## TRANSFORMING PEDIATRIC MENTAL HEALTH: AN INNOVATIVE DESIGN AND CARE MODEL











#### **SPEAKERS**



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#### **AGENDA**

- 1. Ped. M/B Care and Facility Challenge
- 2. Cincinnati Children's College Hill Design Study
- 3. Ped. M/B Care Models and the Old Facility Issues: Providers' POVs
- 4. Pre-/Post-Occupancy Evaluation: The Research Partnership
- 5. Closing Discussions





#### **LEARNING OBJECTIVES**

- Understand the complexity of operating pediatric behavioral health facilities from the perspective of the facility administrator, including how spatial design supports various treatment programs that involve varying levels of security and meet the diverse needs of patients.
- Learn about the key decisions a pediatric hospital system faces when building an addition to the largest inpatient facility in the country and how this facility integrates within the entire system.
- Explore the key decisions made throughout the design and construction process to manage the most cost-effective way of addressing the potential for physical abuse within the facility.
- Learn about the one-of-a-kind POE toolkit for evaluating the effectiveness of public spaces in supporting various treatment programs within the pediatric behavioral health facility.

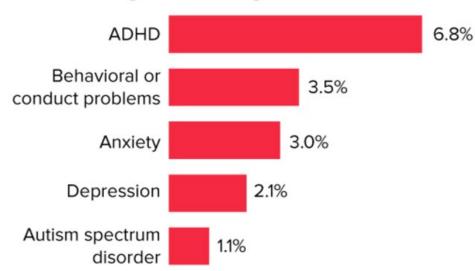




## RISE IN MENTAL/BEHAVIORAL HEALTH



#### Children ages 3-17 diagnosed with:



Source: Centers for Disease Control and Prevention

- 1 in 5 or 15 million American children and young adults experience a mental health disorder each year, and 2/3 or 10 million are undiagnosed or untreated.
- 50% of all lifetime mental illness begins by age 14, and 75% by age 24
- Suicide is the 2<sup>nd</sup> leading cause of death among people aged 10-14.







## CHALLENGES IN PEDIATRIC M/B HEALTHCARE

Increased demand and emergency department overload



Shortage of mental health providers trained to meet the needs of children and adolescents

Inadequate resources in certain areas and limited access to care



Societal and cultural factors leading to stigma and misunderstandings





#### **INADEQUATE FACILITIES**

- Overall space shortage and lack of beds (SQFT)
- Lack of supportive design that fulfills unique patient needs
- Inadequate spatial design that considers care operation
- Lack of spaces to support staff well-being in a high stressful work environment









