something that was nice**, just being more alone or being more private or a little quieter.









**Patients' Perception of Care Delivery** 

Sense of security and comfort









**Patients' Perception of Care Delivery** 

#### Gratefulness

There are times,

when we're already cleaning somebody, and they're like, 'oh, I have to go again!' and I'm like... '**that's what I'm here for**.' I'll be here 12 hours; you're fine, go ahead and go.

Powerlessness can be very difficult.









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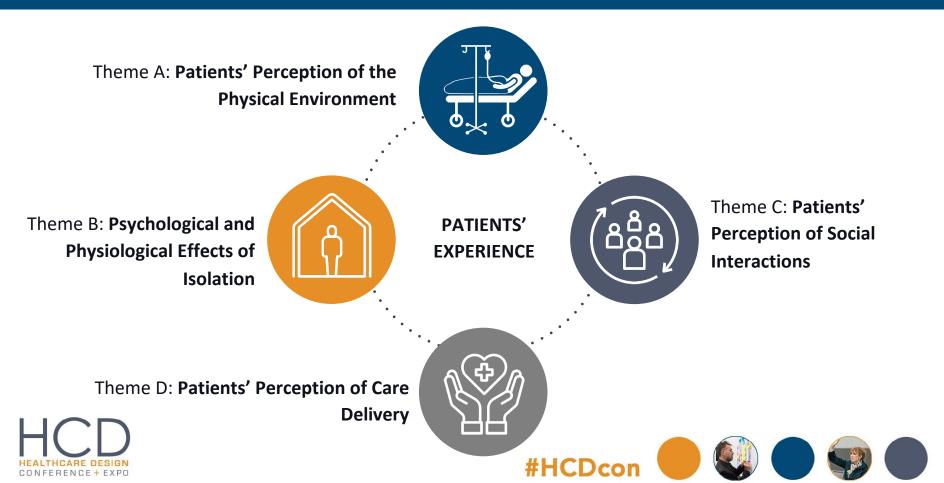
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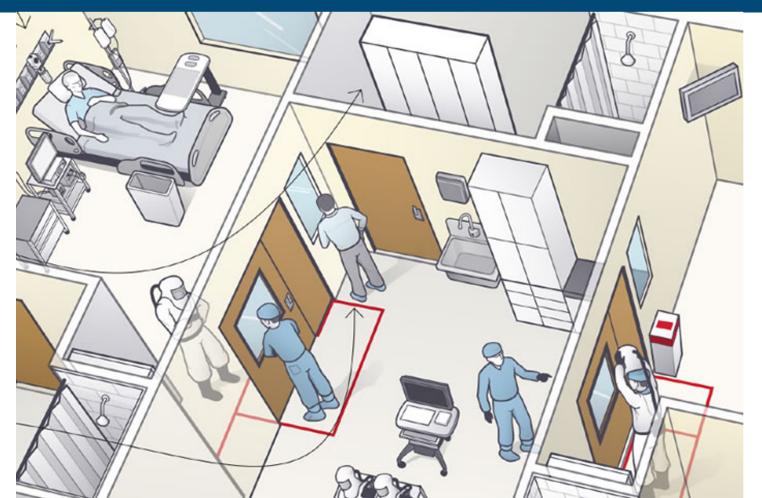
# **Designing Your Isolation Unit to Improve**

# the Patient Experience in Isolation











#### **Perception of the Physical Environment**

- 1. Reduced awareness of the surroundings ("too sick to care about the design of the unit")
- 2. Difficulty adapting to the institutional environment (temperature, noise, smells, lighting, size of the room)



Acoustical Environment

Lighting Design



**Optimal Room Size** 





#### **Psychological and Physiological Effects of Isolation**

- 1. Spatial and temporal disorientation
- 2. Feeling lack of agency: Having control of the environment
- **3.** Perceptions of isolation: Confining nature of isolation, Out-of-the-ordinary conditions
- 4. Coping strategies: physical activity, mediated connectivity, direct visualization of the outside world
- 5. Sense of Recovery: Maintaining normalcy and personalization of space







**Psychological and Physiological Effects of Isolation** 

- 1. Spatial and temporal disorientation
- 2. Feeling lack of agency: Having control of the environment

#### Help the Restoration & Maintenance of Spatiotemporal Orientation



Higher Level of Patient Independence and Control



#### Flexible Layout for Space Adjustment





**Psychological and Physiological Effects of Isolation** 

- **4. Perceptions of isolation:** *Confining nature of isolation, Out-of-the-ordinary conditions*
- 5. Coping strategies: physical activity, mediated connectivity, direct visualization of the outside world
- 6. Sense of Recovery: Maintaining normalcy and personalization of space

Enable the Connection to the "Outside World"



Direct Visualization of the Outside World



Accommodate Safe Rehabilitation of Patient





**Patients' Perception of Social Interactions** 

- 1. Lack of privacy: visual, audio
- 2. Sense of social and emotional connectedness: care-givers, family & friends, other patients





See the Faces of Nursing Personnel w/o PPE



Enable Patients to Communicate with Others





Patients' Perception of Care Delivery

- 1. Sense of security & comfort: touch, presence, verbal reassurance, comforting sounds
- 2. Gratitude to care providers

