

FLEXXX



A STUDY OF FLEXIBILITY IN OUTPATIENT SETTINGS

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A FOLLOW-UP TO THE CLINIC 20XX SERIES

Supported By:

CADRE | Center for Advanced Design
Research and Evaluation

HKS

Steelcase

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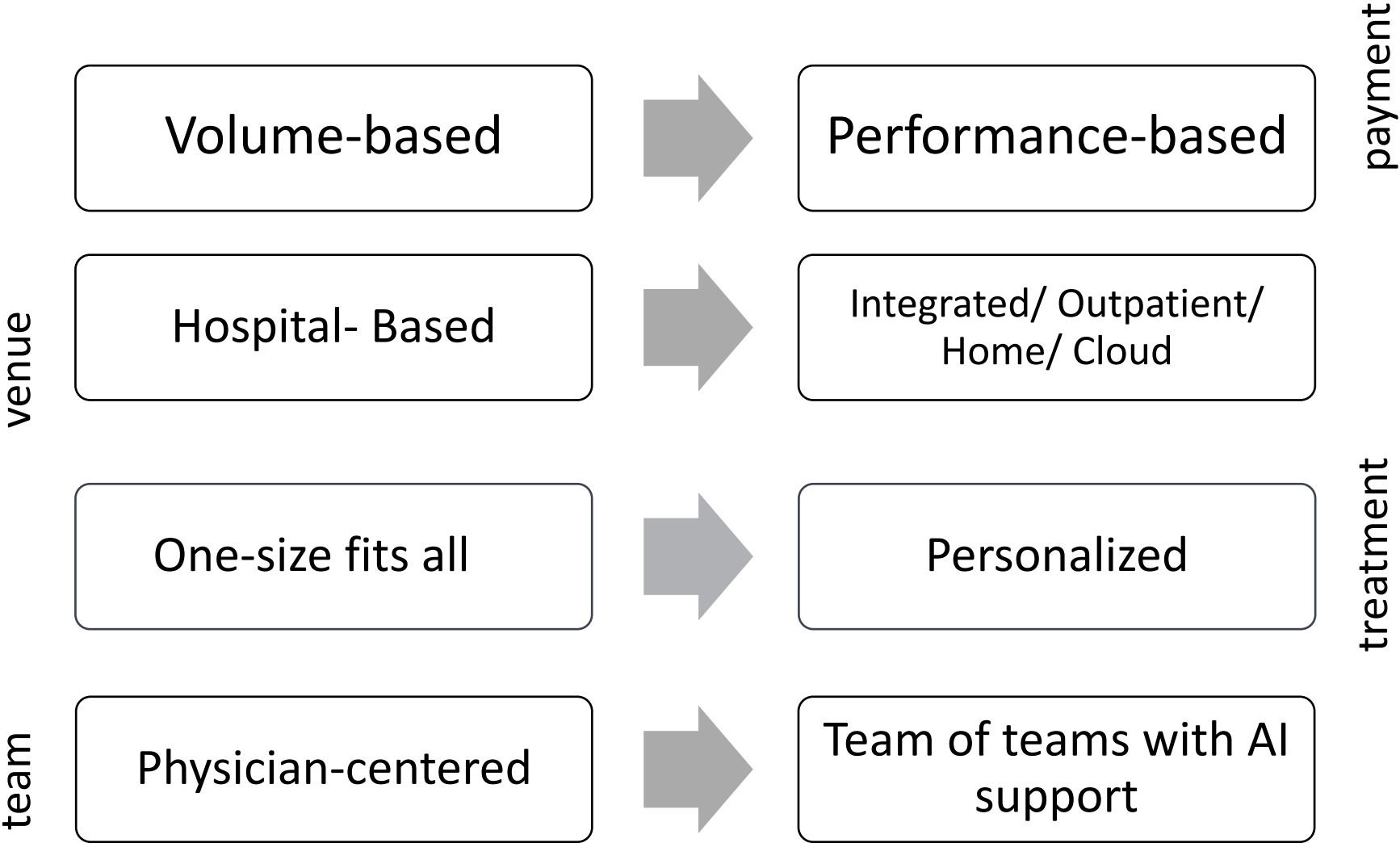
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Director of Healthcare Environments, Steelcase

Health

The Challenge

The Shifting Healthcare Landscape



**How do we design for change-
without a crystal ball?**

Clinic 20XX: Designing for an
Ever-Changing Present



05 DRIVERS

06 | DISASTER PREPAREDNESS?

01 | SYSTEM



more access.
more accountability.

02 | PATIENT



chronic conditions,
consumer expectations.

03 | PROVIDER



physician shortage,
extender/team increase.

04 | FIELD



advanced diagnostics, precise &
precision medicine.

05 | TECHNOLOGY



technology boom, big data and
sophisticated construction

DRIVING CHANGE

TRENDS



mHealth/Telehealth

health at hand,
remote access



Care Coordination

coordination between patients,
providers and systems for
efficient patient care and work
flow



Population Health

community-based, whole
person health with regional
health goals



Retail Health

demand-focused,
choice-based health for
extensive and
immediate reach

+ Home Health

RESPONDING TO CHANGE

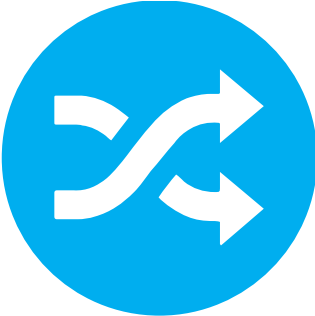
Three Tenets of 20XX

Connectivity



Clinics have to be positioned to have connectivity regionally to their constituents and systemically to the larger health information systems.

Flexibility



Flexibility to adapt has to be considered at multiple scales ranging from site and building planning to wall systems and furniture.

Sense of Place

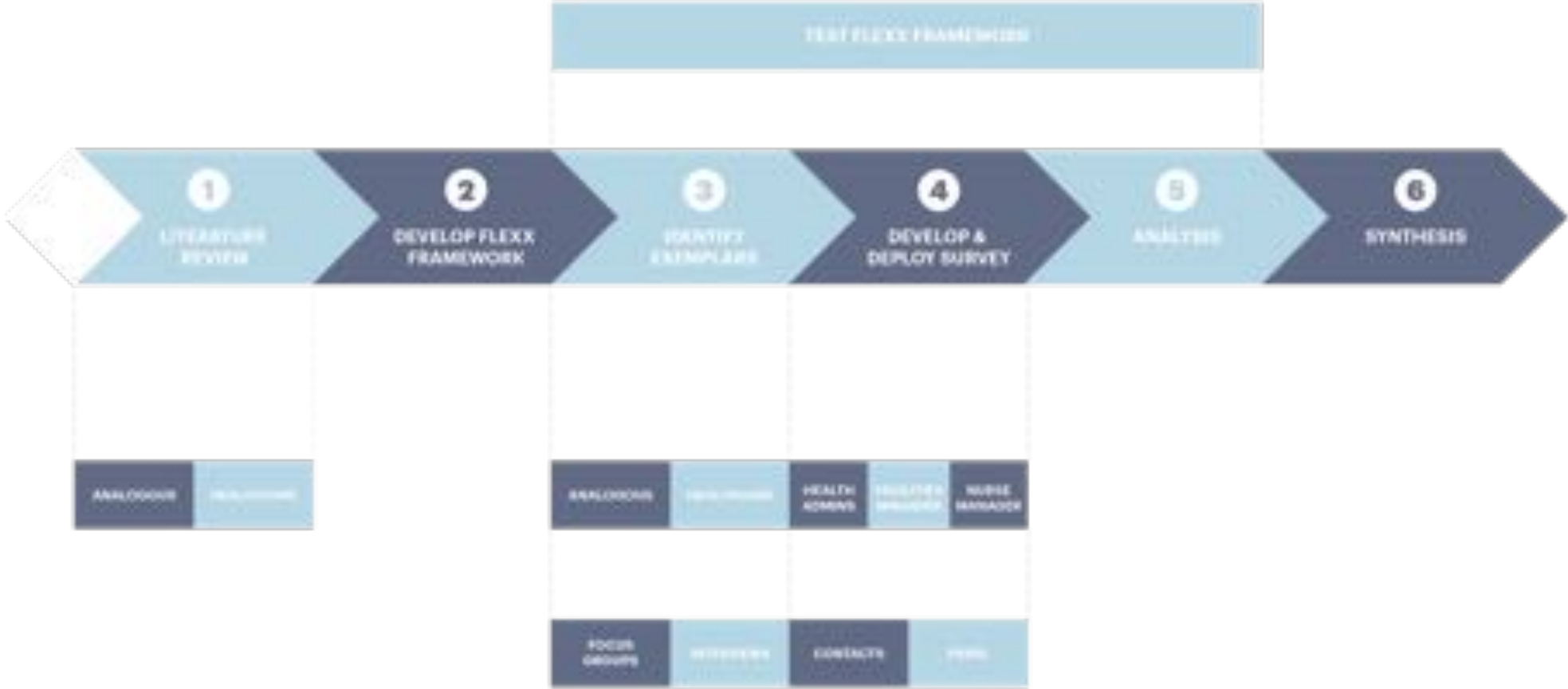


A sense of place that promotes health and wellbeing, and is inclusive of different physical abilities and generational preferences can be a differentiator. Spending time knowing the people we are designing for is key.

Research Objectives

To develop a framework to address flexibility in outpatient clinic settings, by looking beyond the healthcare context, in order to create change-ready facilities.

Methodology



What does the literature tell us?

Lifespans

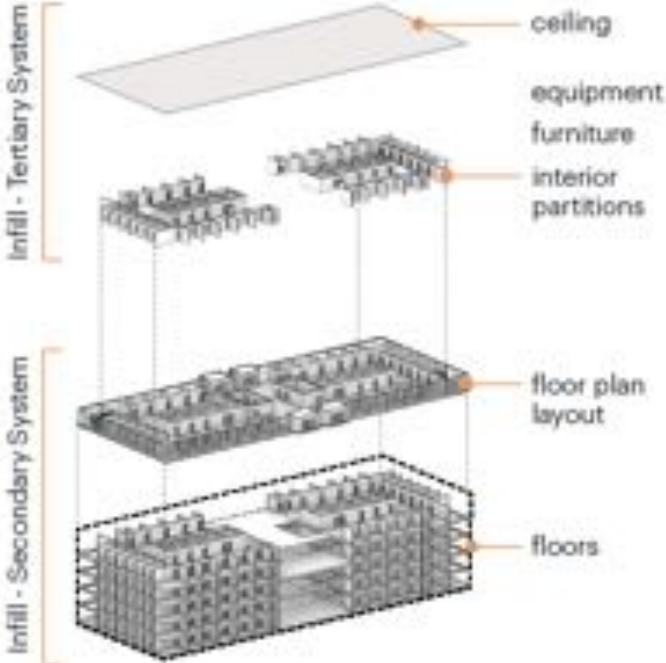
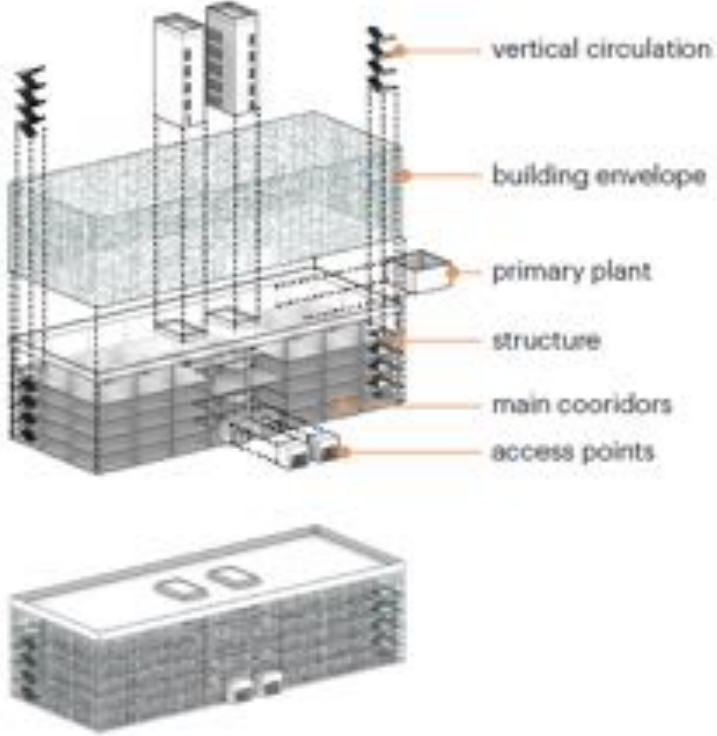
BUILDING LIFESPAN AND SYSTEMS