### HISTORY OF MENTAL HEALTH FACILITIES

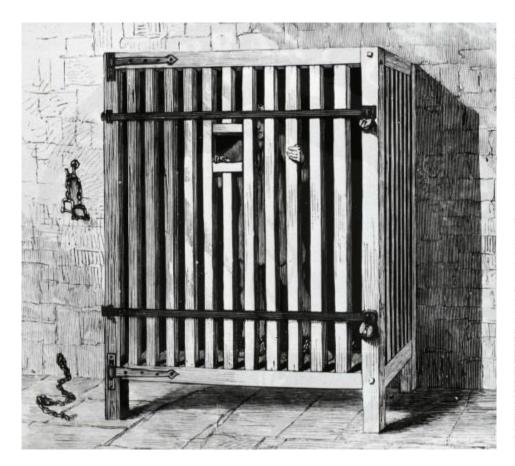


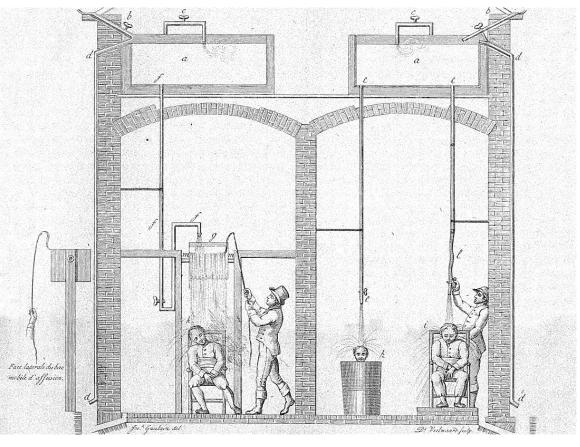






### HISTORY OF MENTAL HEALTH FACILITIES

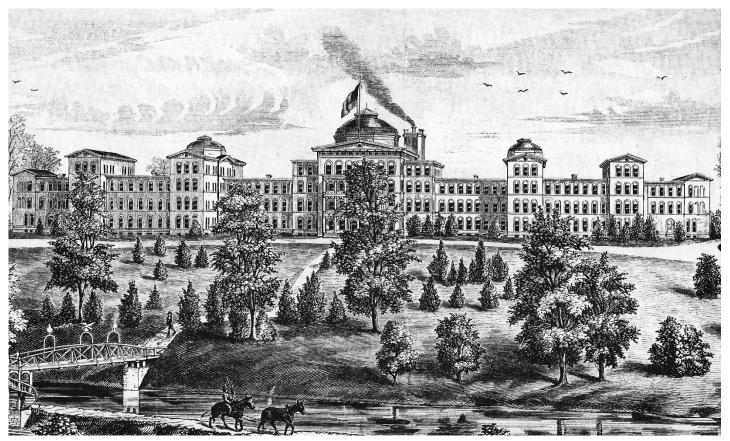


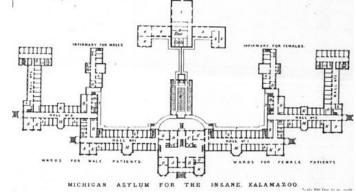






### HISTORY OF MENTAL HEALTH FACILITIES



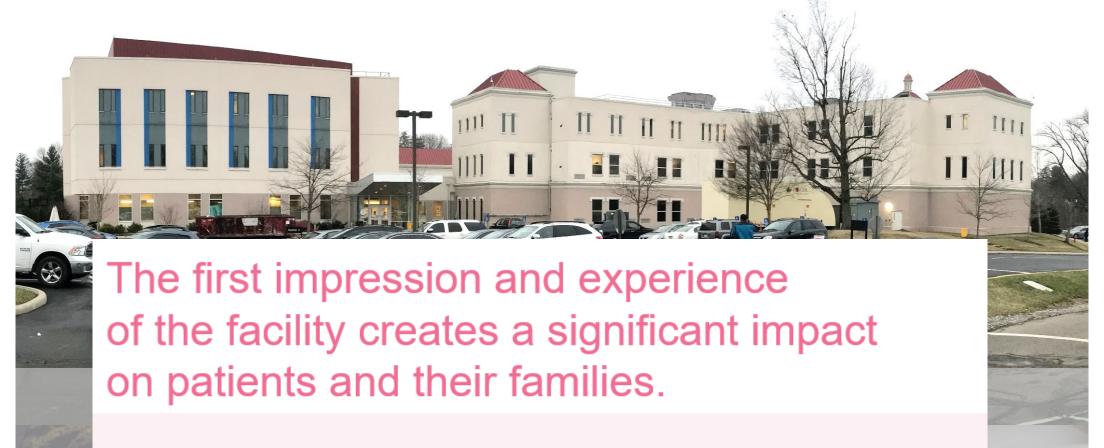








#### CINCINNATI CHILDREN'S COLLEGE HILL CAMPUS



"The unit feels cold, drab and institutionalized. It feels like a step-child – not a part of Cincinnati Children's. You don't feel any sense of kindness, love, warmth. It's <u>really hard</u> to leave your child there." PARENT







## **GOALS + VISIONS**









#### PROJECT BY THE NUMBERS

- CCHMC is a \$2.7B Hospital System with 16,500 employees
- College Hill Project
  - 160,000 SF addition
  - o 68% larger than existing facility
  - o 83 Private Rooms
  - \$105 Million Project Cost
- \$36M Lead Gift Convalescent Hospital Fund
- \$10M New Funding from State of Ohio
- \$30M Target additional philanthropy (\$12M)
- \$30M Hospital Operations/Revenue





#### REGIONAL IMPACT: SUICIDE RATES IN TEENS & YOUNG ADULTS

- 22% of high school students have serious thoughts of suicide (CDC, 2023)
- 10% of high school students have reported suicide (CDC,2023)
- \$15M gift in Mental and Behavioral Health Institute
  - Integration of 1,000 professionals
  - Integration in schools, primary care, and emergency departments
  - Research to develop early warning signs of suicide ideation





## SITE / CONTEXT















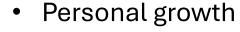
### **DESIGN CONSIDERATIONS**

**Patients** 









- Positive Distraction
- Healing Setting

**Parents** 









- Supportive
- Comforting Setting

Staff







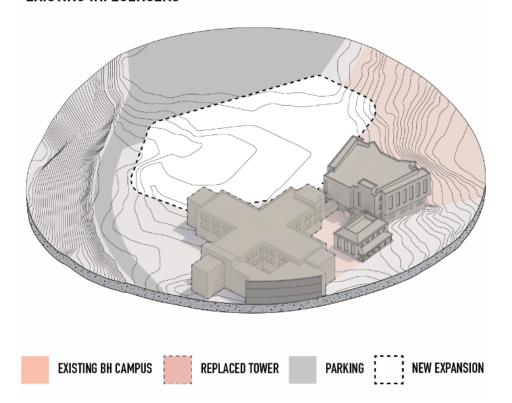
- Pioneering Methodology Growth
- Decompression
- Rejuvenating Setting





**Campus Pressures:** The Inpatient and Outpatient replacement tower fits into a sweet spot, optimizing financial, operational, and experiential benefits.

#### **EXISTING INFLUENCERS**

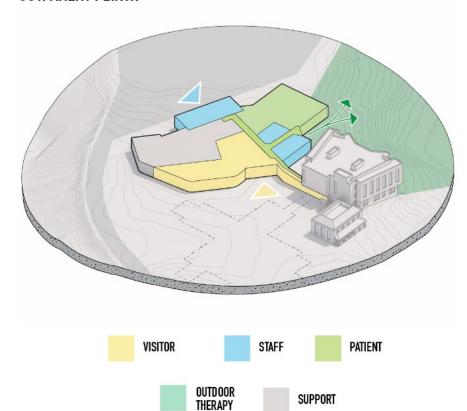






**Energetic Base:** The 1st and 2nd floors manage visitors, staff, and outpatient care, connecting to the residential building and outdoor therapies.

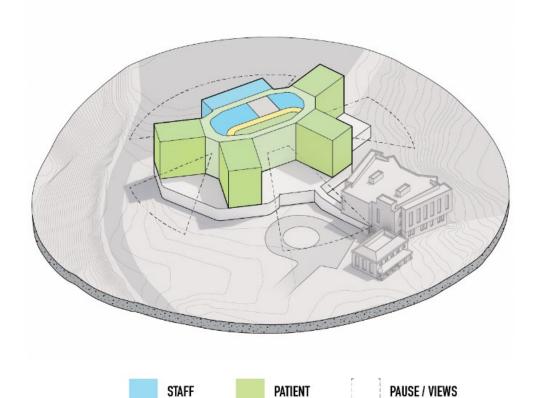
#### **OUTPATIENT PLINTH**







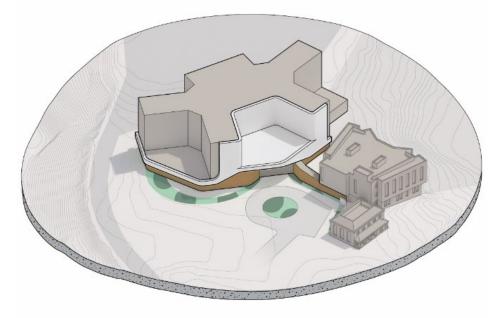
**Elevated Inpatients:** Levels 3-5 offer a calm, quiet haven with outreaching bed units, dispersed milieu and external views for patients and staff.







