Adapting Business Models to Address Social Determinants of Health

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Becker’s 10th Annual Meeting, April 4, 2019

Nemours. Children’s Health System
Kayla’s Story

The best health care system in the world?
Jamal’s Story
The worst health care system in the world?
We are directing 18% of America’s GDP (over $3 trillion) to buy the opposite of what we want.
We are getting *exactly* what we are paying for.
Investing in the health of children is the most powerful lever to align the financial incentives to create a healthier society, a stronger economy, and a better future for our country.
Amount Trending in the Wrong Direction

- Unchecked healthcare costs will grow faster than GDP by .8% over the next decade.

- Projected annual growth of 5.5%, reaching $6 trillion and nearly 20% of GDP

Source: Congressional Budget Office, CRFB extrapolations
Proportion Trending in the Wrong Direction
United States per Capita Healthcare Spending is more than twice the average of other developed countries.

Our Nation’s Health — Where is the Value?

Life Expectancy and Health Care Spending, 2008

Source: OECD Health Data 2010
What Determines the Health of an Individual?

Degree of Influence in Shaping the Health of Populations

Things we can impact:
- Medical Care: 15%
- Environmental: 10%
- Social: 15%
- Behaviors: 40%
- Genetic: 20%
We Want: **Health**

We Are Paying for: **Medical Care**

<table>
<thead>
<tr>
<th>Determinants of Health</th>
<th>Spending on Medical Care</th>
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<tbody>
<tr>
<td>15% Medical Care</td>
<td>97% Medical Care</td>
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<tr>
<td>85% Health Behaviors &amp; Other Factors</td>
<td>3% Health Behaviors &amp; Other Factors</td>
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The social determinants of health are the conditions in which people are born, grow, live, work and age.

These circumstances are shaped by the distribution of money, power and resources at global, national and local levels.

The social determinants of health are mostly responsible for health inequities.
What are the primary social determinants of health?

- Education and literacy
- Nutrition and Food Security
- Childhood experiences
- Healthy behaviors
- Income and social status
- Employment and work conditions
- Social supports and coping skills
- Physical environments
- Biology and genetic endowment
- Culture
Among the Largest Health Disparities on the Planet
Your ZIP CODE shouldn’t predict how long you live, BUT IT DOES.

STOCKTON 95202
Life Expectancy 73

IRVINE 92606
Life Expectancy 88
How Do We Spend Our “Health” Dollars?

Health and Social Care Spending as a Percentage of GDP

- FR: 21% (12 Health Care, 9 Social Care)
- SWE: 21% (12 Health Care, 9 Social Care)
- SWIZ: 20% (11 Health Care, 9 Social Care)
- GER: 18% (11 Health Care, 7 Social Care)
- NETH: 15% (12 Health Care, 3 Social Care)
- US: 9% (16 Health Care, 3 Social Care)
- NOR: 16% (9 Health Care, 7 Social Care)
- UK: 15% (8 Health Care, 7 Social Care)
- NZ: 11% (9 Health Care, 2 Social Care)
- CAN: 10% (10 Health Care, 0 Social Care)
- AUS: 11% (9 Health Care, 2 Social Care)
Lack of Education Links Directly to High Risk of Death

Deaths Associated With Low Education

Deaths in 1,000s

- <High School Education
- Stroke
- Alzheimer’s Disease
- Diabetes Mellitus
- Suicide
- Motor Vehicle
- Homicide

The Most Powerful Behavior to Promote Health: School Yearly vs 3rd Year Pap Smears
Mammography vs Not Screened
Normal vs LDLC >160
Blood Pressure >140 vs 120
Smoking 30 years vs Never
Advanced Degree vs HS

Quality Adjusted Life Years by Risk

Data estimated from Whitehall 39 year follow-up: Clarke BMJ 2009;339:b3513
Impact of Food Insecurity on Health Outcomes

Food Insecure Young Children Face Increased Chances of Various Health Risks

Adverse Childhood Experiences

- Emotional or physical neglect
- Physical, emotional or sexual abuse
- Growing up with family members with mental illness, alcoholism or drug problems
- Family violence
- Incarcerated family member
- One or no parents

