THE GLOBAL IMPACT OF THE CONCEPT OF POPULATION HEALTH ON THE DESIGN OF HEALTH NETWORKS + HEALTH FACILITIES
RESEARCH BASED DESIGN
Fundamental to Architectural Excellence
While Advancing Population Health
SPEAKERS

Louis A. Meilink, Jr., AIA, ACHA, ACHE

- Principal with 29 Years of Diversified Healthcare Experience
- 2 Pebble Projects with The Center for Healthcare Design
- Kansas State – Class of ‘87

Debbie Phillips, AIA, ACHA, EDAC

- Senior Healthcare Planner
- Accredited in Healthcare Planning and Evidence Based Design
- Aggie – Class of ‘85
TODAY’S AGENDA

• ABOUT BALLINGER
• RESEARCH/EVIDENCE BASE DESIGN
• TODAY’S HEALTHCARE LANDSCAPE
• POPULATION HEALTH
• THE EVOLVING QUADRUPLE AIM
• ARCHITECTS’ ROLE IN PUBLIC HEALTH
ABOUT BALLINGER

- Founded in 1878
- 225 Architecture + Engineering + Interiors Professionals in Single Office in Philadelphia
- Collaborative, Client Focused Approach
- Principal Involvement
- Integration of Planning, Design + Technology; History of Innovation
- Design Excellence
- Health Science Initiatives: Clinical, Teaching, Research
225 ARCHITECTS, INTERIORS + ENGINEERS BASED IN PHILADELPHIA
ARCHITECTURE FOR HEALTH: RECENT PROJECTS

Golisano Children’s Hospital - 2015

University of Maryland Medical Center - 2014

Reading Hospital Medical Center - 2016

Penn Medicine, Lancaster General Health - 2013
HEALTHCARE EXPERTISE/LEADERSHIP
“Evidence-based design (EBD) is the process of basing decisions about the built environment on credible research to achieve the best possible outcomes.”

Evidence-based medicine starts with Professor Cochrane’s book.

**1972:** Evidence-based medicine starts with Professor Cochrane’s book.


**1978:** Planetree is founded.

**1980:** Planetree is founded.

**1985:** First Planetree model hospital.

**1993:** Center for Health Design is founded.

**1998:** Dr. Haya Rubin study on # EBD studies.

**1999:** IOM – To Err is Human.

**2001:** IOM – The Quality Chasm.

**2004:** CHD publishes first literature review; 84 EBD studies.

**2005:** Pebble Project launches.

**2006:** EBD in industry guidelines.

**2008:** 1200 EBD studies.

**2009:** 100 EDAC certified individuals.

**2012:** 1000 EDAC certified individuals.

**2014:** Design & Health Research Consortium established.

**2016:** 1,673 EDAC certified individuals.

Adapted from Center for Health Design.
TODAY’S HEALTHCARE LANDSCAPE
*Other = Government administration + Government public health activities + Investment (noncommercial research, structures and equipment)

NATIONAL HEALTH EXPENDITURES: WHO’S PAYING?

64% COST OF CARE BY GOVERNMENT

- 48% FOR MEDICARE, MEDICAID, AND VA
- 6% FOR GOVERNMENT COVERAGE OF PRIVATE INSURANCE FOR EMPLOYEES
- 10% TAX SUBSIDIES FOR HEALTHCARE INSURANCE

36% COST OF CARE BY PRIVATE INSURANCE

Source: American Journal of Public Health - 2016
**POPULATION HEALTH VS. UNBUNDLED CARE: CHALLENGE/TENSION**

**THE GOVERNMENT** WANTS TO BUNDLE PAYMENTS TO GAIN ACCOUNTABILITY FOR ENTIRE TREATMENT.

**PRIVATE INSURERS** WANT TO PAY BY SERVICE.

"THE PIE IS GETTING SMALLER AND THE TABLE MANNERS ARE GETTING WORSE."

- The Advisory Board
5% of the population accounts for half of health spending.

Source: MIT Technology Review
COST OF CHRONIC DISEASE

OF ALL DEATHS ARE CAUSED BY ONE OR MORE OF 5 CHRONIC DISEASES:

- HEART DISEASE
- CANCER
- STROKE
- CHRONIC OBSTRUCTIVE PULMONARY DISEASE
- DIABETES

SOURCE: Centers for Disease Control and Prevention
NEARLY \(\frac{1}{2}\) OF ALL AMERICANS SUFFER FROM AT LEAST ONE CHRONIC DISEASE

CHRONIC DISEASES ACCOUNT FOR $3 OF EVERY $4 SPENT ON HEALTHCARE

SOURCE: Centers for Disease Control and Prevention
THE EVOLVING HEALTHCARE LANDSCAPE

ADAPTABLE INFRASTRUCTURE
Well-defined zones of pre-investment for infrastructure allow for future flexibility where it is most needed. It is cost prohibitive and ineffective to design all spaces with 100% flexibility.