**Uplifting Arrival:** A soothing landscape paired with natural architectural materials greets patients, families, and visitors seeking a confident transition beneath the "softened blanket"









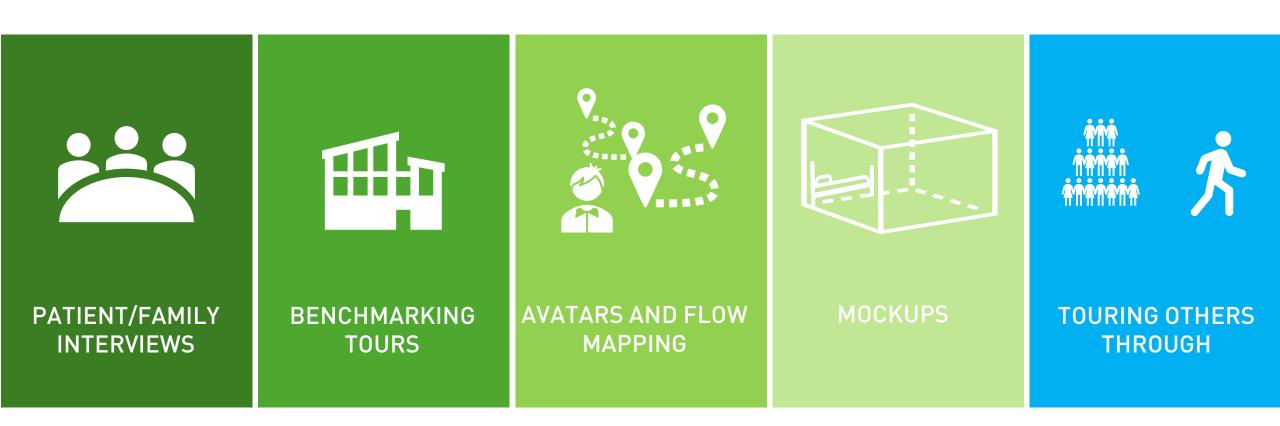






#### **EVIDENCE-BASED DESIGN PROCESS**

- Interactive design process is critical
- Input from Psychiatry, Psychology, nursing, behavior health specialists







#### **EMPATHY - WHO IS THIS BUILDING SUPPORTING?**



CHRIS, 15

Background: History of violence. Threatened teacher at school. Absentee parents

Diagnosis: Psychotic, Obese, diabetic. intellectually delayed

Admission: Police brought to ED then brought to CH by transport team.

Length of stay: variable Visitors: Case

admission, first stay manager, probation officer, HFS Length of stay: 2 representatives Days

> Visitors: Parents, Grandparents

Background:

Depressed, Self-

Diagnosis: Major

Depression/ Mood

Admission: Direct

Suicidal/

Injurious

Disorder

 Inpatient – private room Inpatient -need to mobilize Inpatient - adequate (secure setting) increased staffing or support if De-stimulation, restraint and Involvement of behavior including discussion of how appropriate walls and floor. physical intervention would specialist: Nutrition: Psychiatry placed appropriately on the Social work: School teacher to occur if needed given patient's unit with ante room (see ante obtain MFE to ascertain size: consistent

	ISSUE	Physical Setting	People
	First stay	Private room- parents may want to room in with patient. Inviting, non-institutional appearance (applies to all patients and families) "noise control rooms" similar	Unit staff to appropria orient to treatment Family Resource Cente NAMI (parent support Social work
NATALIE,14			

	1
s	

	PETE, 17
	Background:
2	Trauma, Leari
	disability Lea

issues, conduct disorder Diagnosis: Bi- pola with psychotic features

Admission

for disorderly

conduct at home

Length of stay: 30

Visitors: Parents.

grandparents.

	ISSUE	Physical Setting	People	Process
	Age	Access to outpatient services for transitional age youth	Social work     Branch of lighthouse that he can be referred to	<ul> <li>Transition to adult services when 18. Patients on inpatien unit cannot access these.</li> </ul>
	Legal	Private room     Environment of safety including separate space where we could discharge the patient to police and not have	May need extra staff if becomes violent     Probation officer     Police or protective services involvement if becomes violent	<ul> <li>Develop plan early on what to do if patient becomes violent on the unit including when he can't be on the unit anymore (i.e. sending him to 2020)</li> </ul>

nurses station to make it

easier to observe her

Frequent contact with

Orient them to treatmen

parents

· Possibly in need of private

room if victim of sexual

behavior

ntellectual disability 

Hyperactive, impulsive

trauma and he has sexualized



#### Brought in by Police FRED, 10

Background: Trauma, lives in residential facility, intellectual delay

Diagnosis: Oppositional defiant disorder, attention deficit hyperactivity disorder

Admission: Brought in by police, frequent flyer

Length of stay: 14

Visitors: Parents. Case worker, JFS Wrap- around services, Minister, aunts/uncles



#### ADAM, 11

Background Trauma, (JFS County Custon volatile

Diagnosis: Reactive attachment disorder, impulse control

Admission: Admit from emergency room, has been here 1-2 x before

ISSUE	Physical Setting	People	Process
JFS custody	Separate area for awaiting placement rather than staying on an inpatient unit	Social work     Social work supervisors     JFS supervisors	Contact with JFS within 24 hours to begin treatment planning as soon as possible
Trauma	Possibly in need of private room if victim of sexual trauma who has sexualized behavior	Staff who are able to provide trauma-informed care, including unit staff, therapist, behavior specialist.     Parents     Outpatient therapist	Understand the nature of patient's trauma, initiate trauma-based therapy and include parents     Educate parents on impact of trauma on behavior     Opportunities for coaching and training (one way glass) teaching interview skills
Reactive attachment disorder – may become inappropriately attached		Unit staff     Behavior specialist     Foster family	Staff awareness     Appropriate and consistent boundaries     Regular and frequent involvement of foster parent on the unit
Drug and alcohol issues		Drug counselor     Medical physician	Protocol for detox     After care process and follow-

· Staff who are able to provide

unit staff, theranist, behavior

specialist.

· Outpatient therapist

Parents

Unit staff

trauma-informed care, including

**/** 

· Understand the nature of

include parents

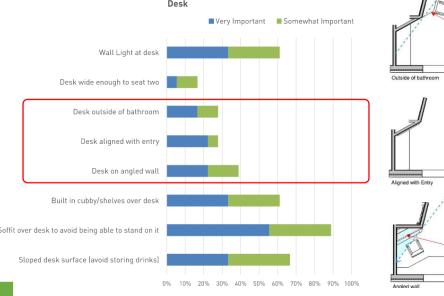
trauma on behavior

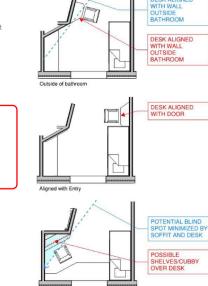
· Psychological testing if not

patient's trauma, initiate

trauma-based therapy and

Educate parents on impact of





#### 4 Patients

#### **6 Parents**

7 Support

Ages 13 – 19

Received care as early as 3 years old

Inpatient Residential **Partial Programs** Outpatient

Social Work Guardian Ad Litem Transport **Protective Services** 

Anxiety, Autism, Attention Deficit Hyperactivity Disorder, Bi-polar, Eating Disorder, Fetal Alcohol Syndrome, Learning Disability, Intellectually Delayed, Major Depression / Mood Disorder, Non-verbal, OCD, PSTD, Reactive Attachment Disorder, Trauma

