Social and economic factors that influence the health of children and their families

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3 presentations today and tomorrow

1. Social and economic factors that influence the health of children and their families
2. Thinking about how pediatric care can help the population's health outcomes
3. Effective relations between health, schools and other institutions

1. Scope of the problem and pediatric response
2. Structure and impact of hospital and health system response
3. Building a multi-sector response to help all children thrive
Scope of the problem and pediatric response

- Asthma – paradigm
  - Framework
  - Specific hardships - modifiable factors
- Generalized approach beyond asthma
  - Interventions
- Subspecialists and population health
Hamilton County
- 80+ neighborhoods
- 180,000 children

Cincinnati
- 45 neighborhoods
- 75,000 children

Procter & Gamble home
Cincinnati Reds baseball

Child poverty top 10 cities in the US
Health Disparities or Health Inequities
- factors often called: Social determinants of health

- Presence of systematic and potentially remediable differences in one or more aspects of health across population subgroups defined socially, economically, demographically, or geographically

- Differences in health that are not only unnecessary but, in addition, are considered unfair and unjust.

Braveman 2006
Clinical Case

Jalen, 11 year old boy with asthma from Avondale

• Hospitalized 4 times in 3 months
  – March, April intensive care unit, April, May intensive care unit
• Care team:
  – Primary care MD; nurse case manager, social worker
  – Pulmonologist and an allergist

• What are we missing?
Clinical Case

Jalen, 11 year old African American boy with asthma

Hospitalized:
- March 08, April 08 PICU, April 08, May 08 PICU

Care team:
- Primary care MD, nurse case manager
- Pulmonologist and an allergist

Pediatric resident called patient’s mother after last admit
- Rental apartment has mold
- Mother complained and landlord threatened to evict the family
- Lost health insurance and not buying his medicines
  - Employer’s payroll clerk wouldn’t verify wages
Children from high morbidity areas:
- More likely to be exposed to mold, cockroaches
- More likely to lack reliable transportation
- More likely to live in poverty
- More likely to have a depressed parent
- More likely to have low quality housing

Asthma admission rate per 1000 children, 3 year average (2010-2012)
Patient day rate by neighborhood poverty rate (FY2012-2017)
Rudolf Virchow – Birth of ‘Social Medicine’
1821-1902

Father of modern pathology, first to describe leukemia, that each cell comes from another cell, embolism.

Sent to address the Typhus Epidemic in Upper Silesia in 1848 – Medicine is a social science.

Physicians are the natural attorneys of the poor, and social problems fall to a large extent within their jurisdiction.

If medicine is to fulfill her great task, then she must enter the political and social life. Do we not always find the diseases of the populace traceable to defects in society?

German liberal revolution in 1848 – expelled from his position in Berlin.
Time to readmission, by race

- 19% readmitted at 12 months
- 23% of African Americans
- 11% of whites
Historical racism: Denied mortgages, denied wealth
**Inpatients with Asthma:**
From “Poor” to Structured Assessment of Hardships

<table>
<thead>
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<th>Strain Question</th>
<th>14 22 36 47 65</th>
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<tbody>
<tr>
<td>Not enough money to make ends meet</td>
<td>24</td>
</tr>
<tr>
<td>One or more days with no food &amp; no $ to buy</td>
<td></td>
</tr>
<tr>
<td>Not able to pay full rent or mortgage</td>
<td></td>
</tr>
<tr>
<td>Not able to pay full bill for heat or electricity</td>
<td></td>
</tr>
<tr>
<td>Not able to borrow $1000, any source</td>
<td></td>
</tr>
<tr>
<td>Not own home or apartment</td>
<td></td>
</tr>
<tr>
<td>Had to move in with others due to lack of money</td>
<td></td>
</tr>
<tr>
<td>Had to borrow money in past year</td>
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Risk of a 2\textsuperscript{nd} asthma admission within 1 year