Information Source: Kendall [10]

Building Systems

BASE BUILDING - PRIMARY SYSTEM



Strategies

1. Master planning for future expansion
2. Loose-fit design promoting extra sq. ft. for future changes
3. Adaptable flexibility for multiple functions
4. Convertible flexibility for a new permanent use
5. Robust utilities having extra capacities for the future
6. Plug-and-play infrastructure to minimize interruption during future construction

The Joint Commission. (2008). Health care at the crossroads: Guiding principles for the development of the hospital of the future. Retrieved from https://www.jointcommission.org/assets/1/18/Hospital_Future.pdf

Frameworks

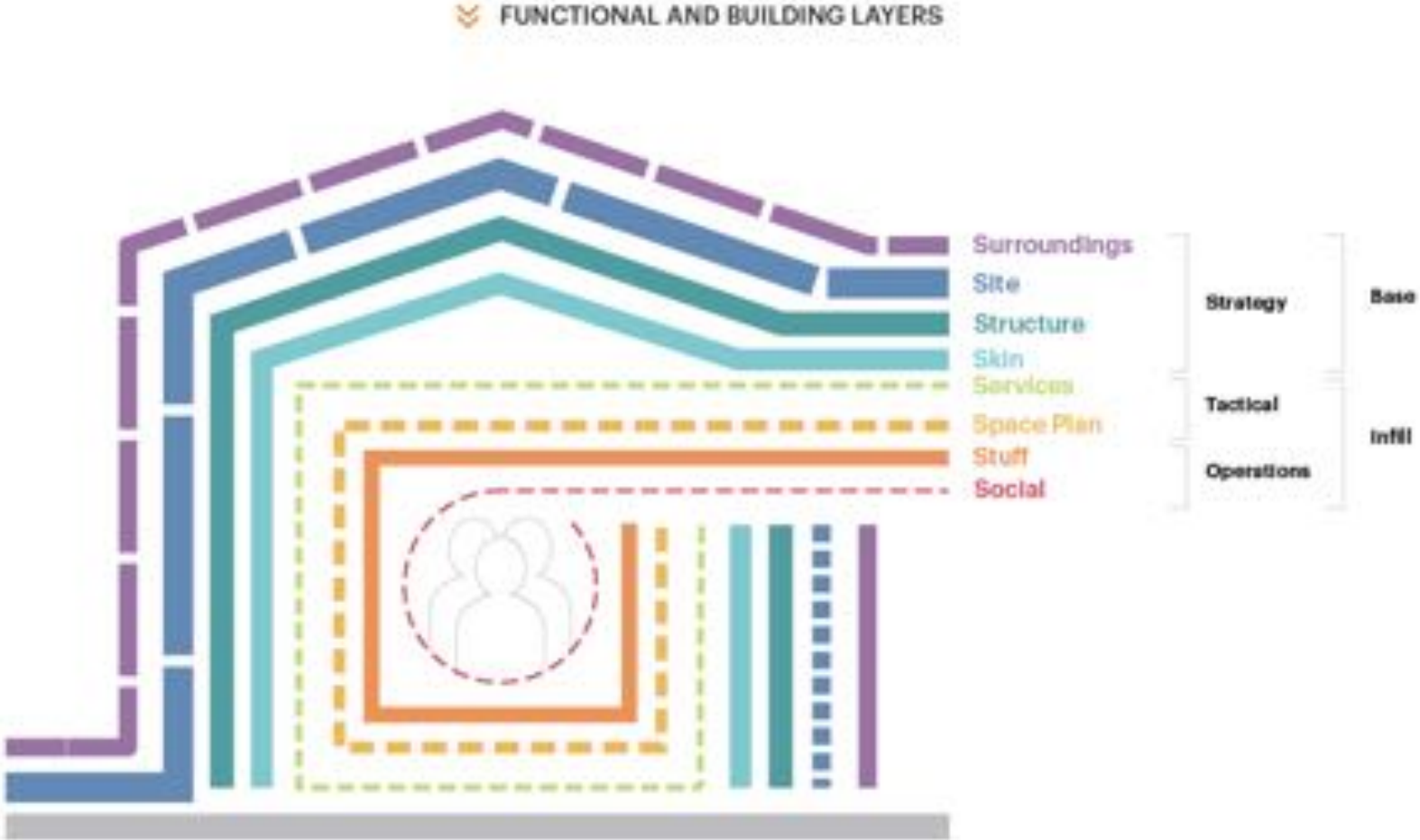
PERSPECTIVE	DEFINITION	CITATION
Attributes	The different attributes of flexibility such as Fluidity, Versatility, Modifiability, Convertibility, and Scalability.	Monahan, 2002
Soft / Hard	Hard space has limited change options from the design. Soft space has open options for the user.	Pressler, 2006
Temporal	The lifespan of building components such as short and long as well as: Primary (100 years), Secondary (20 years), and Tertiary (5-10 years).	Kendall, 2005
	Operational - day-to-day; fast change Tactical - months away; slow change Strategic - years away; infrastructural change	de Neufville, et al., 2008
Base/Infill	Primary purpose is differentiating the main macro systems of a building as the base building and the micro systems within it as the infill.	Kendall, 2000, 2011 Capolongo, 2016
Building Layers	Specific layers that make up the building. Referred to as shearing layers such as: Social, Stuff, Space Planning, Services, Skin, Structure, Site, Surrounding	Shuchi, 2012 Adaptable Futures, 2017

Keeping it Simple: Four Attributes



Information Source: Monahan [14]

Seven Layers

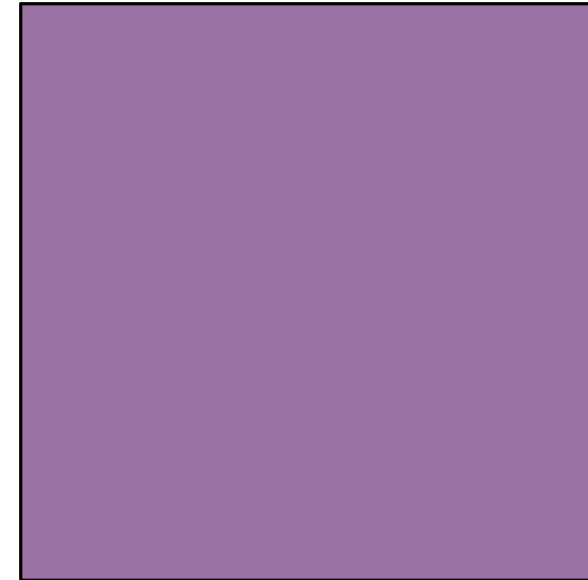


Adapted from *Adaptable Futures* [1] and *Pressler* [18]

Versatility

“I can do different things in it”

Versatility in a building is defined as the ability or intention for a space to be used for multiple and different functions with limited or zero change to tangible building attributes, where the user has agency.



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Versatility

Structure

Crown Hall

(Mies Van Der Rohe)

Column free space supported by a suspended roof structure; designed for multiple uses - exhibitions, studios, lectures and events

Image Courtesy of Taylor Chan



Versatility

Surroundings

U.S. Bank Stadium

Designed as a multi-purpose venue and surrounding site, aims to enhance landscape and culture of the community

Image Courtesy of HKS, Inc.