Cincinnati Children's College Hill, A4C, Green Township, Lindner Center of Hope, Private Therapy, Out of State- California, Michigan, Oregon, Utah, Wisconsin

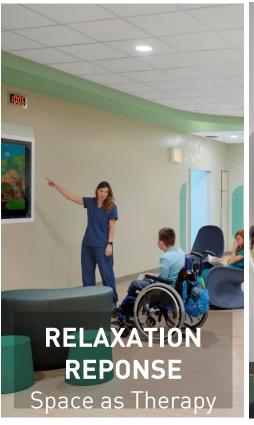




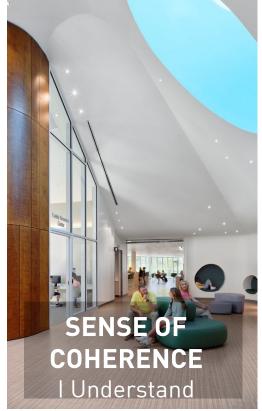


#### **SALUTOGENESIS CONCEPTS**

















Cincinnati Children's College Hill / Cincinnati, OH / Completed 2023 / USG Gold Award / pEUI = 100.00 kBtu/sf/yr | 63% reduction from baseline (270.15).











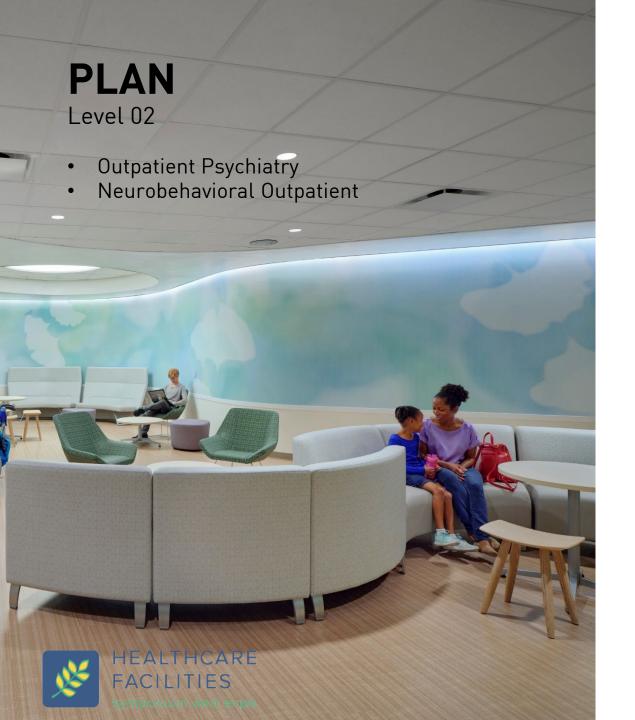












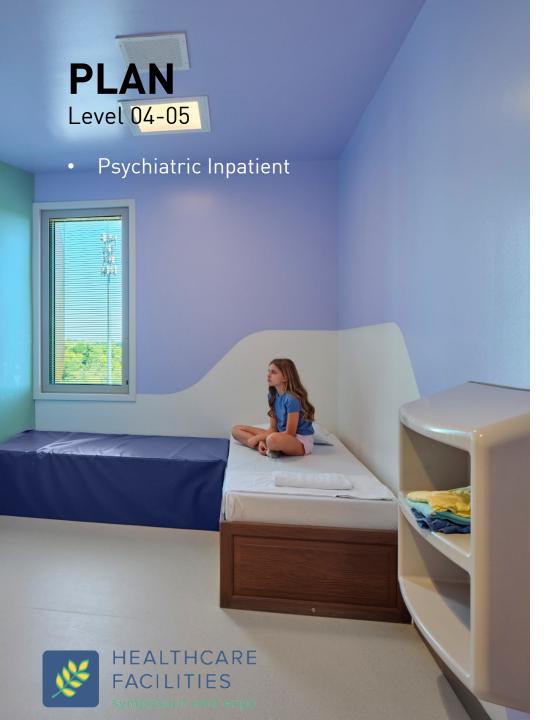












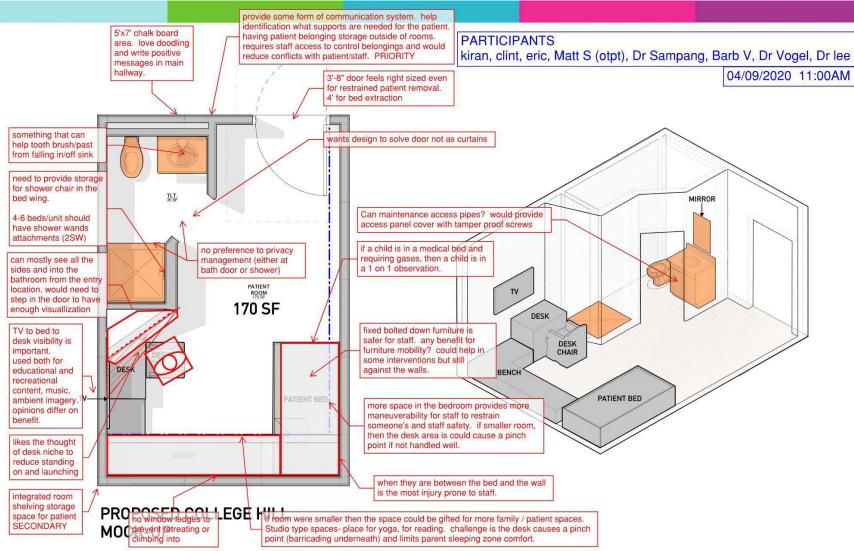




#### PATIENT BEDROOM MOCK-UP











## **WALL MOCK-UP**







#### CINCINNATI CHILDREN'S HOSPITAL

- Large pediatric healthcare system located in southwest Ohio
- Total of 749 inpatient beds
- Mental health
  - 99 inpatient beds
    - College Hill (83)
    - Lindner Center of HOPE (16)
  - 3,168 inpatient admissions in FY24
  - College Hill also has outpatient clinic space and a 24-bed residential program



#### THE JOURNEY TO A NEW BUILDING

- Building A 94,366 SF
- Originally built in the 1970's for adult psychiatric care
- Campus census has grown over the years as services have been added

# Some renovations made to keep up with specific needs

- Outpatient space (2007)
- Residential building (2015)
- Neurobehavioral unit (Renovated, 2018)
- Ligature risk reduction (2019-2020)