TECHNOLOGY

LEGISLATION

INFLUENCE OF ARCHITECTURE, PLANNING, + DESIGN

AGILITY

EFFICIENCY

DIVERSITY

CONSUMERISM

POPULATION HEALTH

HEALTH + PREVENTATIVE CARE
Evidence-Based Design of health facilities illustrates the importance of principles such as quality of care and patient safety on Population Health.

PERFORMANCE BASED FUNDING
The American Affordable Care Act is tightening the reins on reimbursements through several initiatives (e.g., Value-Based Purchasing program, Hospital Readmissions Reduction Program). Hospital Consumer Assessment of Healthcare Providers and Systems scores are also affecting reimbursements. Quality of facilities has a positive impact on these legislated initiatives.

CHOICE + ACCESS
Today's patients and their families have access to information and choice about their care. Providing a greater level of comfort and amenities keeps institutions competitive. Hospital leaders are looking for innovative ways to replace outdated inpatient facilities, repurpose existing buildings and upgrade in place.
POPULATION HEALTH
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)*
HEALTH DETERMINANTS VS OUTCOMES

HEALTH OUTCOMES
- LENGTH OF LIFE
- QUALITY OF LIFE

HEALTH FACTORS

POLICIES & PROGRAMS

HEALTH BEHAVIORS
(30%)

CLINICAL CARE
(20%)

SOCIAL & ECONOMIC FACTORS
(40%)

PHYSICAL ENVIRONMENT
(10%)

TOBACCO USE

DIET & EXERCISE

ALCOHOL USE

SEXUAL ACTIVITY

ACCESS TO CARE

QUALITY OF CARE

EDUCATION

INCOME

FAMILY/SOCIAL SUPPORT

EMPLOYMENT

COMMUNITY SAFETY

ENVIRONMENTAL QUALITY

BUILT ENVIRONMENT

SOURCE: UNIVERSITY OF WISCONSIN POPULATION HEALTH INSTITUTE.
COUNTY HEALTH RANKINGS 2013
MEASURING SUCCESS

**PHYSICAL HEALTH**
- Greater life expectancy
- Lower rates of chronic disease
- Access to healthcare
- Better self-reported health

**SOCIAL WELLBEING**
- Community engagement
- Higher levels of employment
- Lower rates of smoking
- Lower rates of obesity

**MENTAL HEALTH**
- Lower rates of depression
- Lower rates of substance abuse
- Lower stress levels
- Greater ability to cope

**COST**
- Lower cost per capita
- Lower insurance premiums
ADVANCING POPULATION HEALTH WITH RESEARCH BASED DESIGN

<table>
<thead>
<tr>
<th>RANK</th>
<th>Health Outcomes</th>
<th>Length of Life</th>
<th>Premature death</th>
<th>Quality of Life</th>
<th>Poor or fair health</th>
<th>Adult smoking</th>
<th>Adult obesity</th>
<th>Excessive drinking</th>
<th>Alcohol-impaired driving deaths</th>
<th>Teen births</th>
<th>High school graduation</th>
<th>Children in poverty</th>
<th>Violent crime</th>
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<td>1-60</td>
<td>30</td>
<td>11</td>
<td>6,600</td>
<td>120</td>
<td>20%</td>
<td>15%</td>
<td>28%</td>
<td>17%</td>
<td>32%</td>
<td>52</td>
<td>88%</td>
<td>25%</td>
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<tr>
<td>61-120</td>
<td>5,100</td>
<td>9</td>
<td>4,900</td>
<td>21</td>
<td>20%</td>
<td>16%</td>
<td>26%</td>
<td>19%</td>
<td>20%</td>
<td>25</td>
<td>83%</td>
<td>25%</td>
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<td>121-181</td>
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<td>15%</td>
<td>12%</td>
<td>20%</td>
<td>23%</td>
<td>35%</td>
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<td>87%</td>
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ADVANCING POPULATION HEALTH WITH RESEARCH BASED DESIGN