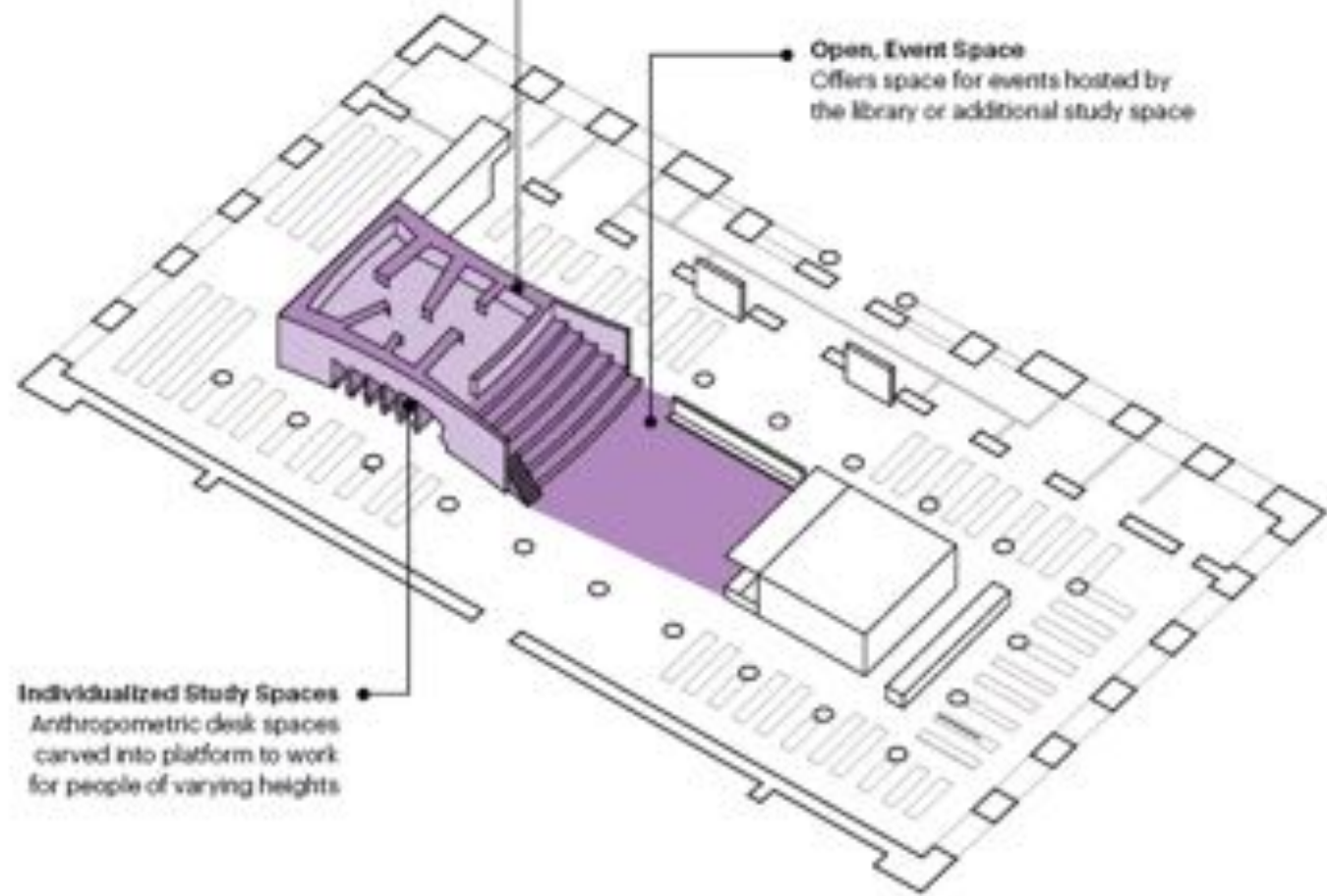
VERSATILITY

ALLOWS MULTIPLE USES

BUILDING LAYER	EXEMPLAR
Social People, flow Page Courtesy of Gehl Design	Muggers Centre Focused on social connection and community building 
Staff Furniture, fixtures, equipment Page Courtesy of Westac	Embold Designed for clinical needs – its approachable, refined design makes it applicable in other spaces as well 
Space Planning Page Courtesy of HOK, Inc.	Texas Scottish Rite Hospital for Children North Campus Standardized patient rooms and core work spaces that are equipped for any clinical needs 
Services MEP Page Courtesy of HOK, Inc.	Dartmouth Medical Center at the University of Texas HVAC equipment serving patient rooms installed in-corridor for interruption free maintenance and room layout changes 
Skin Building envelope Page Courtesy of Spanish Language	Marshall Oak Grove Hospital Double skinned facade helps clean polluted air and is a solar gain blocker 
Structure Page Courtesy of Skidmore	Crown Hall Column-free space supported by a suspended roof structure, designed for multiple uses – exhibitions, studios, lectures and events 
Site Page Courtesy of HOK, Inc.	UCSD North Torrey Pines Living and Learning Neighborhood Open, green space allowing for various outdoor activities, prominently located on-site 
Surroundings Master planning Page Courtesy of HOK, Inc.	U.S. Bank Stadium Designed as a multi-purpose venue and surrounding site, aims to enhance landscape and culture of the community 

Multi-purpose, Elevated Platform
 Large furniture piece carved for different functions, like studying, with large steps offering auditorium seating

Open, Event Space
 Offers space for events hosted by the library or additional study space

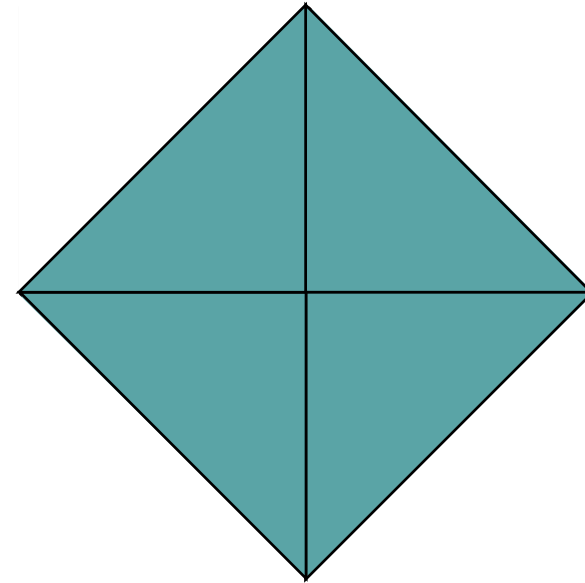


Individualized Study Spaces
 Anthropometric desk spaces carved into platform to work for people of varying heights

Modifiability

“I can change it”

Modifiability in a building is an attribute that welcomes interaction from the user to physically change to a desired function within the space.



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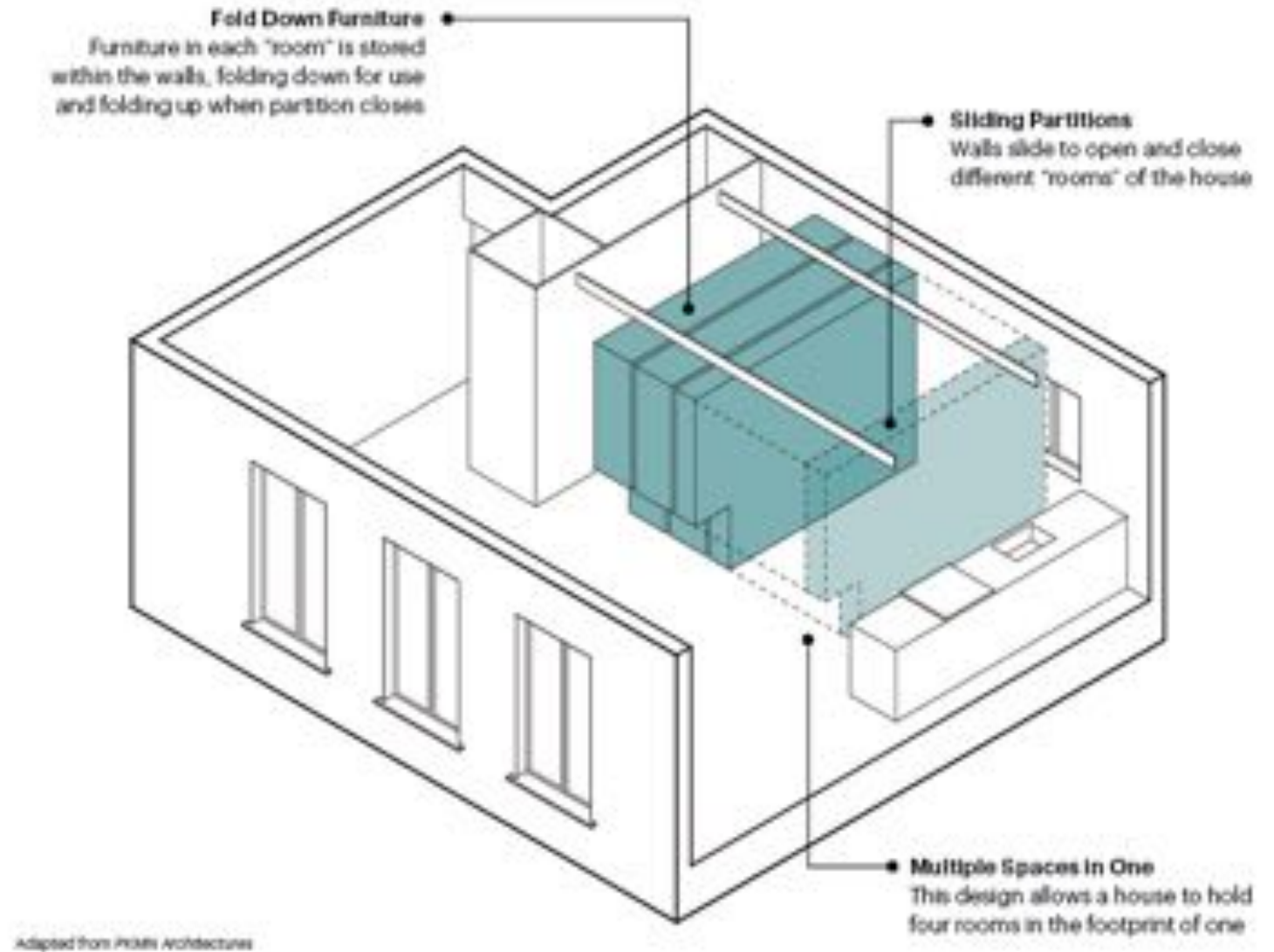


Modifiability

“I can change it”

“All I Own House”

By PKMN Architectures



Modifiability

Stuff

**Norton Women's & Kosair
Children's Hospital (NICU)**

Mobile walls for desired privacy



Image Courtesy of HKS, Inc.

Modifiability

Skin

Al Bahr Towers

(architect: AHR)

Computer-controlled, dynamic screen system, responding to the movement of the sun to avoid solar gain and glare

Image Source: Getty Images



Modifiability

Site

ProMedica Corporate Headquarters

This campus has an open, adjacent, green space that can host farmer's markets, festivals, temporary art installations, and movies in the park

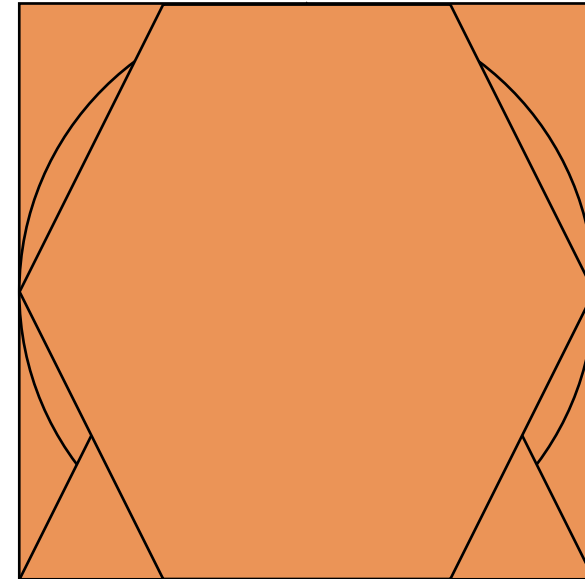
Image Courtesy of HKS, Inc.



Convertibility

“It can change”

Convertibility in a building is defined as the ability to replace the infill, while keeping the base building the same, in order to adapt for a new purpose.



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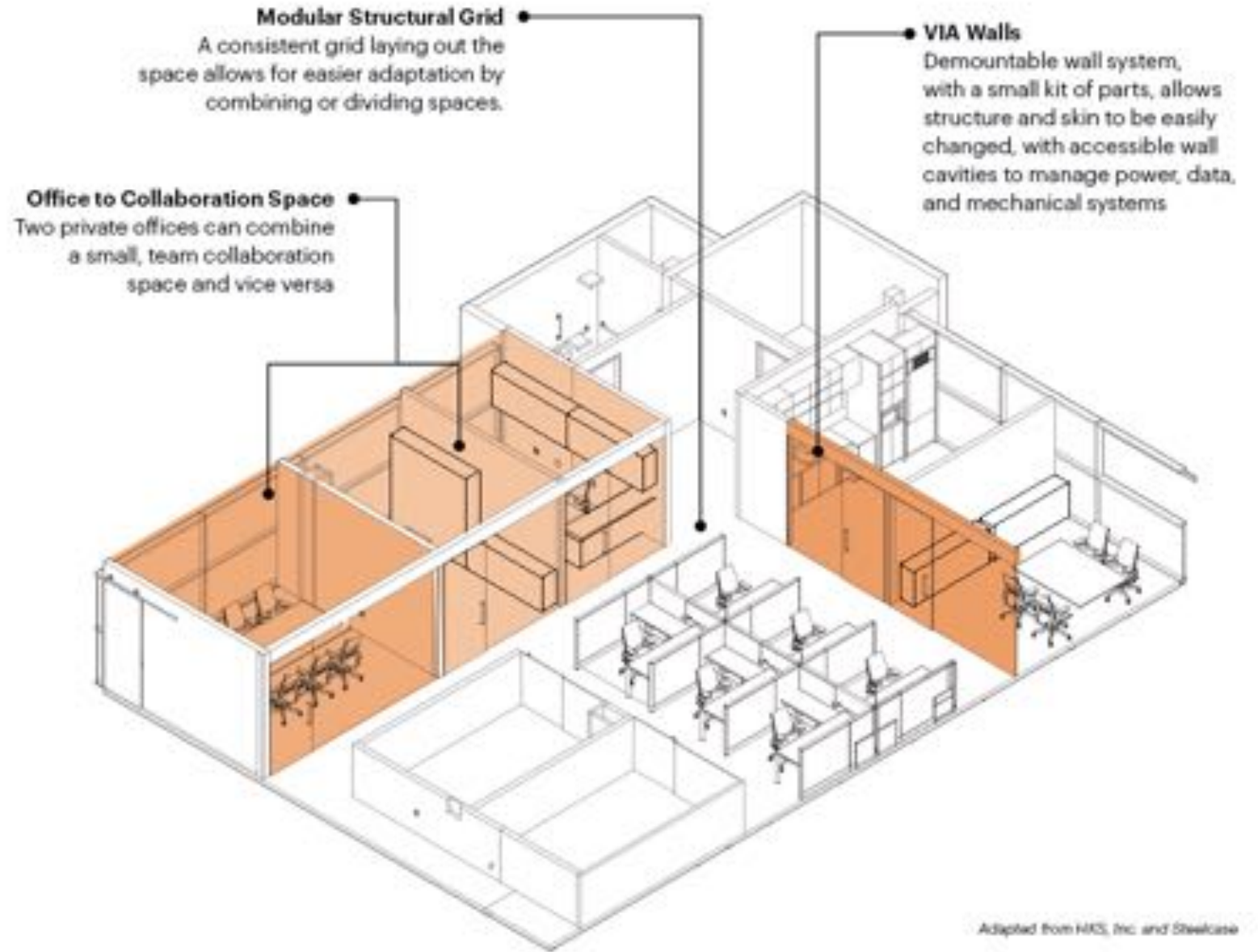
Convertibility

