THE BIG 5 Healthcare Planning + Design Strategies for an Adaptable Future

SPEAKERS





ERIN NUNES COOPER, AIA, LEED AP

Associate Principal, Ballinger @cgdgreen



LOUIS MEILINK, JR. AIA, ACHA, ACHE Principal, Ballinger @LmeilinkA

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DURING TODAY'S PRESENTATION, WE WILL POSE QUESTIONS TO THE AUDIENCE. TO PARTICIPATE IN THE POLL:

TEXT TO **22333**

TYPE BALLINGER2018

THEN TEXT **A, B, C, D, E** or **F** OR **SINGLE WORD WRITE-IN** TO RESPOND TO QUESTIONS



Polling Question

Tell us about yourself. What is your background/ profession?

Audience Response



mechanical baller development arch-medical recruiter sales **designer** business sage **architects** engineering principal student nurse architectural vendor

Learning **OBJECTIVES**

- Explore aspects of population health and evolving technology in healthcare facilities and their impacts on hospital design and construction decisions.
- 2. Identify and understand the impact of floor to floor heights, column spacing, fixed vertical elements, targeted zones of flexibility, and resiliency on a healthcare facility's future adaptability.
- 3. Apply the concept of targeted zones of flexibility in projects
- 4. Identify building resiliency measures that conceive of healthcare facilities as part of our national infrastructure.



THE EVOLVING HEALTHCARE LANDSCAPE

What is **POPULATION HEALTH?**



POPULATION HEALTH

The health outcomes of a group of individuals, including the distribution of such outcomes within the group. *(Kindig + Stoddart)*

POPULATION HEALTH RESEARCH

The study of health outcomes, health determinants, and policies and interventions that link the two in efforts to improve population health and ameliorate health disparities. *(Kindig + Stoddart)*

A shift from individualized care to collective care of the whole – with an emphasis on overall health & well-being.

SOURCE: What is population health? Am J Public Health. 2003 Mar;93(3):380-3. Kindig D, Stoddart G. https://www.ncbi.nlm.nih.gov/pubmed/12604476







OF ALL DEATHS ARE CAUSED BY ONE OR MORE OF 5 CHRONIC DISEASES HEART DISEASE CANCER STROKE CHRONIC OBSTRUCTIVE PULMINARY DISEASE DIABETES

HEALTH DETERMINANTS VERSUS OUTCOMES

PHYSICAL ENVIRONMENT

- Air + Water Quality
- Housing + Transit

SOCIAL FACTORS

- Education
- Income
- Family/Social Support
- Employment
- Community Safety



HEALTHY BEHAVIORS

- Tobacco Use
- Diet + Exercise
- Alcohol + Drug Use
- Sexual Activity

CLINICAL CARE

- Access To Care
- Quality Of Care

SOURCE: COUNTY HEALTH RANKINGS + ROADMAPS, a collaboration between the Robert Wood Johnson Foundation and the University of Wisconsin Population Health Institute COUNTY HEALTH RANKINGS 2018 <u>http://www.countyhealthrankings.org/explore-health-rankings/what-and-why-we-rank/health-factors</u> http://www.countyhealthrankings.org/sites/default/files/2018CountyHealthRankingsData-v1.xls



Sources: Virginia Commonwealth University; U.S. Census Bureau; Philadelphia Police Dept.



HEALTH AND SOCIAL SPENDING



Source: Organization for Economic Cooperation and Development (OECD)

E.H. Bradley and L.A. Taylor, The American Health Care Paradox: Why Spending More is Getting Us Less, Public Affairs 2013

U.S ANOMALY IN HEALTH AND SOCIAL SPENDING



Source: Organization for Economic Cooperation and Development (OECD)

E.H. Bradley and L.A. Taylor, The American Health Care Paradox: Why Spending More is Getting Us Less, Public Affairs 2013

Healthiest Countries



1 Italy

- 2 Iceland
- **3** Switzerland
- **4** Singapore
- **5** Australia
- **6** Spain
- 7 Japan
- 8 Sweden
- 9 Israel
- **10** Luxembourg

The Evolving **QUADRUPLE AIM**



Delivering the Right Care, for the Right Price, at the Right Time – in the Right Place

Humanizing **TELEMEDICINE**



INGESTIBLE SENSORS



VR + AUGMENTED REALITY

EMERGING

"Ultimately healthcare comes down to human-to-human interaction. So if you are going to go into **artificial** intelligence, machine learning, etc., it's got to be able to **re-humanize**, as opposed to de-humanize care."