The Adverse Childhood Experience ACE Study

• Center for Disease Control and Kaiser Permanente Collaboration

• Ten-year study involving 17,000 people

• Looked at effects of adverse childhood experiences (trauma) over the lifespan

• Largest study ever done on the subject
Findings

- 67% of respondents had at least one ACE
- 1 in 4 exposed to 2 categories of ACEs
- 1 in 16 was exposed to 4 categories.
- 22% were sexually abused as children.
- 66% of the women experienced abuse, violence or family strife in childhood.
Impact of Trauma Over the Lifespan

Neurological, biological, psychological and social. They include:

• Changes in brain neurobiology;

• Social, emotional & cognitive impairment;

• Adoption of health risk behaviors as coping mechanisms (eating disorders, smoking, substance abuse, self-harm, sexual promiscuity, violence); and

• Severe and persistent behavioral health, health and social problems, early death. (Felitti et al, 1998)
ACE Study Findings

Compared with people with no ACEs, those with four or more ACEs were:

• Twice as likely to smoke
• Seven times as likely to be alcoholics
• Six times as likely to have had sex before age 15
• Twice as likely to have cancer or heart disease
• Twelve times more likely to have attempted suicide
• Men with six or more ACEs were 46 times more likely to have injected drugs than men with no history of adverse childhood experiences

Is the impact of these childhood experiences really that large into adulthood? Don’t they just get over it?

An untreated high ACE score in a child predicts a 20 years decrease in life expectancy.
Health Costs of Adverse Childhood Experiences

41% of Medicaid enrollment in Alaska can be linked back to ACEs.

22,000 Alaskans rely on Medicaid due to ACEs at an estimated cost of $360 million.

32% of Alaskan smokers likely smoke due to ACEs.

Each year, 37,000 Alaskans with ACEs smoke at an estimated cost of $190 million.

24% of non-gestational diabetes cases are linked with ACEs.

Each year, 10,000 Alaskans with ACEs have diabetes and annually cost $110 million.

14% of obesity in Alaska is linked with ACEs.

Each year, 22,000 Alaskans with obesity health issues related to ACEs cost more than $31 million.

11% of binge drinking is linked with ACEs.

Each year, 11,000 Alaskans likely binge drink due to ACEs at a cost of $70 million.

Source: Adverse Economic Costs of ACEs in Alaska. Prepared for the Alaska Mental Health Board and the Advisory Board on Alcoholism and Drug Abuse. Available at: http://dhss.alaska.gov/hl/abada/ace-ak/Pages/default.aspx
Investing in the Social Determinants in Children Increases ROI By on Order of Magnitude

- Longitudinal studies (i.e. James Heckman) show direct health benefits

- Longitudinal studies confirm economic benefits to age 35, which translate to lifelong health benefits

- These benefits stand up to rigorous (onerous) statistical correction
Abecedarian Preschool and Early School Age Project: Heckman et al North Carolina

- Social experiment based upon intellectual stimulation in early childhood
- Preschool (Birth – 5) and School age (6-8)
- Two meals and a snack daily
- Periodic medical checkups
- Health behaviors and lifestyle
Results on Health Outcomes
All Changes Statistically Significant at Age 35

- Lower systolic and diastolic blood pressure
- Less likely to be stage one hypertensive or pre hypertensive
- None exhibited metabolic syndrome versus 25% of a control group
- Higher levels of HDL “good cholesterol”
- Lower incidence of abdominal obesity
Results on Health Behaviors
All Changes Statistically Significant at Age 35

- More likely to engage in regular physical exercise
- Less likely to smoke at early age
- More likely to eat nutritious food at age 21
- Less likely to be overweight in childhood
- Less likely to start drinking alcohol before age 17
Results on Economic Outcomes

- 13% return on investment per annum
- Increased high school graduation rate
- Less likely to be convicted of a crime and be incarcerated
- Higher median annual income compared to controls
- Two generation effect
Share of Medical Care Spending by Age Group

- **Share of Population**
  - Under 18: 24%
  - 19 to 34: 22%
  - 35 to 44: 13%
  - 45 to 54: 13%
  - 55 to 64: 16%
  - 65 and over: 12%