“It can change”

Phoenix Children’s Hospital
Administration Building

Design by HKS, Inc.

VIA Wall System by Steelcase



Adapted from HKS, Inc. and Steelcase

Convertibility

Stuff

Modular casework installed on a rail system, allowing cabinetry to be moved, changed, and reconfigured with minimal dust and disruption

Image Courtesy of Steelcase

Convey by Steelcase



Convertibility

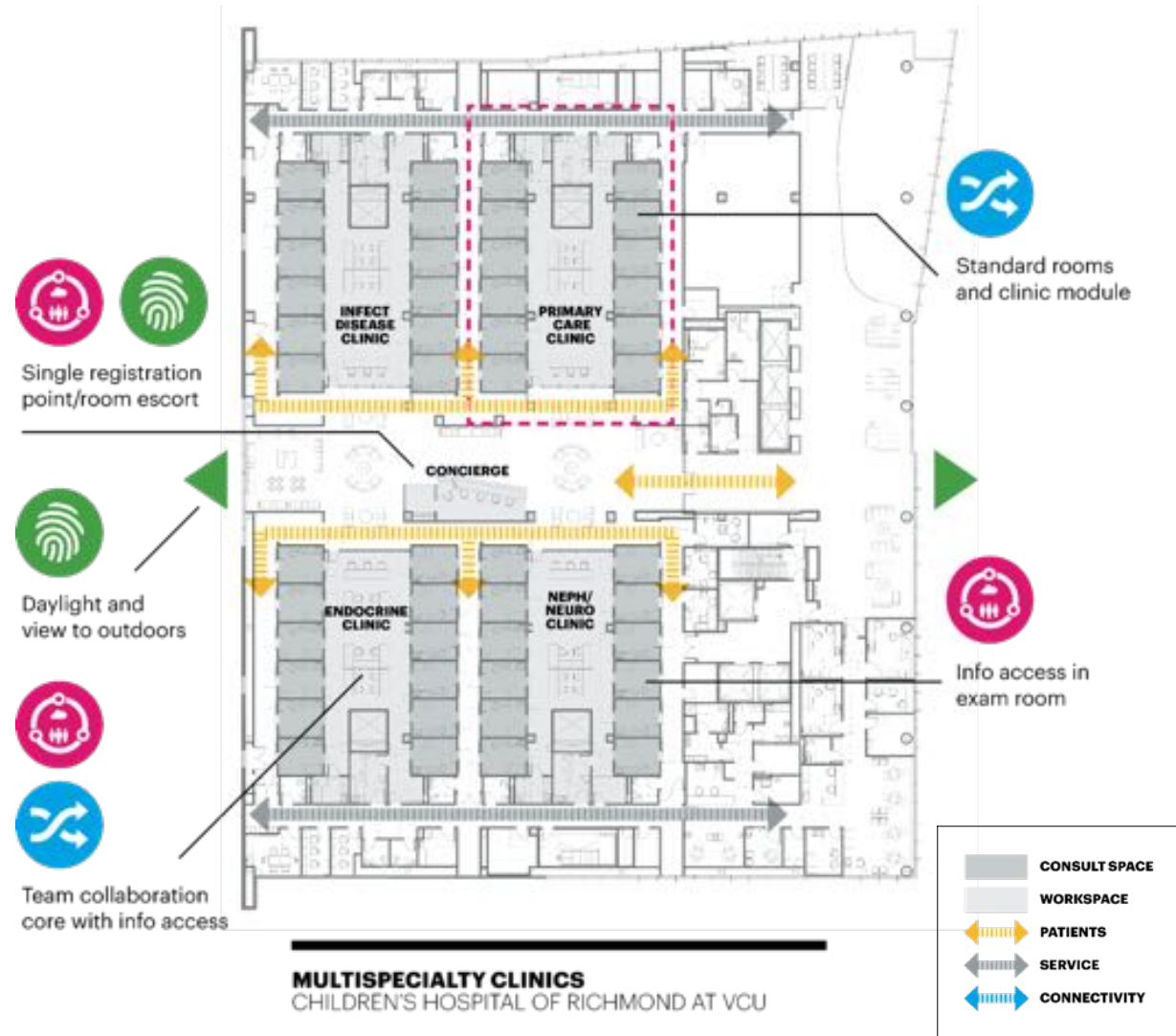
Space Planning

Children's Hospital of Richmond

Clinic modules are zoned with a consistent layout, allowing for various specialty clinics with little construction



Image Courtesy of HKS, Inc.



Convertibility

Services

AirFRAME by SLD Technology

Prefabricated, modular OR ceiling,
integrating air diffusion and lighting,
allowing for changing light and boom
layouts

Image Courtesy of SLD Technology



Convertibility

Structure

UT Center for BrainHealth

Existing, vacant building gutted to

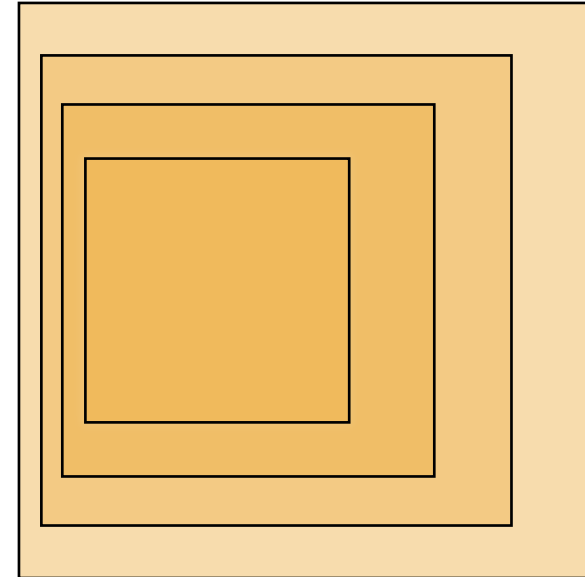
Reinvent to the Center for Brain
Health



Scalability

“It can grow or shrink”

Scalability is defined as the attribute that allows a building to expand or contract according to changing demands.



Scalability

“It can grow or shrink”

Scalability is defined as the attribute that allows a building to expand or contract according to changing demands.



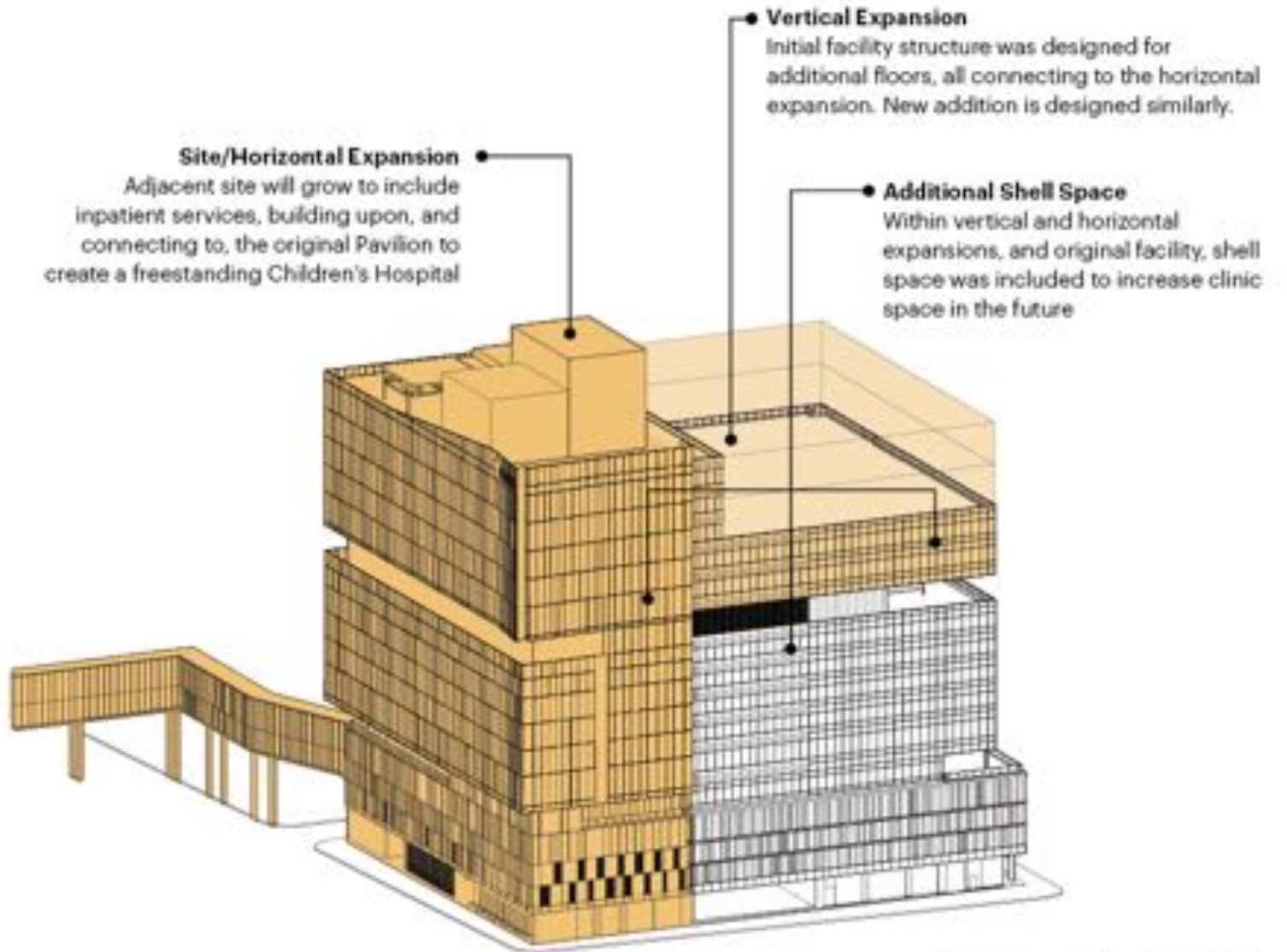
Scalability

“It can grow or shrink”

Children’s Hospital of

Richmond Pavilion

By HKS, Inc.