Dr. Steven Corwin CEO, New York Presbyterian



Source: Advisory Board, "2018 Telehealth Industry Trends", 2018 https://www.advisory.com/research/market-innovation-center/resources/2018/telehealth-industry-trends

CHANGE is the only constant in health care...

... in treatment and technology, in disease and patient demographics, and in reimbursement and regulation.

Therefore, master planning must accommodate what and how health care is provided today and changes that can't be imagined over the lifespan of the campus.

THE BIG 5

1. FLOOR TO FLOOR HEIGHTS

4

3

2

1

Floor to floor heights that support state-of-the-art and state-of-the-future technology.



2. COLUMN SPACING

5

4

3

2

1

Column spacing + contiguous floor area that allows changes of use over time.





3. FIXED VERTICAL ELEMENTS

Locations + capacities of elevators, stairs, shafts, and other fixed vertical elements using edges versus centers.

(CORE A)	SOUTH CORE (CORE B)	NORTHEAST CORE (CORE C)	WELLBEING
	Ph1 Peak-Time Staff		
	Event Service SSRA Medical Gases		
nts	Medical Eqpm Staff Mech Ennm Patient Enn		
nts • OB Case Carts	OB Waste Clean Goods Food Food Waste Pharmacy / Lab Clean Goods	Ambulatory Visitors OB Visitors Event Space	
i • OR Case Carts	Prep/Rec Waste Enclosed Food Patient Transport	Gowned Staff Ambulatory Patients OB Patients	Wellbeing Users
at. Lift Clean Core SE3	Seld Service Clean Service Patient/Service	Sce10811 PE012 13 14 15 16817 PE018 19 20	Wellbeing PF21&22
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4. STRATEGIC ZONES OF FLEXIBILITY

Targeted zones of flexibility to invest strategically and avoid over pre-investing.





5. RESILIENCY

Resiliency measures that conceive of healthcare facilities as part of our community infrastructure.





'THE BIG 5' SCORECARD







Polling Question

How does your facility or project you are working on stack up to The Big 5?

Audience Response



98 RESPONSES TOTAL



NYU LANGONE HEALTH Ambulatory Care Center



TOWER HEALTH SYSTEM Reading Healthplex for Advanced Surgical + Patient Care



West Chester, PA

PENN MEDICINE: CHESTER COUNTY HOSPITAL Lasko Tower And Procedural Platform + Inpatient Beds

NEWYORK-PRESBYTERIAN HOSPITAL David H. Koch Ambulatory Care Center





NYU LANGONE HEALTH Ambulatory Care Center



320,000 SF Ambulatory Care | 1 Acre Site



320,000 SF Ambulatory Care | 1 Acre Site





















PRE-RENOVATION CONDITIONS: NORTH PLAZA



RENOVATION: GROUND FLOOR LOBBY





PRE-RENOVATION CONDITIONS: GROUND FLOOR LOBBY + RECEPTION



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PRE-RENOVATION CONDITIONS: GROUND FLOOR LOBBY + RECEPTION

















EXISTING HVAC INFRASTRUCTURE



NEW HVAC INFRASTRUCTURE















Polling Question

What is the ideal floor to floor height for inpatient beds in a new building?

Audience Response



100 RESPONSES TOTAL





TOWER HEALTH SYSTEM Reading Healthplex for Advanced Surgical + Patient Care



3.0 M SF CAMPUS | 46+ ACRES | 680 BEDS



500,000 SF

READING HEALTHPLEX **STATS**

72% of footprint is vegetative roof

24 ORs + 8 Procedure Rooms

-

150 Beds

100 11

CAMPUS SECTION

HEALTHPLEX (2016)	N BUILDING (2005)	R BUILDING (1995)	

CAMPUS SECTION

HEALTHPLEX (2016)	N BUILDING (2005)	R BUILDING (1995)	

ENTRY LEVEL

2

- 1 Arrival/Entry
- 2 Surgical Waiting and Garden
- 3 Prep/Recovery + PACU
- 4 Surgery Suite
- 5 OR Staff Support