- Hardship index: 6 items
  - Enough make ends meet
  - Not pay full rent/mortgage
  - Not pay full utility
  - Not own home/apt
  - Unable to borrow $1000
  - Borrowed in past year

- 3-4 fold greater odds of readmission in highest risk group

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<th>Hardships</th>
<th>%</th>
<th>% readmitted</th>
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<tr>
<td>0</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>1 to 2</td>
<td>31</td>
<td>16</td>
</tr>
<tr>
<td>3 to</td>
<td></td>
<td>Jalen</td>
</tr>
<tr>
<td>5 to 6</td>
<td>15</td>
<td>34</td>
</tr>
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</table>
Biologic mechanisms for social/economic factors

1. Traffic exposure
2. Tobacco smoke exposure
3. Allergen sensitization
4. Adherence, caregiver stress

Additional key factors: Access to medical care, specialists, care management

Genetic susceptibility
Biologic mechanisms: How does poverty ‘get under the skin’?

**Serum cotinine** (ng/mL)

<table>
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<tr>
<th>Number of hardships</th>
<th>Serum cotinine*</th>
<th>trend p=0.028</th>
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<tr>
<td>0</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>1.1</td>
<td>.03</td>
</tr>
<tr>
<td>2</td>
<td>1.0</td>
<td>.07</td>
</tr>
<tr>
<td>3</td>
<td>1.4</td>
<td>.005</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>.002</td>
</tr>
<tr>
<td>5+</td>
<td></td>
<td>2.4</td>
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*Geometric mean; adjusted for age, marital status, race
Time till asthma readmission: Explaining racial differences

80% of differences by race explained by potentially modifiable factors

Unadjusted Adjusted
White 20%
Black 39%

Log-rank P = .39

Time Since Index Date, d

African American (unadjusted)
African American (adjusted)
White (unadjusted)
White (adjusted)
Interim Summary

Learn from each case
Move from vague, overwhelming ‘social/economic factors to specific hardships to see possible interventions
Explore biologic mechanisms for insights and to build will
Know if we are to fulfill our great task, then we must enter social and political life
Neighborhood asthma admission rate per 1000 children, Hamilton County, 3 year average (2010-2012)

Neighborhood Preterm Birth Rates per 100 births (2010-2012)

Avondale
Price Hill

Neighborhood Injury rate per 1000 children aged 0-16 yrs (2010-2012)

Avondale
Price Hill

Neighborhood Psychiatric Admission Rate per 1,000 Children 3 to < 18 yrs (2012-2014)

Avondale
Price Hill
Disparities in all-cause pediatric inpatient bed-days

If each neighborhood had the same bed-day rate as those with the lowest poverty, there would be ~8,000 fewer bed-days per year (~22 child-years)
General framework for social and economic factors

Positive and negative social exposures (e.g., social support networks, proximity to violent crime)

Positive and negative environmental exposures (e.g., air quality)

Experience with adversity, presence of resilience

Positive and negative economic exposures (e.g., educational, job opportunities)

Structural and political factors that support or impede access to health-promoting resources (e.g., clinics, pharmacies, supermarkets)

Health-related behaviors

Physiologic functioning (e.g., brain development, stress response, immune response)

Short- and long-term health and well-being
What are we missing?
Hardships in families seen in our primary care clinics

Percentage of Families That Ran Out of Infant Formula or Diluted It

Percentage of Families That Skipped or Cut the Size of Meals in the Last Year

Economic Hardships Experienced By Families In the Last Year

- Gas/Electric was cut off: 28%
- Doubled up or moved to cheaper apartment: 23%
- Creditor has called or come by: 42%
- No $ for RX: 20%
Child Health-Law Partnership (Child HeLP)

• To help break the link between poverty and child health by:
  – Increasing knowledge, screening of families’ access to basic resources
  – Partnering with legal advocates focused on poverty law to link families to needed resources and services
  – Addressing housing, benefits, education, family law issues

• Partnership:
  – Division of General and Community Pediatrics
  – Legal Aid Society of Greater Cincinnati