#### Playing Comforting Sounds





#### See the Faces of Nursing Personnel w/o PPE







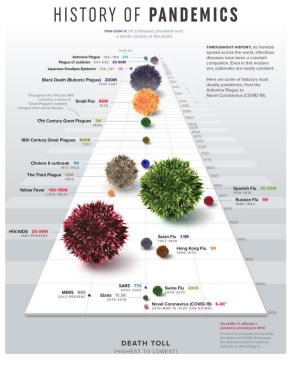
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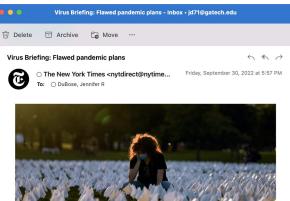
# **Takeaways**





https://www.visualcapitalist.com/history-of-pandemics-deadliest/

#### &\*^%\$#@! Pox is coming!!



News Analysis

#### Brynn Anderson/Associated Press

#### New Infectious Threats Are Coming. The U.S. Probably Won't Contain Them.

The coronavirus revealed flaws in the nation's pandemic plans. The spread of monkeypox shows that the problems remain deeply entrenched.

By Apoorva Mandavilli





Study	Total	lso Mean	olated SD		Not iso Mean	olated SD		Sta	ndar Dif	dise		ean		SMD	ç	95%-CI	I
Gammon (1998) Control	20	11.40	3.23	20	16.10	3.52		-						-1.36	[-2.06:	-0.67]	
Gammon (1998) Self-esteem	20		3.08		16.90	4.09				_						-0.05]	
Lau (2016) Anxiety	75	1.48	1.72	420	1.70	1.80			_	÷.					-	0.121	
Lau (2016) Depression	75	6.89	4.92	420	7.35	5.92				÷.						0.17]	
Findink (2012) Depression	60	8.83	4.70	57	7.89	4.90				7.					-	0.56]	
Kennedy (1997) State anxiety	16	37.80	19.90	16	34.20	15.70					_					0.891	
Findink (2012) Anxiety	60	7.23	4.10	57	6.42	3.90								0.20	I-0.16	0.56	
Kennedy (1997) Fatigue/inertia	16	7.10	6.40	16	5.80	3.90					_				-	0.93	
Kennedy (1997) Vigour/activity	16	13.90	6.50	16	12.10	7.00					_				-	0.96	
Kennedy (1997) Confusion/bewilderment	16	3.90	5.70	16	2.40	4.40				-++	_			0.29	[-0.41	0.98]	
Kennedy (1997) Depression	16	16.50	9.90	16	12.30	10.70					-			0.40	[-0.30	1.10]	
Kennedy (1997) Anger/hostility	16	12.40	11.70	16	4.90	7.10					+	-		0.76	0.03	1.48]	ľ.
Day (2011a) Anxiety/Depression	20	14.35	1.61	83	13.00	0.78					+	÷ .		1.35	[ 0.83	1.88]	
Gammon (1998) Anxiety	20	12.75	2.43	20	8.15	3.17					-	+		1.60	[ 0.88	2.32	i i
Gammon (1998) Depression	20	12.45	2.21	20	7.30	2.05						-	-	2.37	[ 1.54	3.19]	
Lupion-Mendoza (2015) Depression	72	7.80	0.51	72	6.60	0.43						+	+	2.53	[ 2.09	2.97]	
Lupion-Mendoza (2015) Anxiety	72	8.20	0.48	72	6.90	0.40								2.93	[ 2.45	3.40]	
, ,															-		
							-3	-2	-1	Ó	1	2	3				

Mean lower if isolated Mean higher if isolated

Figure 2 Standardised mean difference of psychological scores in those isolated versus those not isolated.

Purssell E, et al. BMJ Open 2020;10:e030371. doi:10.1136/bmjopen-2019-030371













#### Connection



https://www.npr.org/2016/12/05/504458311/video-callsreplace-in-person-visits-in-some-jails Natasha Harvey for NPR





https://canhrnews.com/nursing-home-advocates-push-forfacilities-to-allow-more-visitors/





Control

- 1. Illness and hospitalization = loss of agency and control
- 2. Look for simple ways to introduce control

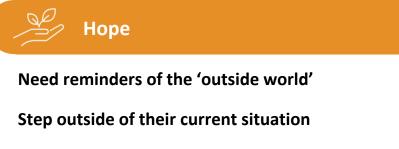


Acoustic Environment



Refreshments





#### Go beyond the current limitations

Enable the Connection to the "Outside World" Direct Visualization of the Outside World

Access to Nature

#### Accommodate Safe Rehabilitation of Patient









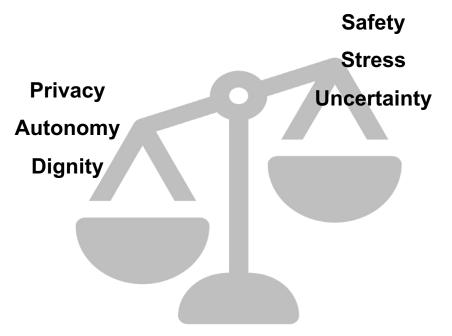




Photo: Emory School of Medicine





Research Manuscript

Understanding Experience of Patients With Highly Infectious Diseases During Extended Isolation: A Design Perspective

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