- 6 Psychiatric Treatment Unit
- 7 ED Expansion
- 8 Trauma Expansion
- 9 OR/Anesthesia Administration

GROUND LEVEL

-

10

10

- Prep/Recovery
 Short Procedure Suite
- 3 ED Administration
- 4 OR Staff Support
- 5 On Call

- 6 Protocol Offices
- 7 Pre-Admissions Testing
- 8 Public Conference Room
- 9 Trauma Administration
- 10 Healing Garden/Public Park










-

in in

in in 10

Private Bed Unit (30)

PENTHOUSE in in

-

-

50

-

AND IN THE REAL PROPERTY OF

in in

in in Ti

MEP Infrastructure





























Polling Question

What is the ideal perimeter column grid for inpatient beds?

Audience Response



98 RESPONSES TOTAL





PENN MEDICINE: CHESTER COUNTY HOSPITAL Lasko Tower And Procedural Platform + Inpatient Beds



600,000 SF CAMPUS | 36 ACRES | 248 BEDS









'THE BIG 5' SCORECARD

Below Average for Inpatient Use

ADMINISTRATIVE CLINICAL









Polling Question

What is the ideal floor to floor height for a new diagnostics and treatment floor?

Audience Response



99 RESPONSES TOTAL




























'THE BIG 5' SCORECARD



Above Average - Excellent

Polling Question When are you likely to implement resiliency or emergency strategies in preparation for an adverse weather event?

Audience Response









NewYork-Presbyterian Hospital David H. Koch Ambulatory Care Center



740,000 SF | 42,000 SF Site | 1 Acre



740,000 SF | 42,000 SF Site | 1 Acre



16 Fixed Imaging Modalities

52'-0" Linear Accelerator Elev. Above Grade NewYork-Presbyterian Hospital **STATS**

102 Private Prep / Recovery Rooms

29 Procedure Rooms

HOSPITAL FOR WOMEN & NEWBORNS 220,000 SF

AMBULATORY CARE

PUBLIC SPACE

740,000 SF NEW CONSTRUCTION

- 18 Postpartum + Antepartum
- 17 Postpartum
- 16 Postpartum
- 15 Neonatal Intensive Care Unit
- 14 Labor + Delivery
- 12 Maternal Fetal Medicine / Food Service
- 11 Mechanical
- 10 Mechanical

9

8

7

- Pre-Admission Testing + Digestive Diseases
- Endoscopy
- Shared Staff Support + Diagnostic Imaging
- 6 Ambulatory Surgery
- 5 Interventional Radiology
- Radiation Oncology + Infusion

5 RESILIENCY **STRATEGIC ZONES** 4 **OF FLEXIBILITY FIXED VERTICAL** 3 **ELEMENTS** 2 **COLUMN SPACING FLOOR TO FLOOR**

HEIGHTS









32'

65





50 5

-ED-





3T MRI MAGNET



7T MRI MAGNET















- ConEd HT. Service N+2 on level 10
- Three emergency generator on 11
- 96 hour fuel oil storage
- Utilities street roll-up connections
- Air handling units on emergency power
- All heating equipment on emergency power
- Two chillers, cooling towers and associated pumps on emergency power
- Controllers to below grade equipment located above 1st floor



























'THE BIG 5' SCORECARD



Overall Score



LESSONS LEARNED

 We do not need to meet all of The Big 5 to have a successful project.

 It is reasonable to overcome 1 - 2 shortcomings with creative design solutions.

 Projects that meet 3 or fewer may reach a tipping point with design and cost challenges.

RECOMMENDATIONS

1. FLOOR TO FLOOR	2. COLUMN SPACING	3. FIXED VERTICAL	4. STRATEGIC ZONES OF FLEXIBILITY	5. RESILIENCY
Minimum 14'-0" New Beds 16'-0" New D+T Minimum 12'-0" Existing Beds 14'-0" Existing D+T	 32'-0" Perimeter Inpatient Beds Opportunities for ORs out of bed footprint 24'-0" - 26'-0" ORs (with deeper dimension) 100 - 120' Procedure Platform width 	Use edges versus centers Locate outside of clinical blocks	Large swatches of uninterrupted space Minimum footprint 20,000 GSF More flexibility on D+T Beds tend to be more static	Regional and local priorities Redundant feeds Independence from grid Dual fuel sources Surge conditions
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