• Legal advocates on site in clinic 5 days per week

• Who might be an unusual partner, agency, friend in the social services sector who you could reach out to?
Child HeLP’s Impact

08-2018:

- 7,070 referrals made
- 5,230 legal cases opened
- 13,240 children and 6,690 adults helped in referred households
- 6,600 positive legal outcomes achieved
- >600 pediatric interns and residents trained

Pie chart showing:

- Housing 37%
- Health/Income 36%
- Family 10%
- Education 14%
- Misc 3%
Identifying and Treating a Substandard Housing Cluster Using a Medical-Legal Partnership
Andrew F. Beck, Melissa D. Klein, Joshua K. Schaffzin, Virginia Tallent, Marcheta Gillam and Robert S. Kala
Pediatrics: originally published online October 22, 2012; DOI: 10.1542/peds.2012-0769

Keeping sick buildings from making children sick continues to be a hard task. On the left, it says:

AVONDALE — Reginald Liddell’s asthma, otherwise easily controlled by an inhaler, had gotten the best of him.
His family had moved to a building at Reading Road and Blair Avenue — into an apartment creeping with mold and crawling with roaches — and Reginald got so sick that he missed school and spent the night at Cincinnati Children’s Hospital Medical Center.
Condition-specific disparities, relative differences, by income

Relatively more bed-days

County mean

Relatively fewer bed-days
Specialty-specific, relative differences, by income

Relatively more IPBDs

County mean

Relatively fewer IPBDs

Red = children from high poverty areas

Blue = children from low poverty areas
Geospatial software for a new morbidity

EXHIBIT 1
Hot spots of hospitalizations for children ages 0–18 years in Hamilton County, Ohio, July 2012–June 2015

SOURCE Authors' analysis of data from Cincinnati Children's Hospital Medical Center and the Cincinnati Area Geographic Information System. Notes: "Heat" refers to the numbers of hospitalization events per half-mile square per year in July 2012–June 2015, before the onset of the formal improvement activities described in the text. The solid lines in the map indicate neighborhood boundaries.

FY20: Engage Subspecialists in Social Determinants of Health

Maps of admissions against poverty rates, Cincinnati

- Sickle Cell
- T1 Diabetes
- Asthma
- Mental Health
Abraham Jacobi, MD 1830-1919
First Professor of Pediatrics in the US
Founder, American Pediatric Society
President, American Medical Association

Every physician is by destiny a ‘political being’ in the sense in which the ancients defined the term; that is, a citizen of a commonwealth, with many rights and great responsibilities. The latter grow with increased power both physical and intellectual. The scientific attainments of the physician and his appreciation of the sources of evil enable him to strike at its root by advising aid and remedy…”

A Jacobi: Trans Am Pediat Soc 1893

German liberal Revolution of 1848, charged with high treason and imprisoned from 1851 - 1853
Ramón Carrillo
1906-1956

Argentine neurosurgeon, physician, academic, public health advocate Nation's first Minister of Health, with a special interest in preventive medicine, social medicine and maternal and child care

- "All men have the same right to life and health",
- "There can be no health policy without social policy"
- “Modern medicine tends to take care of health and the healthy…Medicine should not only cure the sick but teach the people to live, to live in health and to try to make life go on and be worth living.”
Clinical Case

Jalen, 11 yo boy with asthma in primary care

- Hosp: March 08, April 08 PICU, April 08, May 08 PICU
- Eviction threat, No health insurance

- Direct electronic health record referral to legal advocates:
  - Legal advocate – got landlord to move family to healthier housing, no eviction
  - Health insurance for the whole family – got employer verification
  - $2800 in public benefits wrongly denied and $950 per month ongoing

- Asthma nurse practitioner joined public health nurse for a home visit
  - Helped create dynamic for improved medication adherence; including moving morning medicine to given by school nurse every day

- Went over one year without an admission
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Inpatient Bed-day Rates

Average Annual CCHMC Inpatient Bed Days
Per 1000 Population Age 0-18, By Hamilton County Neighborhood, FY 2018

Infant Mortality Rates

Hamilton County

Avondale
Personal: What is my connection to this?