## We have outgrown the current space

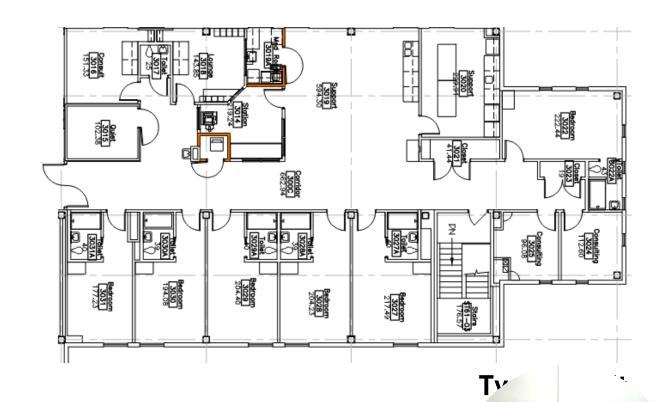
- Non-clinical and clinical space needs
- Programmatic needs





#### THE OLD MENTAL HEALTH FACILITY CONDITIONS

- All units self-contained.
- Milieu space consisting of a single day room ringed by patient rooms
- 1/3 of Patient rooms are semi-private.
- Units are stark and have blind spots
- Limited off-stage staff space
- Limited number of treatment spaces





## THE NEED FOR PRIVATE ROOMS

- About 1/3 of patients had roommates in the previous facility
  - Children in crisis need private spaces
  - It creates the need for constant observation
  - It may result in a patient being denied access to their room
  - It acts as a disincentive for families to visit and participate in care





#### THE NEED TO REDEFINE THERAPEUTIC SPACES & MILIEU

- The old facility does not allow us to tailor treatment to each patient
- Patient escalation currently interrupts treatment for other children and may traumatize them
- Changes of scenery are difficult in our old space
  - \*This leads to boredom, frustration, and potentially aggressive behaviors





#### PIONEER PROGRAM

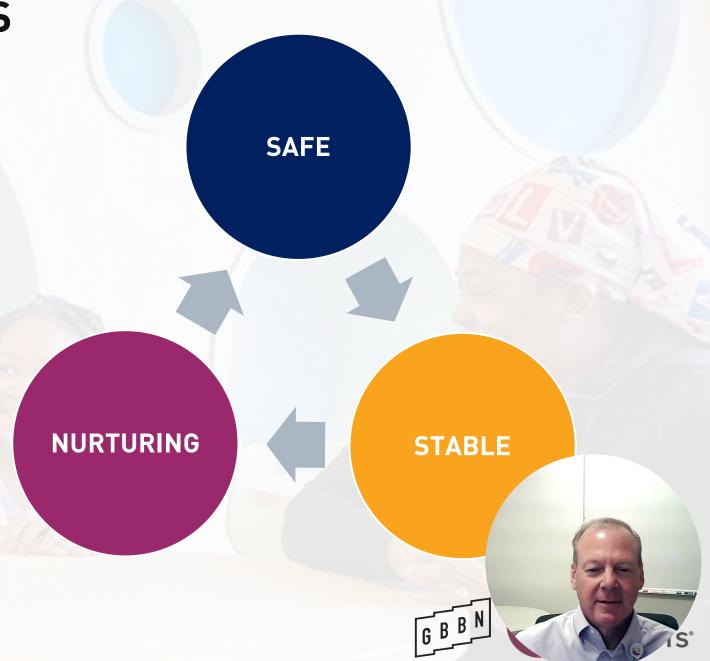
- In 2019, we embarked on a project to redesign our inpatient mental health care
- Observations/issues
  - Patients were spending too much time in their rooms and not in programming
  - Nearly all programming and activities occur in the day space of each unit.
    - Can be a crowded, overstimulating environment
    - Lack of "off unit" activities
  - Unable to tailor care to the individual
  - Aggressive episodes result in interruptions in treatment
    - It also leads to staff injuries and burnout
  - Families were not participating in care
    - We need to have better and more frequent family communication
    - We need to prepare parents to care for their children after discharge





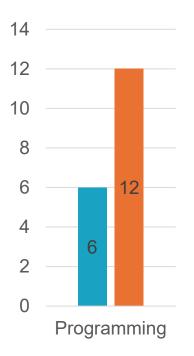
## **PIONEER INTERVENTIONS**

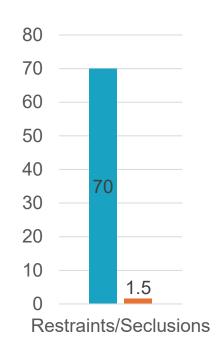
- Milieu "quarterback" to increase programming
- Increase positive interactions
- Increased leadership presence
- Family-centered rounds
- Learning system to reduce staff injuries

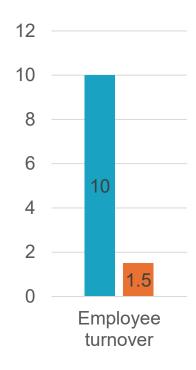


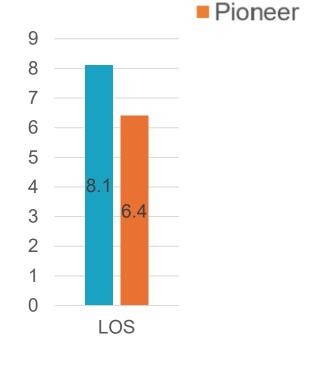


## **PIONEER RESULTS**



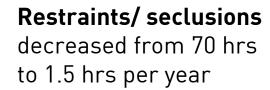






Previous

**Programming** increased from less than 6 hrs to 12 hrs per day



**Employee turnover** decreased from 10% to 1.5% over 2 years





## **AWARDS AND RECOGNITION**

- Co-inpatient unit of the year at Cincinnati Children's in 2021
- Health Collaborative finalist for Quality Improvement in 2021





## TRANSITION FROM OLD TO NEW FACILITY

- Successfully moved into our new building on October 18, 2023
- · What did we learn?
  - It was difficult for staff to implement new treatment processes and be in a larger, new space
  - Physical interventions rose but had been rising for 3-4 months prior to the move due to higher patient acuity
    - Physical interventions returned to near baseline about 6 months after the move despite continued high acuity.
  - Median length of stay remained stable at 6 days





## IMPORTANCE OF MILIEU SPACE



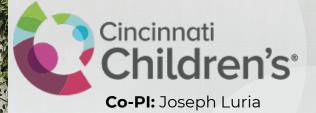
In a behavioral health hospital or long-term residential care facility, *milieu* is used for group therapy sessions, guided activities, dining, and free choice time, fostering social interactions and activities (Mazzi, 2022).