Adapted from conceptual rendering by HKS, Inc.

Scalability

Structure

University of Texas MD Anderson Cancer Center Alkek Tower

Oversized columns allowed for eight
floor vertical expansion; expanded
floorplates

Image Courtesy of HKS, Inc.



Scalability

Surroundings

Field Hospital (Level III) by Weatherhaven

Portable, medical shelters linked to interconnector kits, which link to a central corridor to create larger facilities

Image Courtesy of Weatherhaven



FleXX Framework



Kitchen Table



Delv City



Shipping Container



International Space Station

VERSATILITY

I can do different things in it

MODIFIABILITY

I can change it

CONVERTIBILITY

It can change

SCALABILITY

It can grow or shrink

LEVEL OF USE



EXAMPLES

- + multi-purpose space
- + built-ins with multiple uses

- + mobile furniture
- + moveable partitions
- + rolling equipment

- + demountable partitions
- + reconfigurable walls

- + structure
- + MEP

TIME FRAME



COST



STATE CHANGE



Adapt between states

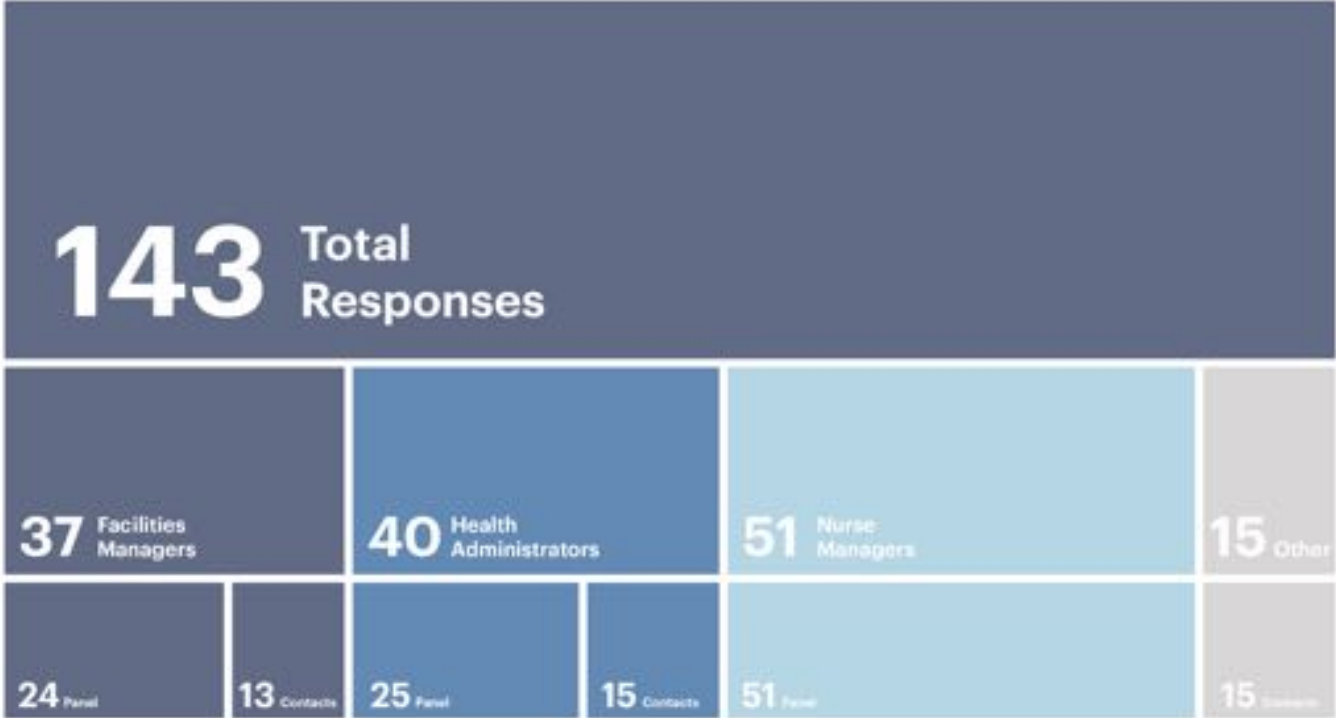


Adapt to a new state

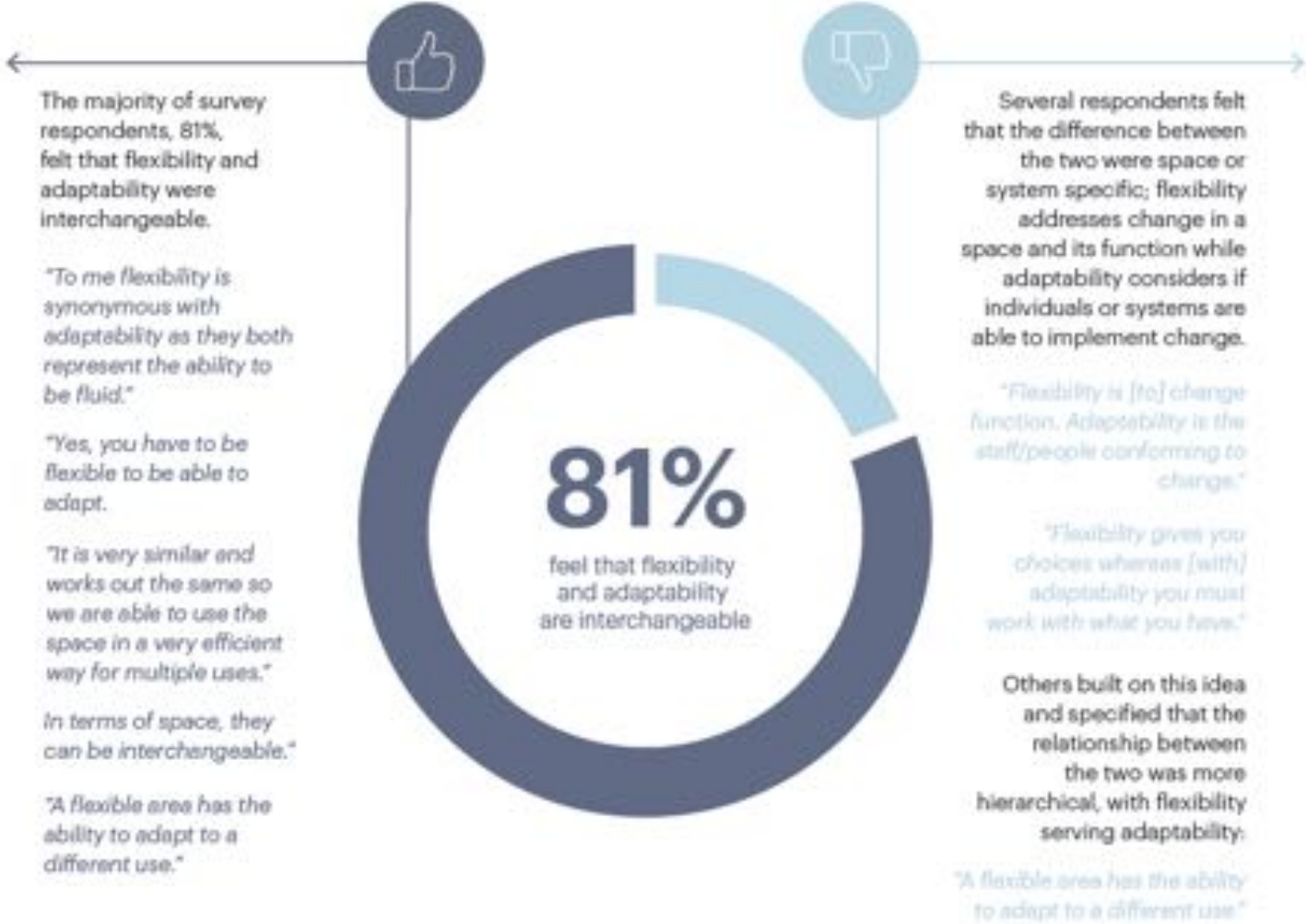
But what do stakeholders think?

Health Administrators
Nurse Managers
Facility Managers

About the Survey



Are flexibility and adaptability interchangeable?



How do nurse managers define flexibility?



Operations. Culture.

How do health administrators define flexibility?

"Flexibility allows an organization to respond to market/customer needs quickly and seamlessly."
-Health Administrator

"The ability to simply modify the built environment to shape the future."
-Health Administrator

"Flexibility is the ability to rapidly adapt to constantly changing demands of the healthcare environment."
-Health Administrator

"It means being able to change in an ever-changing environment."
-Health Administrator

Organizational.
Strategic.

"The ability to flex staff and supply spend."
-Health Administrator

"Ability to adapt space to meet needs of population it serves."
-Health Administrator

"In an effort to provide optimum care with challenges around space and time we need to be creative in space allocation, provider availability and staffing."
-Health Administrator

How do facilities managers define flexibility?

"Being flexible to me means being able to adapt our system and culture to changing demands of our customers and the ability to integrate new technologies into our business."
-Facilities Manager

"Buildings are expensive, we must sweat the asset through more efficient usage."
-Facilities Manager

"Ability to adapt new technologies, best practices, and changes in healthcare, with minimal capital expenditure."
-Facilities Manager

Spatial.
Planned.