In the judging of political crimes, the sword of Justice is guided not by truth and right, but by whatever chances to be victorious.

Victor Hugo

In his trial for high treason

In April 25, 1876 from the original manuscript of my late beloved Father.

"He suffered much; now peace be with his ashes!"

Emilie (Chicago)

Lazarus Gatzert is a great great grandchild of David Kahn.

Gatzert is one of the founders of Lazarus Gatzert, translator of only a hand-written script in German in C.M. Karner, N.Y.

Justice: What rules would we make for the world if we didn’t know whose child we would be?

What rules would we want for any child who walks or doesn’t walk into our clinic?
Questions?
What Can We Do?
Working from a Position of Respect and Trust in PPC

My child's doctors show respect for what I have to say
- Strongly Agree: 39%
- Agree: 58%

I trust my child's doctors
- Strongly Agree: 98%
- Agree: 2%
Why am I here?

DEFENSE
by
LAZARUS GATZERT
Made before the jury at Darmstadt
May 16, 1850
in his trial for high treason

In the judging of political crimes, the sound of Justice is guided not by truth and right, but by whatever chances to be victorious.
Victor Hugo

Copied on April 29, 1876 from the original manuscript of my late beloved father.
"He suffered much; now peace be with his ashes!"
Emilie (Chicago)

*GATZERT is a great great grandson of Bernard-Jacquin Gatzert, a wealthy businessman of 18th century Lorraine, France, who left a handwritten diary in French which is presented here. The diary contains detailed descriptions of his life and travels in various European countries. It is believed that Gatzert was a member of the wealthy aristocratic families of the time, and his writings provide valuable insights into the social and political life of the early 18th century.*
Distinguishing tragedy and injustice

Few tragedies can be more extensive than the stunting of life, but few injustices deeper than the denial of an opportunity to strive or even to hope, by a limit imposed from without, but falsely identified as lying within.”

Stephen Jay Gould
Professor of Zoology, Harvard University
Evolutionary Biologist
US Infant Mortality Rate, By Race/Ethnicity and Year

6.8 to 5.8 = 13.4% reduction
Infant mortality in the US, by state

- Massachusetts – 3.7
- Ohio – 7.2
- Mississippi – 8.6

Death Rates

- United States 5.8
- 3.7 - 4.6
- 4.6 - 5.7
- 5.7 - 6.1
- 6.2 - 7.1
- 7.1 - 8.6

¹The number of infant deaths per 1,000 live births.
Indifference can be tempting -- more than that, seductive. It is so much easier to look away. It is so much easier to avoid such rude interruptions to our work.

It is, after all, awkward, troublesome, to be involved in another person's pain and despair.

Indifference is not a beginning, it is an end.

White House 1999
Improving the mean, but widening the gap?
Longitudinal Measurement

Child HeLP Referred

PPC Child Referrals

Child HeLP Housing Referrals Per 1,000 Well Child Visits
1/1/15 - 4/30/19

- Referrals per 1,000 WCC
- PPC referrals per 1,000 WCC
- Housing referrals per 1,000 WCC
- Average referrals per 1,000 wcc visits
- Control Limits
Identifying potential levers for improvement

“Conditions in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life. These forces and systems include economic policies and systems, development agendas, social norms, social policies and political systems.”

http://www.who.int/social_determinants/en/
HCVD accounted for 22% asthma use rate variation.
HCVD remained significantly associated with use rates after adjust for poverty (p=0.01).

Asthma utilization and housing code violations

- Housing code violations

Census tract asthma utilization rate per 1,000 children*

- Low
- Low-medium
- Medium-high
- High

*Calculated from 8,736 emergency department visits and hospital admissions in 113 Greater Cincinnati census tracts between 2009-2012