https://www.gbbn.com/insights/the-future-of-behavioral-healthcare-rethinking-milieu/

#### RESEARCH PARTNERSHIP







**Co-PI:** Shan Jiang Consultant: Angela Mazzi Coordination: Kirsten Miller, Noah Gaither





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**GRAs:** Zahra Ghazanfari, Arielle (Ella) Spencer, Graham Denton, Laurin Uptegrove, Liam Casagrande, Yash Salian, Yang Chun (Neil) Zhou, Gianna Capurso, Khin Kye Htet, Taylor Cox



## **GAP IN RESEARCH**

**KEY WORDS** 

ARCHITECTURE

POE

MENTAL HEALTH FACILITY

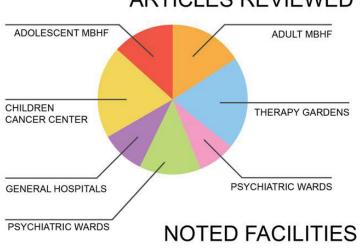
**BEHAVIORAL HEALTH** 

CHILDREN ADOLESCENT

**DATABASES** 

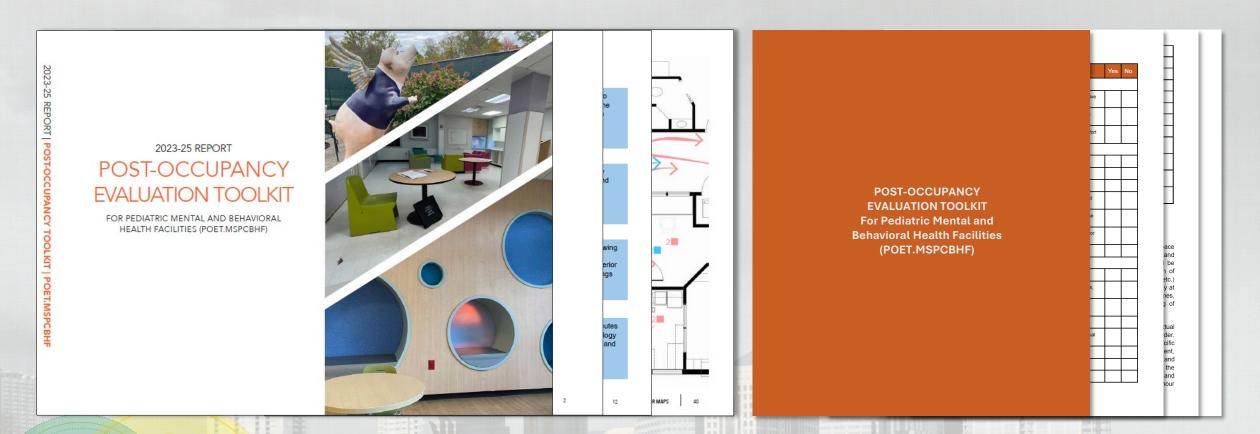
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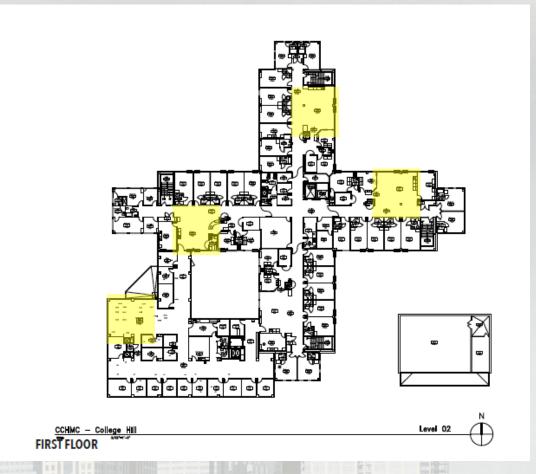
## THE ONE-OF-A-KIND TOOLKIT