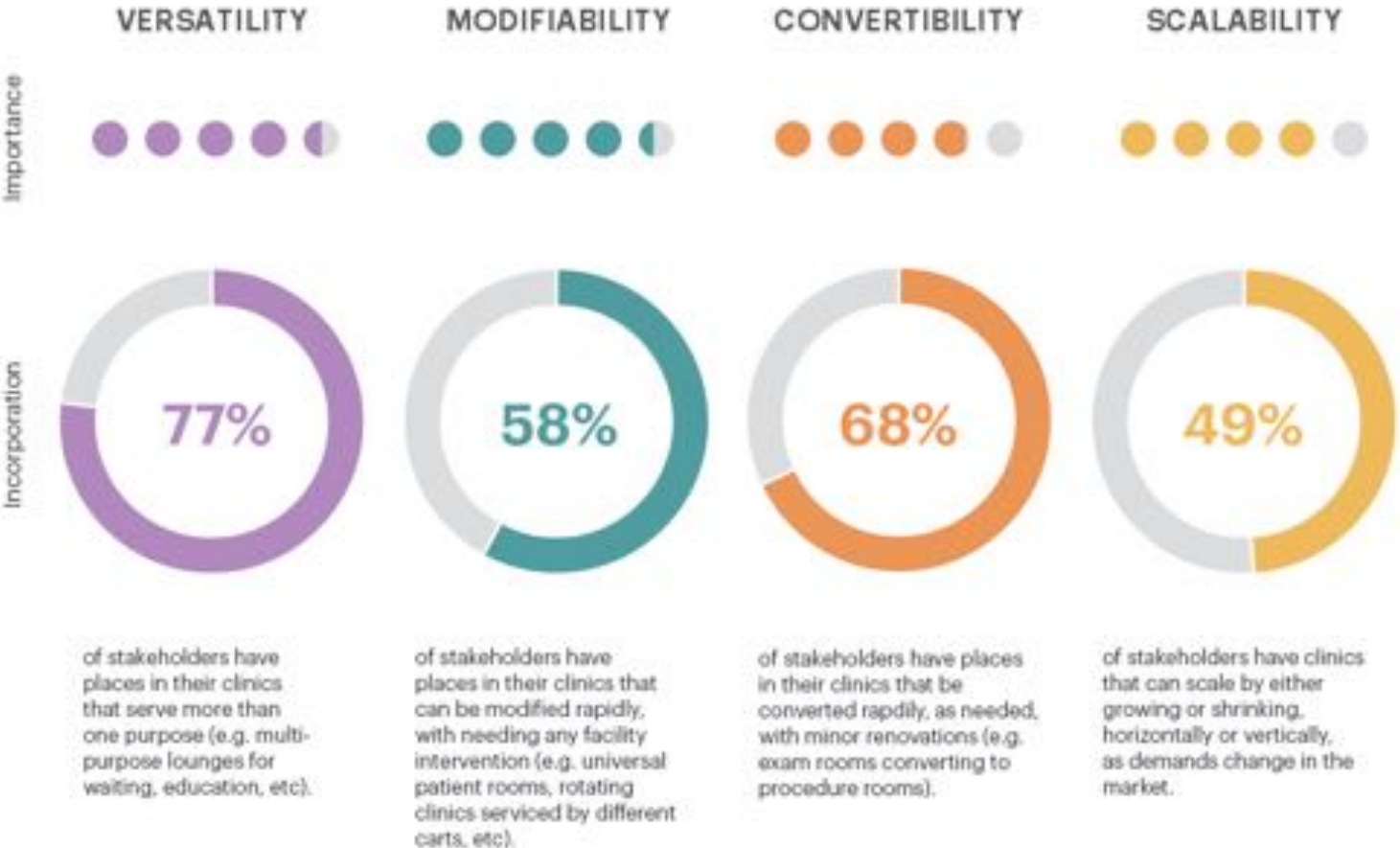
"Flexibility in facility planning means that the spaces we plan will be multi-purpose and serve multiple functions."
-Facilities Manager

"If it can change, it will change.
Plan accordingly."
-Facilities Manager

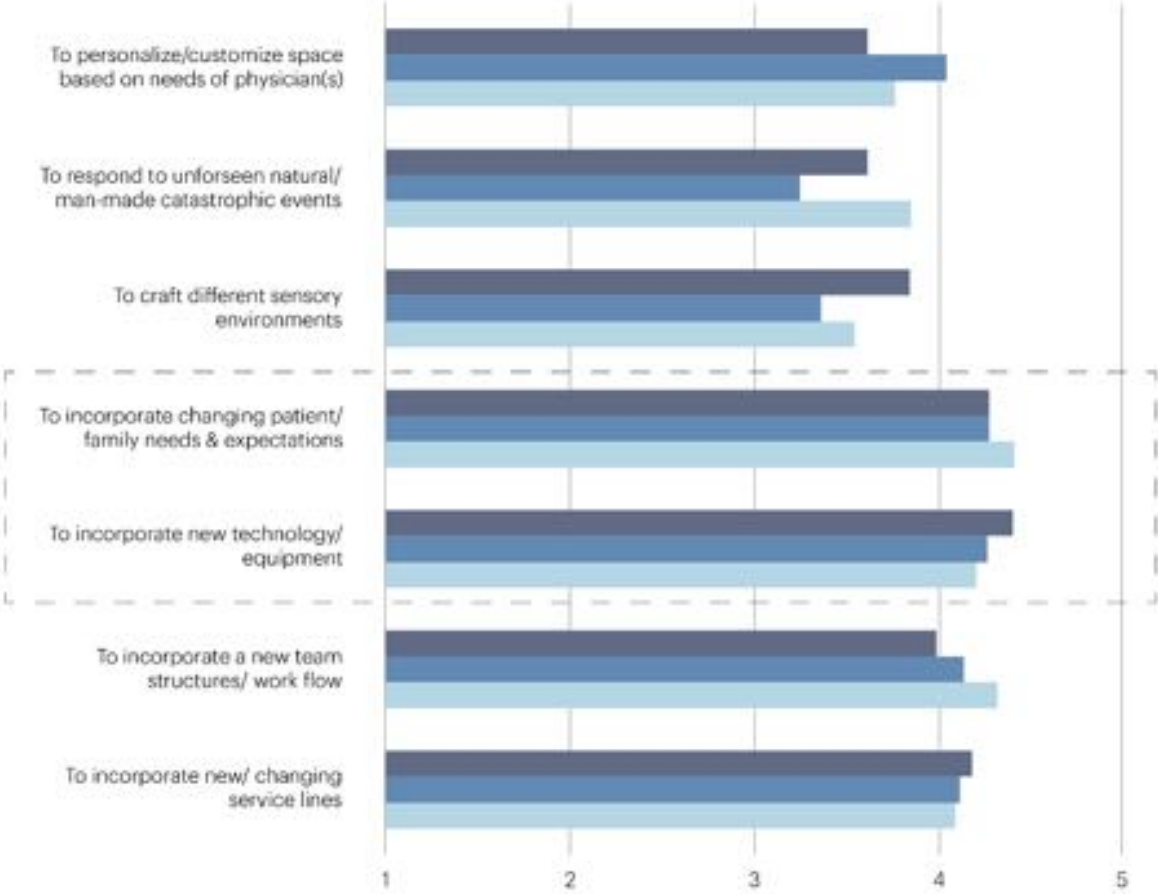


“Be” Flexible “To” Adapt

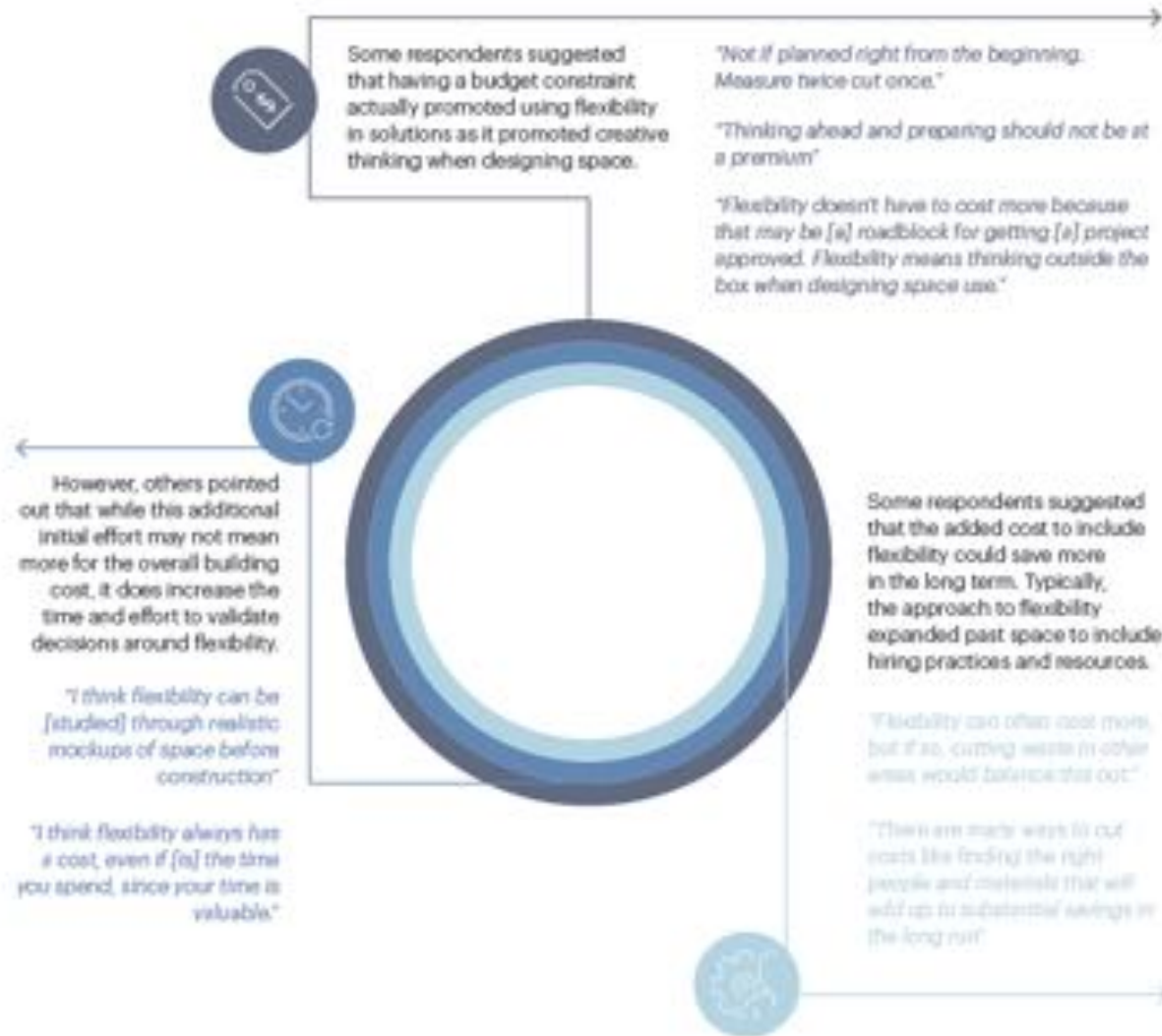
Importance of Attributes of Flexibility



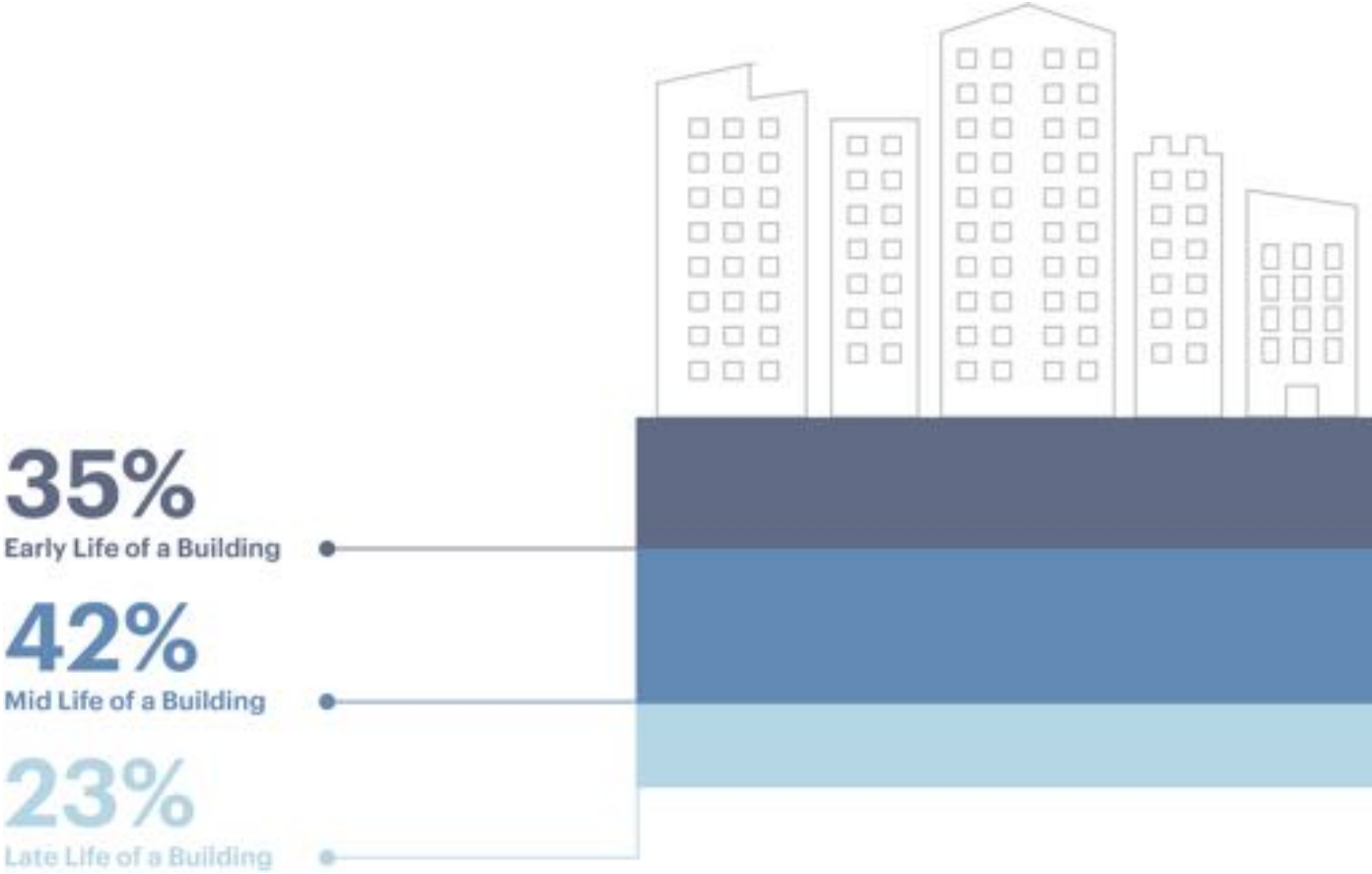
What drives the need for flexibility?