<table>
<thead>
<tr>
<th></th>
<th>Chester (Ch)</th>
<th>Philadelphia (Ph)</th>
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<tbody>
<tr>
<td>Health Outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of Life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premature death</td>
<td>4,800</td>
<td>9,900</td>
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<tr>
<td>Quality of Life</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor or fair health</td>
<td>11%</td>
<td>23%</td>
</tr>
<tr>
<td>Adult smoking</td>
<td>14%</td>
<td>23%</td>
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<tr>
<td>Adult obesity</td>
<td>24%</td>
<td>29%</td>
</tr>
<tr>
<td>Excessive drinking</td>
<td>19%</td>
<td>19%</td>
</tr>
<tr>
<td>Alcohol-impaired driving deaths</td>
<td>44%</td>
<td>25%</td>
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<tr>
<td>Teen births</td>
<td>13</td>
<td>51</td>
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<tr>
<td>High school graduation</td>
<td>82%</td>
<td>72%</td>
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<td>Children in poverty</td>
<td>9%</td>
<td>37%</td>
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<tr>
<td>Violent crime</td>
<td>165</td>
<td>1,190</td>
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</tbody>
</table>

RANK 1-17  18-34  35-50  51-67

SOURCE: UNIVERSITY OF WISCONSIN POPULATION HEALTH INSTITUTE.
COUNTY HEALTH RANKINGS 2016
WHAT IS THE AFFORDABLE CARE ACT?

2 PIECES OF LEGISLATION
- To expand health insurance coverage for Americans
- Hold insurance companies accountable
- Lower healthcare costs
- Guarantee more choice for consumers
- Enhance quality of care received

IMPACT OF THE AFFORDABLE CARE ACT

1. Pay for Service / Pay for Performance

2. Focus on Health + Preventative Care

3. Increase in Outpatient Services

4. Patient Satisfaction Matters for Hospital Reimbursement
Rate of smoking related deaths varies by state – 16.6% in Utah vs. 34% in Kentucky.

Many southern states spend less on anti-smoking initiatives, have fewer restrictions on indoor smoking, and have lower taxes.
A 3 CENTS PER OUNCE TAX ON SUGAR-SWEETENED BEVERAGES IN PHILLY COULD HELP...

• 36,000 people per year avoid obesity,
• prevent 2,280 annual cases of diabetes,
• avert about 730 deaths over a decade,
• save almost $200 million in health spending.

Harvard T.H. Chan School of Public Health
TECHNOLOGY: BIG DATA

ELECTRONIC HEALTH RECORDS
VIRTUAL REALITY
ACCESS TO SHARED DATA

HEALTH TRACKING
TELEHEALTH
ACCESS TO INFORMATION
The Informed Patient

OCT. 24, 2016
New Reasons Not to Miss a Well-Child Visit
Pediatric practices are using new methods, including texts, to get parents to follow the recommended doctor-visit schedule for their children, which includes about a dozen appointments by the time they turn three.

OCT. 10, 2016
When Patients Take Too Many Pills, Doctors Deprescribe
Health-care professionals are screening patients to cut out ineffective medicines and avoid risky combinations.

SEP. 26, 2016
Are You Fit for Surgery?
Hospitals are working to prevent complications and save money by addressing more patients’ conditions before surgery, such as diabetes, anemia, mental health and nutrition.

SEP. 12, 2016
The Ultimate Battle Against MRSA
Some hospitals are giving all intensive care patients germ-killing baths and an antibiotic nose ointment upon admission to fight MRSA, the potentially deadly bacteria. Recent studies show the universal treatment is effective.

AUG. 15, 2016
New Treatments for Children With Eating Problems
Hospitals are setting up new clinics and protocols to help parents when infants and toddlers can’t eat properly. Sometimes a feeding tube can help, but sometimes a surgery is needed.
BLUE TOOTH ON MEDICINE BOTTLE

Smart wireless pill bottles bottle starts to glow with blue light as time to take pill approaches.

If pill has not been taken by a certain time, bottle glows red and beeps, and a message is sent to patient or caregiver, either through a recorded phone message or a text message.

Source: http://healthtechinsider.com/2015/05/11/smart-bottle-saves-lives-and-money/
SOCIAL SCIENCES
CHANGING BEHAVIOR

Penn Medicine’s Nudge Team and The Power of Adding a Step

GOAL: To reduce costs, encourage physicians to prescribe more generic drugs over branded drugs.

SOLUTION: When physician prescribed a drug for a patient, the electronic medical record would default to a generic. (Need to go the extra step to check an “opt-out” box to prescribe brand name).

RESULTS: Generic prescription rates rose from 75% to 98%. Could result in major long-term cost savings.