- **Share of Spending**
  - Under 18: 7%
  - 19 to 34: 11%
  - 35 to 44: 13%
  - 45 to 54: 10%
  - 55 to 64: 13%
  - 65 and over: 36%
Total Health Care Spending

Spending on **CHILD HEALTH** provides the largest lever to impact **future generations**
Nemours at a Glance

- The only multi-state, multi-region, multi-hospital pediatric care system in the U.S.
- Commitment to all aspects of children’s health including medical care
- Enduring legacy of Alfred I. duPont
Nemours at a Glance

- 1.8 million visits
- 470,000 unique patients
- 3,800 trainees (residents and fellows)
- 847 employed physicians
- 218 researchers
- 42 specialties and subspecialties
- 8,000 employees
- 80 pediatric care locations
  - Delaware
  - New Jersey
  - Maryland
  - Pennsylvania
  - Florida
Nemours Prevention and Population Health
Spreading and Scaling Impact in the Early Years
Three Anecdotal Examples of Leveraging SDOH to Improve Children’s Health

- Broad based community wide approach to childhood asthma
- Development of a social determinants of health screening tool to be used for all children at the primary care doctors office
- Implementation of healthy lifestyle training in preschool
Nemours CMMI Asthma Award
Value Based Care in a Fee-for-Service World

- Award Parameters:
  - 3-year award beginning July 1, 2012
  - $3.7 million
  - Cooperative Agreement

- Self Monitoring and Evaluation:
  - Nemours in collaboration with Thomas Jefferson U and U of Delaware
  - NORC at the University of Chicago: External Evaluation
Changes in Our Practice Model--Asthma

- Pediatric Primary Care Practices: NCQA accredited PCMHs
- Behavioral Health Integration
- Patient level influencers (Community Health Workers)
- Community level influencers (Community Health Liaisons)
- Optimize Use of Technology
Behavioral Health Integration

- Psychologists and social workers hired and integrated into the practice team

- Role
  - Behavioral health management
  - Adherence promotion
  - Team building/integration
  - Population-based interventions – education/groups
  - Consultations
Deployment of a Navigator Workforce

Patient Level

- Hired, trained and deployed Community Health Workers – unlicensed
- Link between clinic and home
- Home environmental assessments
- Case management of non-medical issues/concerns
- Reinforcement of asthma education
Deployment of Integrators Workforce
Community Level

- Community liaisons
- Community engagement and mobilization
- Link between clinic and community—increase in connections to community resources
- Focus on upstream determinants of health
- Facilitated partnerships with key stakeholders (HUD, ALA, DPH, etc.)
- Facilitated practice team members engagement with community
- Developed and implemented community action plans
Optimize Use of Technology

- Establish Asthma Registry
- QI measures and tracking
- Individualized Asthma Action Plan
- Standardized evidence-based approach—Control stops in EMR
- Student Health Collaborative

Asthma Education:
- Electronic newsletter
- Texting Program
- Provider Training Modules in Nemours University
Patient Based Results
Internal Data

- 40% - 60% reduction in ER visits from baseline
- Reduced population based asthma admission rates from 0.7/100,000 to 0.1/100,000
- Inpatient CHW intervention lowered readmissions by half from 2.8% to 1.4%
- Risk-stratification tool worked
- Reduced Overall cost of care <$500 per patient per quarter
- Considerable reduction in cost of care, BUT without a payment model aligned to support outcomes, overall costs to health system were high and unsustainable
Community Based Results

- Change to DE Medicaid drug formulary allowing metered dose inhalers
- Smoke-Free Wilmington Ordinance—Impacts smoking in public spaces
- Reduced school bus idling
- 100% of Head Start childcare centers are asthma-friendly
- School Health Collaborative—school nurses have access to EMR
- Healthy Homes and Integrated Pest Management
Scope of Impact of Community Based Results
In a very small state