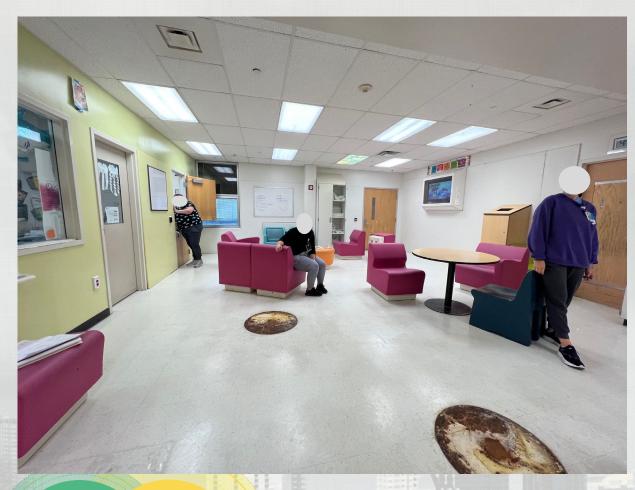


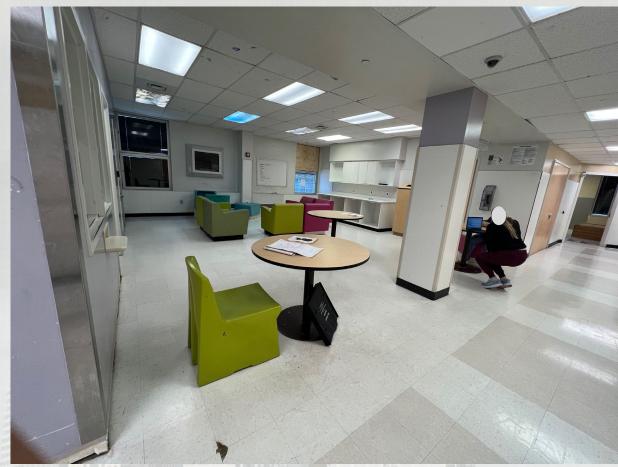
## PRE-OCCUPANCY BENCHMARKING





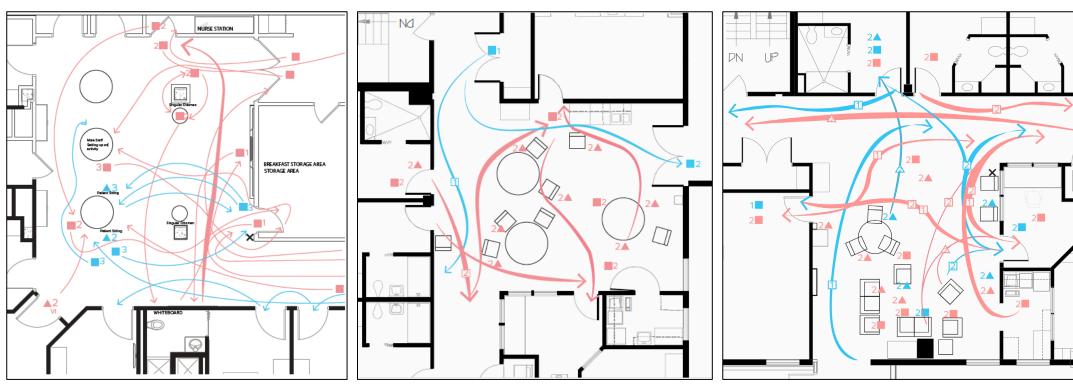
# PRE-OCCUPANCY BENCHMARKING



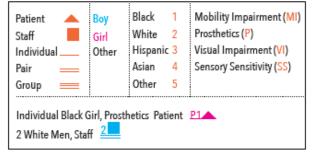


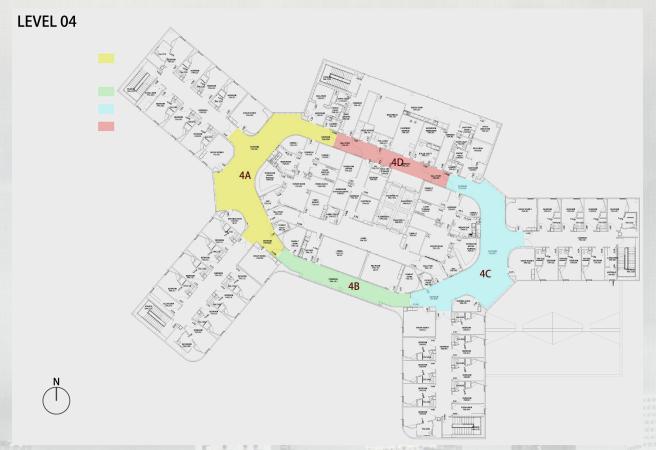


## PRE-OCCUPANCY OVERVIEW



#### Behavioral Map Legend



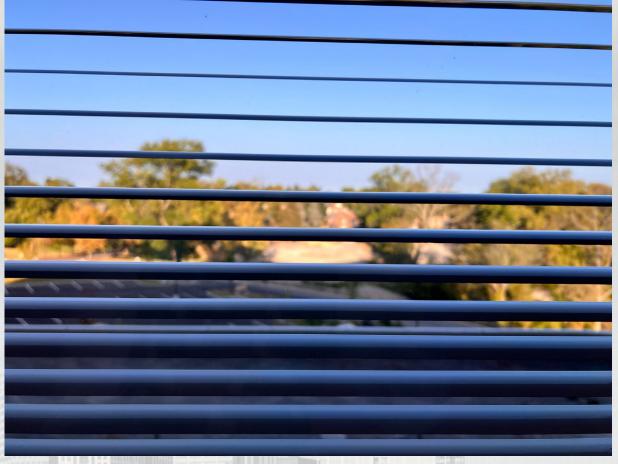






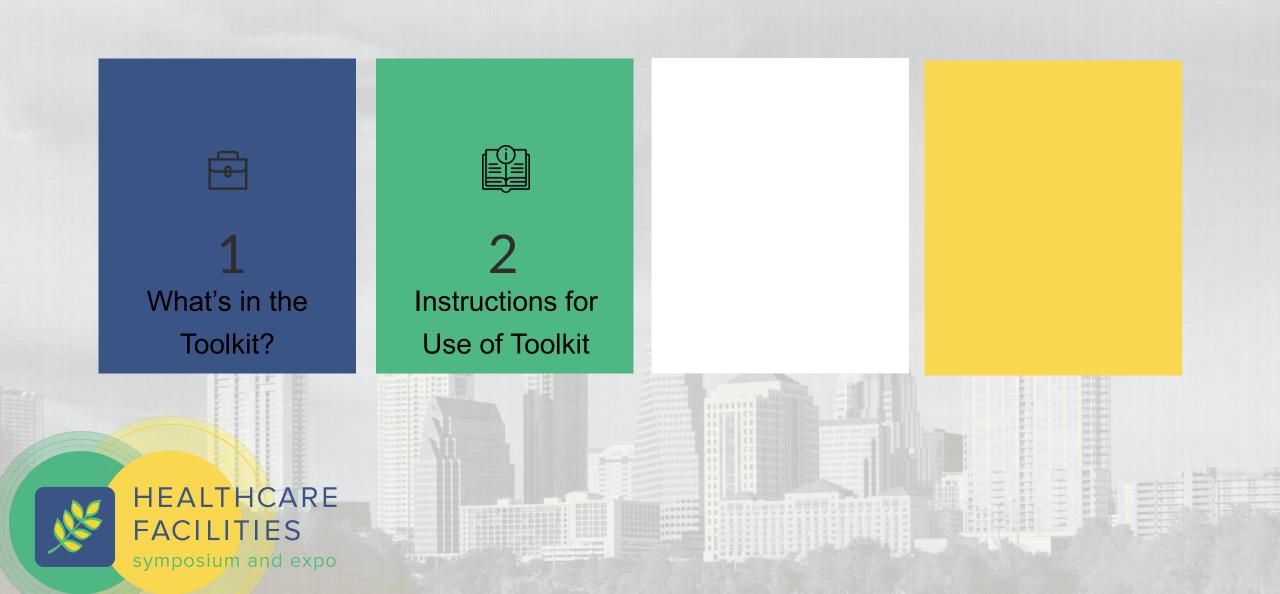


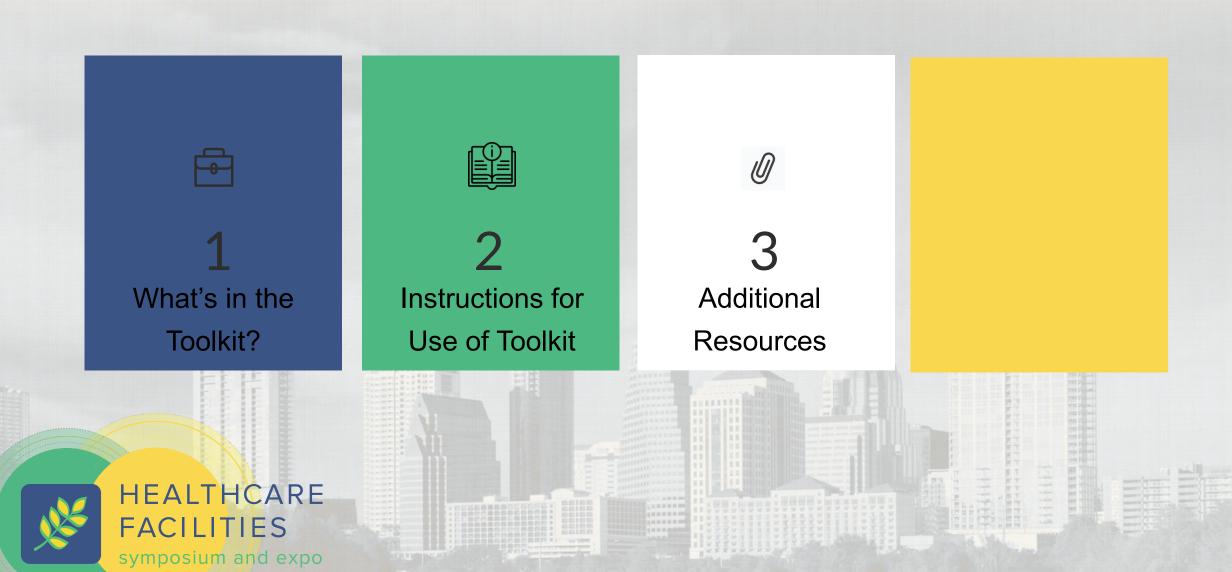








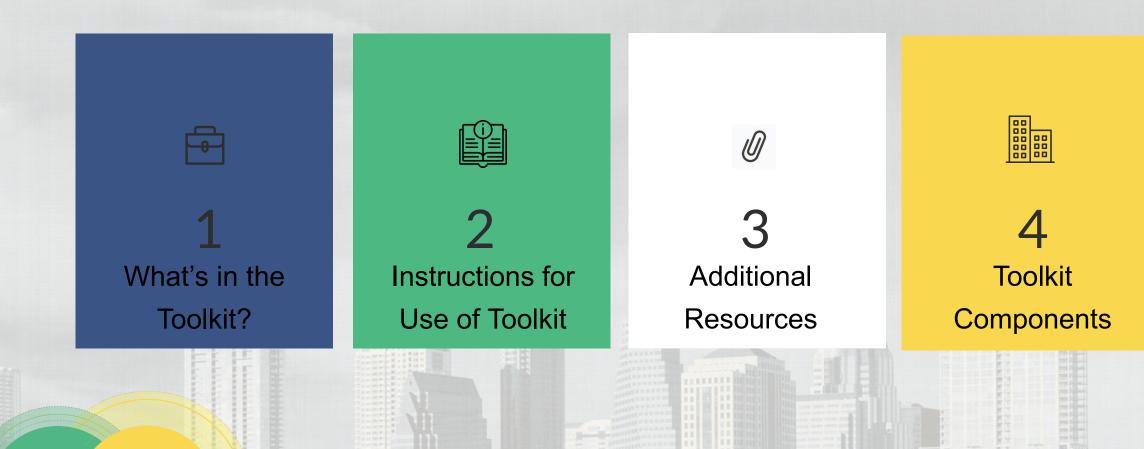




**HEALTHCARE** 

symposium and expo

**FACILITIES** 



ACTOR	TASK		ZONES			
		Patient Room	Hallway	Nurse Workstation	Office	Milieu Spaces
NURSE (RN, LPN) Registered Nurses and Licensed Practical Nurses who provide medical care, administer medications, and monitor patient health.	1. Conduct a comprehensive assessment of the child's social skills, behavioral health status, and any barriers to socialization.  2. Ensure the environment is safe and free from hazards.  3. Greet the child warmly and introduce yourself.  4. Clearly explain the planned social activities and their benefits in a way the child can understand.  5. Initiate casual conversations to build rapport and make the child feel at ease.  6. Organize and facilitate group activities such as games, arts and crafts, or story sessions that encourage interaction.  7. Encourage participation and positive interactions among children.  8. Use positive reinforcement to encourage desired social behaviors.  9. Monitor the child's interactions and guide as needed.  10. Document the child's participation, progress, and any notable interactions in their medical records.					

4 Millian Space Lavant		
1- Milieu Space Layout		
Is the overall configurations and structure of the milieu architecture conducive to creating a safe and supportive environment for patients?		
Are there rounded corners or soft edges in the milieu space to minimize potential hazards and create a more welcoming environment?		
Does the layout of the milieu space incorporate curved walls or partitions to enhance flow, visibility, and comfort within the space? Does it provide opportunities for privacy or quiet reflection?		