Does flexibility have to cost more?



When is flexibility expected to be used during a building's life?



How is ROI for flexibility investments recognized? Over what period of time?



People



Improved employee experience



Increased patient satisfaction



Place



Flexibility can be used with little cost or modifications



Planned flexibility is being utilized and is functional



Process



Increased efficiency and improved outcomes



Increased patient volume / organization growth



Logistics



Desired measures are met

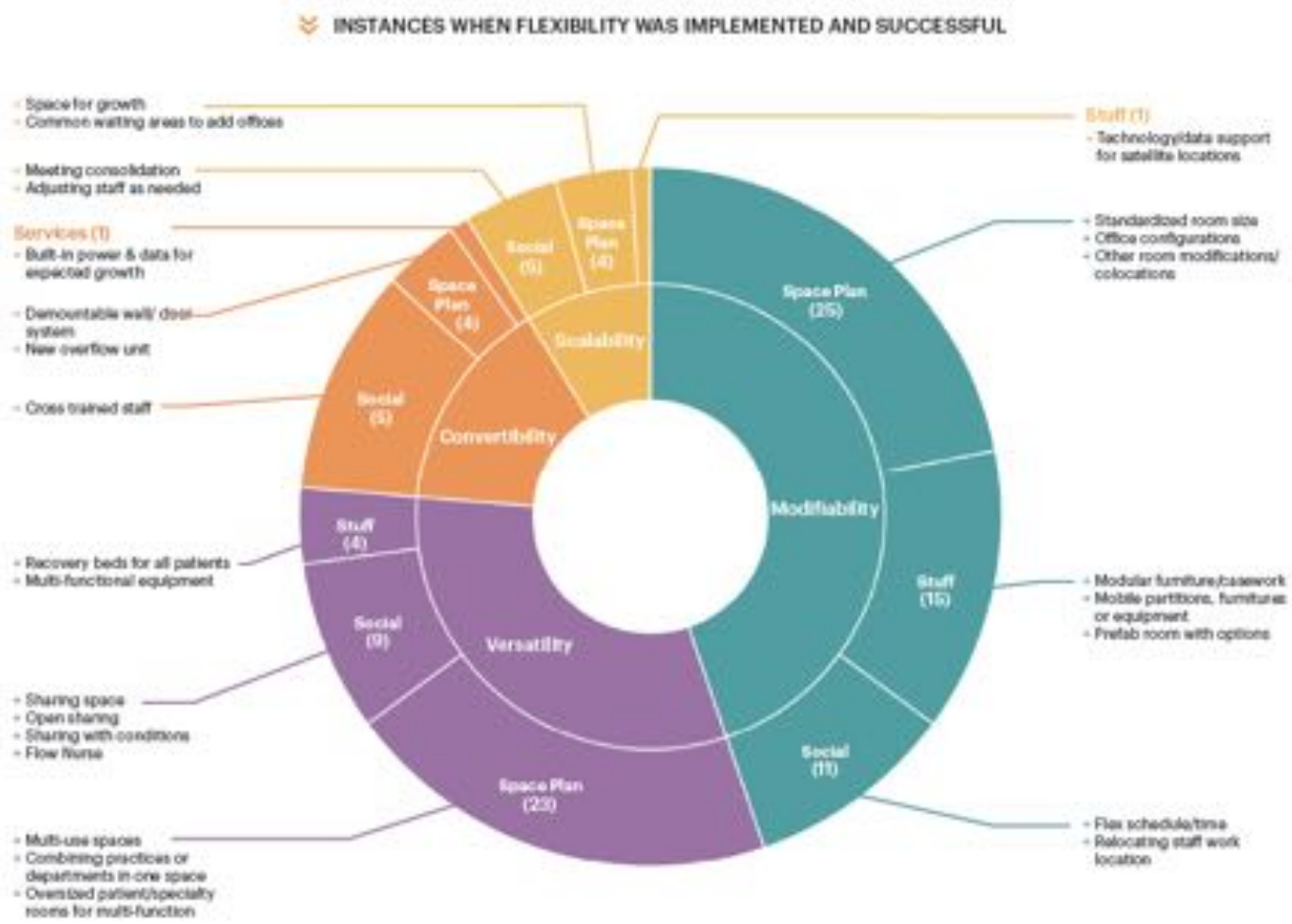


Improved bottom line

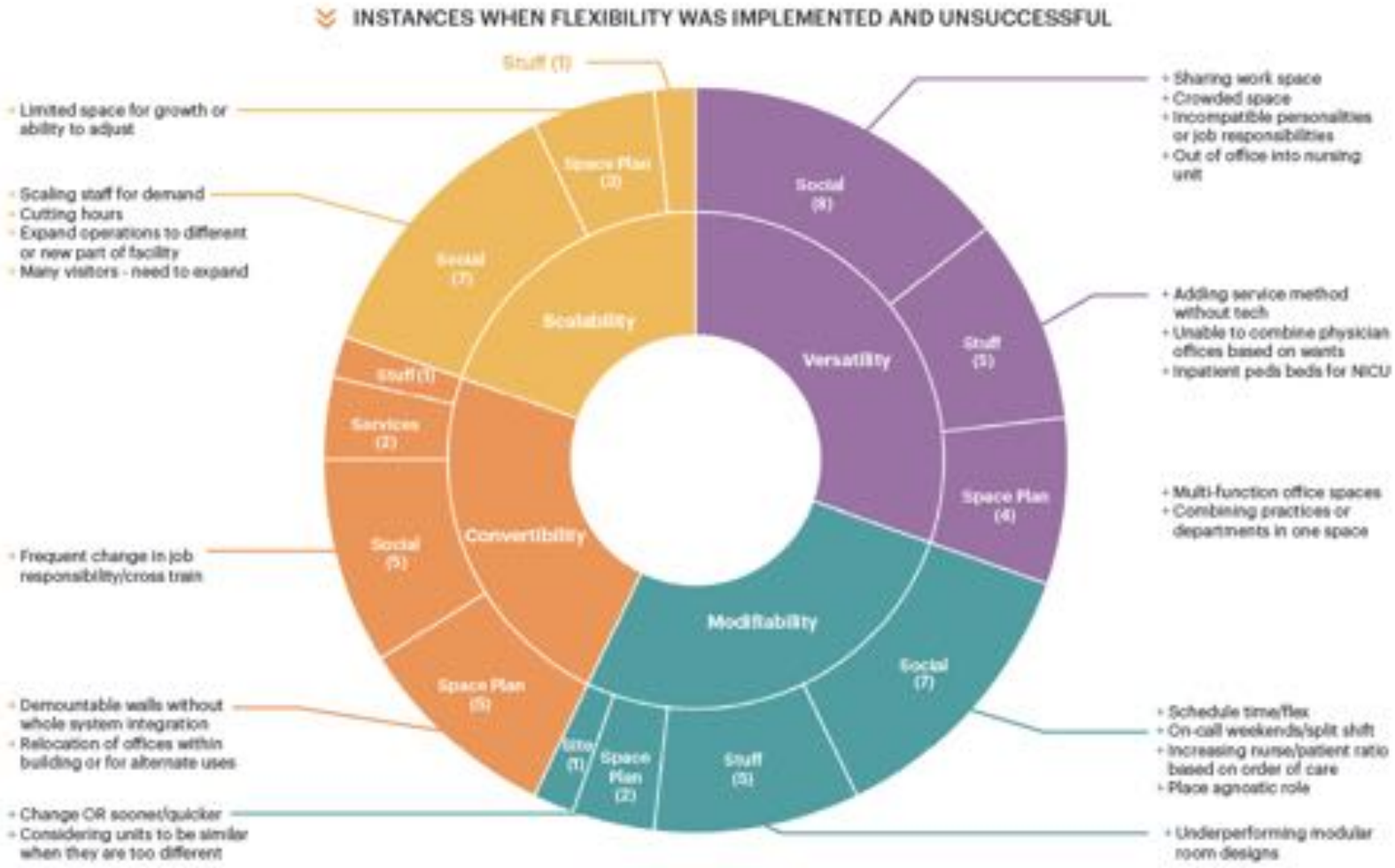
Can we “over-invest” in flexibility?



When has flexibility been successful?



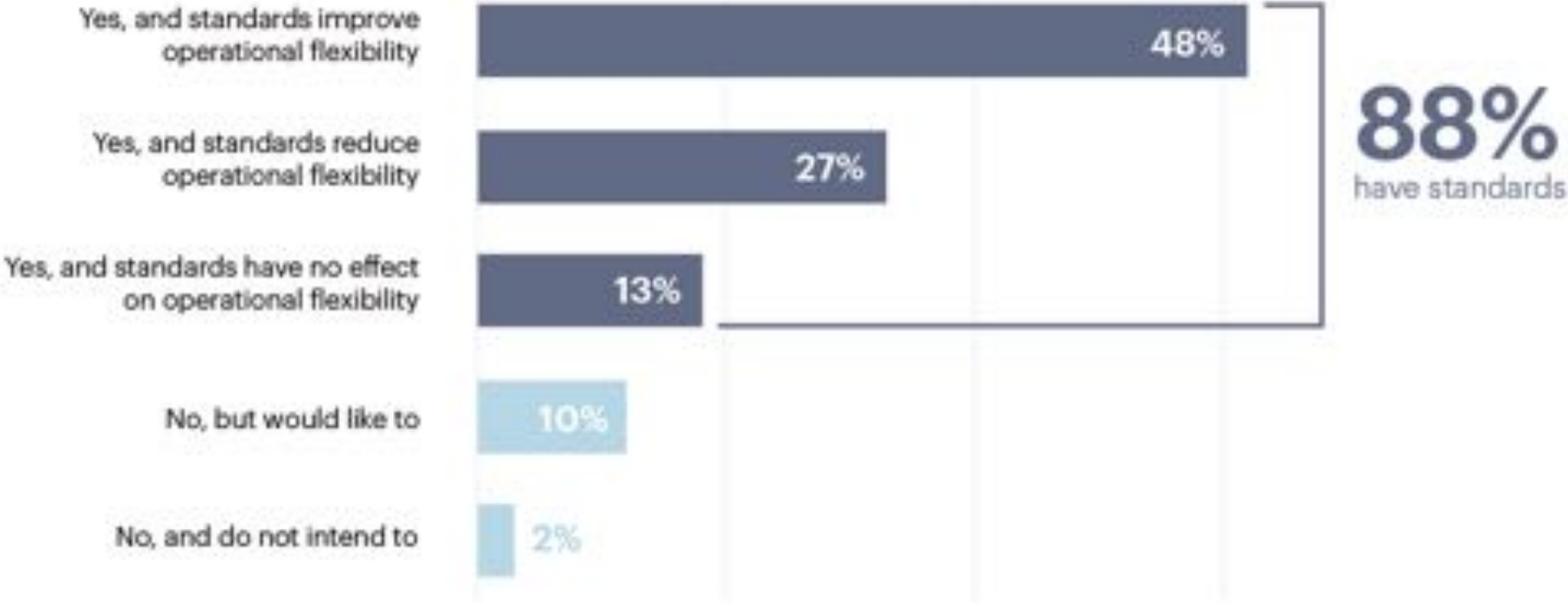
When has flexibility NOT been successful?