Source: Penn Medicine News May 2016
THE EVOLVING QUADRUPLE AIM
THE IHI TRIPLE AIM

IMPROVING THE HEALTH OF POPULATIONS

IMPROVING THE PATIENT EXPERIENCE OF CARE (INCLUDING QUALITY AND SATISFACTION)

REDUCING THE PER CAPITA COST OF HEALTH

THE IHI TRIPLE AIM

THE EVOLVING QUADRUPLE AIM

DELIVERING THE **RIGHT CARE** FOR THE **RIGHT PRICE** AT THE **RIGHT TIME** – IN THE **RIGHT PLACE**
THE EVOLVING QUADRUPLE AIM

DELIVERING THE **RIGHT CARE** FOR THE **RIGHT PRICE** AT THE **RIGHT TIME** – IN THE **RIGHT PLACE**

EXAMPLES OF HOW **DESIGN** OF THE **RIGHT PLACE** FOSTERS...

“**THE RIGHT CARE FOR THE RIGHT PRICE AT THE RIGHT TIME**”
TELEHEALTH

MERCY VIRTUAL

- On Demand Access
- Education to Primary Care
- Coverage in Rural Areas
- Manage Chronic Care
Cool Color Scheme - Option A
SUPER MARKET CLINIC
LANCASTER GENERAL HEALTH RETAIL

- Community Access
- Low Acuity Cases
- Care by Nurse Practitioner
- No Appointment
URGENT CARE
LANCASTER GENERAL HEALTH URGENT CARE
URGENT CARE
LANCASTER GENERAL HEALTH URGENT CARE

- Episodic Care
  - No Appointment
  - Alternative to Emergency Department
  - After Hours Care
  - Care by Physician
AMBULATORY CARE

NYU LANGONE MEDICAL CENTER
AMBULATORY CARE CENTER

- Local Aggregation of Many Clinical Services
  - Engage Community
  - Primary/Specialty Care
  - Ambulatory Surgery
  - Imaging
  - Rehab Center
66% staff feel the decentralized stations improve patient care.

91% patients say the decentralized stations improve the way they feel cared for.

76% staff reported they will use any available workspace.
Satisfaction with sound control:
- 77% at nurse station
- 80% in corridors
- 91% in patient rooms

87% are satisfied with spaces for private conversation.

89% average increase in satisfaction with quietness.
PATIENT SAFETY

HAIs HAVE DECREASED 52% ↓ SINCE THE MOVE

79% ARE SATISFIED WITH SELECTION OF MATERIALS AND HOW THEY HAVE HELD UP

90% HCAHPS

28% AVERAGE INCREASE IN SATISFACTION WITH CLEANLINESS
Research Toward Improving Population Health in the Design of Health Facilities
Biophilia

100% are satisfied with the integration of nature in the patient care experience.

While 88% report satisfaction with daylight, commenters state: "Some rooms get too much light"
Research Toward Improving Population Health in the Design of Health Facilities

- Regional Aggregation of Service Line
- Chronic Care and Wellness
- One Stop Shopping
- Spaces for Community Use
REGIONAL HOSPITAL
READING HEALTH SYSTEM
HEALTHPLEX FOR ADVANCED SURGICAL + PATIENT CARE
LOWER LEVEL

OR Suite (6/18 + 30 + 30)
OR Clean Core and Storage
Entry & OR Waiting Room
OR Admin and Support
Psychiatric Evaluation Center
ED Expansion (16)
Trauma Expansion (4 + 3)
Ground Level

- Procedure Suite (8 + 24)
- Pre-Admit Testing Protocol
- OR Support
- On-Call Rooms
- Trauma & ED Administration
- Atrium Link & Healing Garden
- Patio Seating Expansion
Private Bed Unit (30)
Helipad

ROOF
REGIONAL HOSPITAL

READING HEALTH SYSTEM
HEALTHPLEX FOR ADVANCED SURGICAL + PATIENT CARE

- Tertiary Care
- Higher Acuity
- Specialty Care
- Spaces for Community Use

Research Toward Improving Population Health in the Design of Health Facilities
ACADEMIC MEDICAL CENTER
UNIVERSITY OF MARYLAND MEDICAL CENTER
SHOCK TRAUMA CRITICAL CARE TOWER
Research Toward Improving Population Health in the Design of Health Facilities
ARCHITECTURE’S ROLE IN PUBLIC HEALTH
ARCHITECTS & PUBLIC HEALTH

PUBLIC SAFETY

SOCIAL CONNECTEDNESS

ENVIRONMENTAL QUALITY

ACCESS TO NATURAL SYSTEMS

PHYSICAL ACTIVITY

SENSORY ENVIRONMENTS
PUBLIC SAFETY
SOCIAL CONNECTEDNESS
ENVIRONMENTAL QUALITY

U.S. GREEN BUILDING COUNCIL
LEED
USGBC
ACCESS TO NATURAL SYSTEMS
PHYSICAL ACTIVITY
SENSORY ENVIRONMENTS
THANK YOU.