- Changes to drug formulary – metered dose inhaler. **11,805 children impacted.**
- Smoke-Free Wilmington Ordinance – **19,224 children** impacted
- Reducing school bus idling in Wilmington - **14,029 children** impacted.
- 100% of Telamon Head Start childcare centers in Delaware are asthma-friendly, impacting 852 children annually.
- School Health Collaborative: 1302 patients enrolled in 2015-2016 school year
- Healthy Homes and Integrated Pest Management  >20,000 children est.
Lessons Learned from a “Pay for Health” Project in a “Pay for Sickness” World

- These interventions work. When we invest in health we get health
  - Not a single new drug or innovative medical intervention
  - The acuity level and complexity of care markedly decreased

- Broad partnerships with communities, social service agencies, government, schools etc. are critical to success

- These efforts will only be sustainable when financial incentives are aligned
  - The infrastructure and implementation costs are very high – will likely decrease with experience and economies of scale
  - The costs to the health system of considerable improvements in health is LARGE
Nemours Social Determinant of Health Screener

- Recognition that the health of the children we serve lives predominantly outside of medical care
- Recognition that we can provide more efficient and targeted care if we are cognizant of the social circumstances in which our patients live
  - PILOT – for use in visits to primary care provider
- Will evolve with experience
In the past 12 months, were there times the food you bought didn’t last and you didn’t have money to buy more?

☐ Yes  ☐ No

<table>
<thead>
<tr>
<th>Response</th>
<th>Overall</th>
<th>Hospital ICU and ED Setting</th>
<th>Suburban Care Setting, Mixed Income</th>
<th>Specialty Clinic</th>
<th>Rural Primary Care Clinic</th>
<th>Urban Primary Care Clinic, High Spanish speaking</th>
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<tbody>
<tr>
<td>No</td>
<td>341</td>
<td>73</td>
<td>47</td>
<td>54</td>
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<td>88</td>
<td>21</td>
<td>10</td>
<td>10</td>
<td>20</td>
<td>26</td>
</tr>
<tr>
<td>% with need</td>
<td>20.5%</td>
<td>22%</td>
<td>17.5%</td>
<td>15.6%</td>
<td>27.3%</td>
<td>33.7%</td>
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Future Plans: Calculating Overall Patient Complexity*

*Model based on Children’s Hospital of Colorado Patient Complexity Scoring, August 2018
Amber is a 13-year-old Type 1 diabetic. She resides with her grandmother in Alabama (over a 2-hour drive). The family struggles with transportation and financial issues. These issues have caused several cancelled/no-show appointments. The patient is covered by Alabama Medicaid, which will not transport across state lines.
Levels of Adoption / Intervention for SDOH

**Level 0.** No coordinated SDOH activity.

**Level 1.** Standard data capture organization wide. Locally maintained resource directories.

**Level 2.** Community resource director integration.

**Level 3.** Coordination and joint projects with outside agencies/organizations based on key identified needs.

**Level 4.** Strategic investment and planning around community needs. Transformed care model.
Why Nemours Invests in Early Care and Education

• Nearly 15 million children under 6 are in child care
• 60% of children ages birth to 5 spend at least part of every day in non-parental care
• Families see their ECE providers every day - children spend more time in ECE settings than they do in health care
• ECE programs can promote healthy behaviors
• Practice and policy changes are sustainable and have reach
• A point of primary prevention
National Early Care and Education Collaboratives

The Facts

• 6 years of implementation
• 11 locations in 10 states
• 126 learning collaboratives
• More than 2,500 ECE program participated
• More than 201,500 children served by those programs

The Results

• Pre- and post-tests indicated statistically significant improvements in the number of healthy eating and physical activity best practices met
  • Environment
  • Provisions
  • Teacher Practices
• Improvements maintained at least 12 months post intervention

Findings in pre-publication. Update citation when published.
What if …

• we successfully prevent disease, reduce hospitalizations, and treat disease with less costly treatments?

• children’s health systems do more than deliver superb medical care and also take responsibility for the vital factors outside of the hospital that impact a child’s well-being?

• we become stewards of children’s health in this country?

• we are a major force in creating a new definition of children’s health and in creating the healthiest generation of children in American history?
Total Health Care Spending

Spending on **CHILD HEALTH** provides the largest lever to impact future generations.
It is the duty of everyone to do what is within his power to alleviate human suffering.