2- Safety and Security		
Are all doors in the milieu space equipped with tamper-proof locks and secure access control systems?		
Are the walls constructed with impact-resistant materials to prevent damage and ensure patient safety?		
Are the floor materials non-slip and easy to clean to maintain a safe and hygienic environment?		
Are windows in the milieu space designed to be shatterproof and equipped with security measures to prevent unauthorized egress?		
Is all furniture in the milieu space secured to the floor or walls to prevent it from being moved or used to cause harm?		
Is there a clear and accessible emergency protocol/kit in place for staff to follow in case of a security breach or patient crisis?		
Is there sufficient and adaptable storage available to keep the environment organized, safe, and flexible?		
3- Space Flexibility and Adaptability		
Are there designed movable partitions to allow for easy reconfiguration of the environment?		
Are there elements in the environment that cater to the diverse needs of patients (e.g., sensory-friendly areas, calming zones)?		
Is the furniture in the milieu space lightweight and easy to move to accommodate different activities and therapeutic needs?		
Can the lighting levels in the milieu space be easily adjusted to create different atmospheres as required?		
Are there multi-functional areas that can be quickly adapted for different uses such as group therapy, individual sessions, or recreational activities?		
Does the space have access to natural light, and can it be controlled to provide more flexibility?		
	_	-





# ARTIFICAL INTELLIGENCE TO IMPROVE MENTAL HEALTH

- Create real-time mental health trajectories
- All neurological and psychiatric diseases are interconnected
- CCHMC created software that learns from unstructured data to identify key features in medical record
- Using Machine Learning to decode suicide notes and identify epilepsy neurosurgery candidates early in the disease process





380+ Peer Reviewed Publications



20+ US and International Patents



\$400M+ Economic Impact