When do successful and unsuccessful instances of flexibility compare?

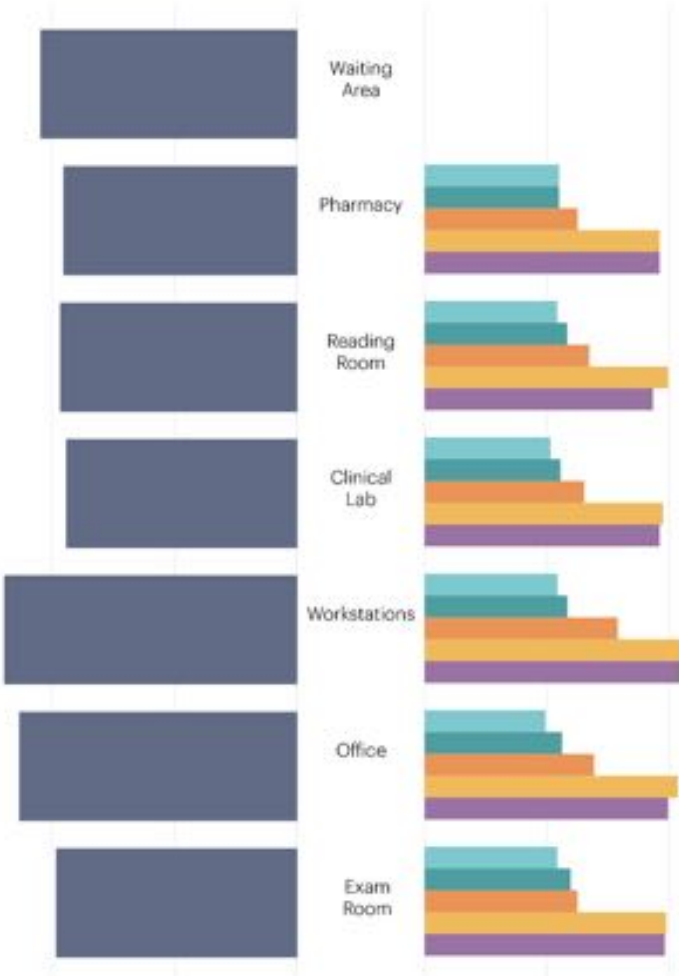
<p>"We created split shifts within the department to cover heavy patient loads and lunch breaks."</p> <p>-Health Administrator</p>	<p>"I established a new position called 'flow nurse' to increase patient and staff satisfaction with the workflow."</p> <p>-Nurse Manager</p>	<p>"Removed existing office cubicles to create a flexible 'big room' that can handle large planning meetings and flex to provide hoteling spaces."</p> <p>-Facilities Manager</p>	<p>"Our outpatient clinical modules are identically provisioned, making each module 'agnostic' to the specialty using it."</p> <p>-Nurse Manager</p>
<p>"Our organization implemented an on-call system that required nurses to be on-call for a full weekend at a time and it was too overwhelming."</p> <p>-Nurse Manager</p>	<p>"Attempting to have staff change responsibilities day to day, they did better when responsibilities don't change routinely."</p> <p>-Nurse Manager</p>	<p>"We tried to 'share' space with two other disciplines - did not work well. Complaints from nursing/providers."</p> <p>-Health Administrator</p>	<p>"Same sized exam room, offices and support spaces. Unfortunately, this requires more space overall, increasing operational cost and staff walking time"</p> <p>-Facilities Manager</p>

Do stakeholders use standards?



How are modular solutions used?

MODULAR SOLUTIONS USAGE IN CLINIC SPACES



- Prefab Room
- Prefab Exterior
- Demountable Walls
- Workstations
- Cabinets

How important are disaster and climate change preparedness?



Flexibility beyond buildings



TIME FLEX
Related to flexibility in scheduling, hours of operation and staffing.



ROLE FLEX
Related to flexibility in roles and responsibilities of staff.



RESOURCE FLEX
Related to using resources - such as equipment, furniture, supplies, amenities, and even space - flexibly.

Illustrating flexibility in practice

TIME

- + Shared rooms
- + Flex hours
- + Split-shifts
- + Self-scheduling
- + Cross-trained staff



ROLE

- + Supervisory roles for more employees
- + Cross trained staff



RESOURCE

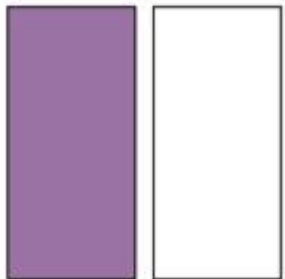
- + Multi-functional equipment
- + Smaller/mobile equipment
- + Leasing instead of buying equipment



Illustrating flexibility in practice

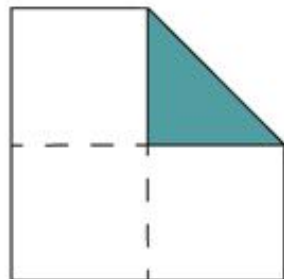
VERSATILITY

- + Open hall spaces
- + Multi-use spaces
- + Flex lab spaces
- + Shared spaces
- + Grouping of specialties
- + Removing partitions



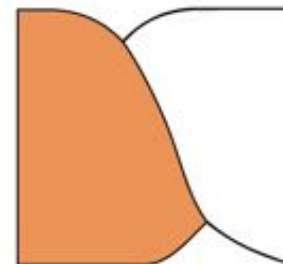
MODIFIABILITY

- + Supervisory roles for more
- + Movable partitions
- + Rotating check-in spaces
- + Modular furniture
- + Ability to add beds
- + Standardization



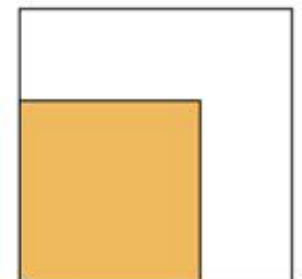
CONVERTIBILITY

- + Hybrid OR
- + Modular walls
- + Storeroom to pathology lab
- + Early MEP planning



SCALABILITY

- + Shell space
- + “Blow out” walls
- + Oversized structural members
- + Early MEP planning



Buildings must “be” flexible in order “to” adapt.

FleXX

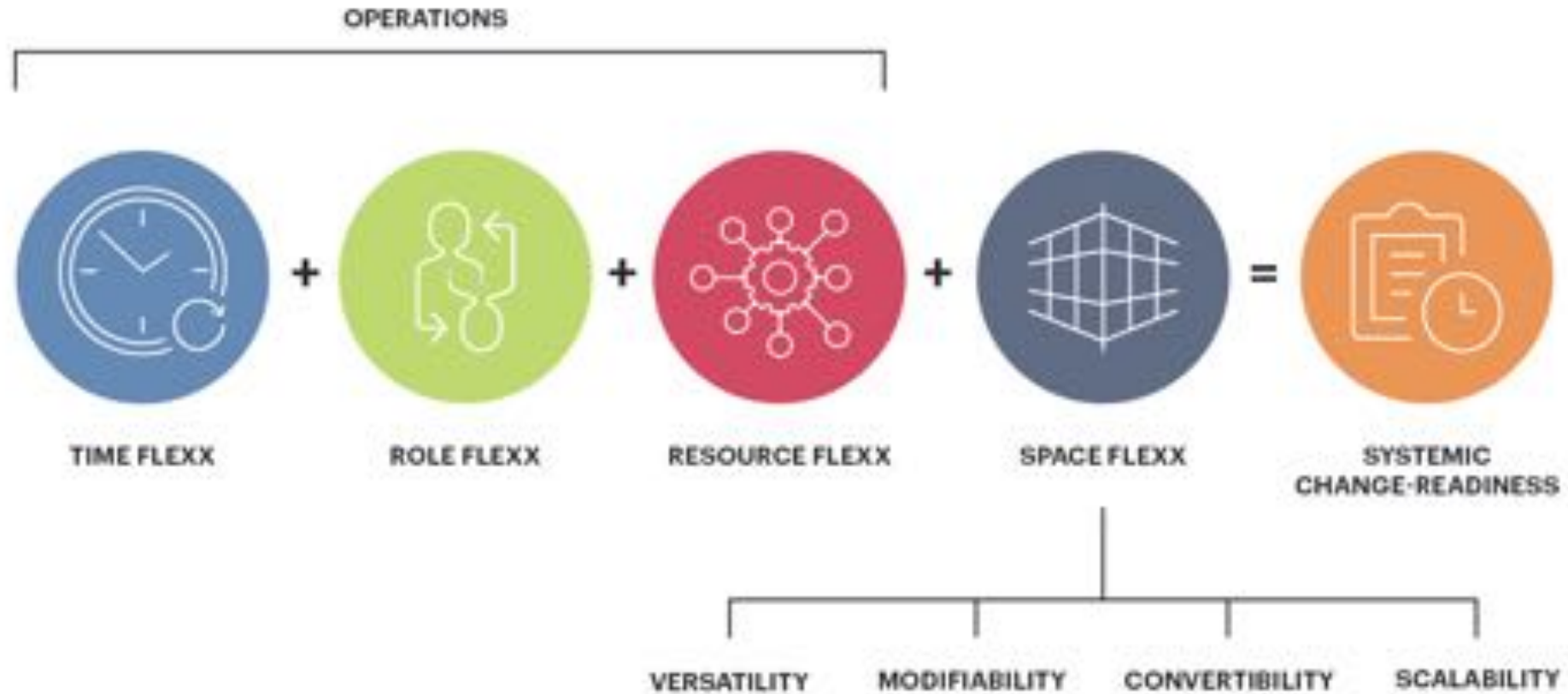
*to adapt by
being flexible*

Flexible environments enable operational, functional, demographic, climate, and market changes over time with optimal capital expenditure, allowing the building to be used as a strategic asset.

Mobilizing Flexibility needs a Strategic Plan



Flexibility must be systemic- and go beyond space



FULL REPORT CAN BE DOWNLOADED AT:

<http://www.cadreresearch.org/flexx>

<http://www.cadreresearch.org/flexx>

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Q&A

**Request for examples and
critique**