Context really does matter – improvement science at the frontlines of child health

Andrew F. Beck, MD, MPH
CUGH Annual Conference
March 27, 2015
Objectives

1. Highlight how **improvement science** facilitated a reduction in asthma morbidity

2. Illustrate strategies aimed at understanding and addressing upstream social determinants of health (SDH)

3. Advocate for integrated and proactive approaches to health
   - Silo to system
2010 Institutional Strategic Plan

Purpose
Lead, advocate, and collaborate to measurably improve the health of local children and reduce disparities in targeted populations

Specific-Measurable-Achievable-Realistic-Timely (SMART) Aim for Asthma
– To reduce, by June 2015, asthma ED visits & admissions by 20% in Hamilton County children covered by Medicaid
Asthma admissions (Medicaid)

Rolling 12 Month Average Number of Admissions
per 10,000 Hamilton Co. Medicaid Patients age 2 through 17 years old

Baseline – 7.2
20% reduction – 5.8
Current – 4.7

How did we get there?
How do we keep getting better?
Key planning steps

• **Understanding our population**
  – “Hot spot” neighborhoods
  – Underlying context
    • Social determinants of Health (SDH)

• **Staging small scale tests of change**
  – Be both reactive to proactive
  – Intervene at patient and community levels
Children from RED neighborhood:

- 5x more likely to live in poverty (hardship)
- 5x more likely to lack reliable transportation (access)
- 8x more likely to be substandard housing (exposures)
Local asthma inequalities – Gini

- Gini: measure of inequality (usually used for income)
  - 0 = total equality
  - 1 = total inequality

Gini for asthma = 0.52

Decile of nations with highest rates of income inequality

Brazil – Gini = 0.52 (income inequality)
Move from silos to patient-centered and integrated system

- Tests of change
- Culture change
  - Identify and overcome barriers
  - Collaborate across sectors
Tests of change – select examples

- **Inpatient**
  - Medications-in-hand
  - Connection to housing intervention

- **Outpatient**
  - Enhanced risk assessment → Care coordination

- **Community**
  - School-based health
  - Legal Aid
- **Problem**: barriers to filling prescribed medications
  - Issues with access, affordability
- **Test of change**: develop partnership between inpatient providers and outpatient pharmacy
  - Meds delivered to hospital room pre-discharge
- **Prompted new partnerships with community pharmacies**
  - On-site counseling
  - Data sharing
Known link between housing and asthma, but what can we do about it?
→ Identify risk
→ Intervene
Problem: adverse housing exposures

Tests of change:
1. Enhance risk identification
2. Partner with local housing inspectors
Sanitarian contacts family within 1 week

Mutually convenient time arranged for Healthy Homes visitation

Visit to assess for housing risks to health

Orders issued if code violations observed

Follow up to gauge progress toward risk abatement
Outpatient tests

- **Baseline enhanced assessment**
  - Social and environmental risk assessment
    - Housing problems (overcrowding, roaches, rodents, utilities, mold, lead)?
    - Threatened with eviction or losing your home?
    - Over the past 2 weeks, have you felt down, depressed or hopeless?
    - Over the past 2 weeks, have you felt little interest or pleasure in doing things?
    - Do you feel that you and/or your children are unsafe in your relationships?
    - Would you like to speak with a social worker or legal advocate in the clinic about these issues?

- **Care coordination bundle of interventions**
  - Frequent risk assessment/risk assessment
  - Medication delivery
  - Facilitate connection to additional clinical and community resources
    - Schools
    - Legal Aid
Bridging to community

• **Cincinnati Public Schools**
  - Consistent symptom screening
  - Connect back to primary care
  - Monitor progress with shared data

• **Legal Aid Society**
  - Relevant partner because legal needs common among high risk
    - Health-related public benefits (care access)
    - Healthy Housing (in-home exposures)
Medical-Legal Partnerships (MLPs)

- Devoted to:
  - Protecting unmet legal needs
  - Educating health professionals about SDH
  - Advocating for system-level change
- >200 partnerships nationwide
- Cincinnati Child Health-Law Partnership
  - >4,000 referrals since 2008
  - >12,000 people in referred households
Working upstream

BEFORE

AFTER
CINCY URBAN APARTMENTS
1003 Lincoln Avenue
Cincinnati, Ohio 45206
(513) 221-1212
(513) 221-4121 FAX

NOTICE TO ALL RESIDENTS

May 24, 2010

At this time all residents are not permitted to install any a/c units for your apartment.

Anyone with an a/c unit will be evicted immediately.

Thank you
Management
Recognizing patterns

- Others with same letter
  - 16 families referred
  - Also report presence of pests, mold, etc.
- **High rates of asthma**
- Single developer
- Multiple violations
- Legal Aid helped organize complaints
  - Tenant association
  - Repairs facilitated

1 family → 16 families → 19 buildings and 677 units
Asthma admissions (Medicaid)

Baseline – 7.2
20% reduction – 5.8
Current – 4.7

Rolling 12 Month Average Number of Admissions per 10,000 Hamilton Co. Medicaid Patients age 2 through 17 years old

- Enhanced risk screening
- Connections to home inspection
- Medical-legal partnership
- Meds In-hand for hospitalized children
- Care coordination and med delivery
- Enhanced clinic-based risk assessment
- School-based health

2014: 185 patients NOT admitted

Move further upstream, neighborhood deep dive

Last update: 09-19-14 by T. Cole  Data source: Epic
Additional conditions

- Preterm birth
- Grade 3 reading proficiency
- Unintentional injury
- Obesity
• Who is the population?
• What is the aim?
• How might tests of change meet the aim?
  ➢ Patient- and community-centeredness
  ➢ Removing silos
  ➢ Finding the right partners and building relationships
    • Medical providers
    • Community health workers
    • Community agencies
    • Community leaders
QUESTIONS? COMMENTS?
Andrew.Beck1@cchmc.org
EXTRA SLIDES
“The complex, integrated, and overlapping social structures and economic systems that are responsible for most health inequities. These social structures and economic systems include the social environment, physical environment, health services, and structural and societal factors. Social determinants of health are shaped by the distribution of money, power, and resources throughout local communities, nations, and the world.”
Doctors strive to maximize a patient’s ability to achieve potential but usually our focus is on health – what about other basic needs?

Maslow’s Hierarchy of Needs

- Physiologic (health, food, water, shelter)
- Safety (security of body, property)
- Belonging
- Esteem & Respect
- Achieving potential

Community partners as expert consultants
Understanding our population

Hamilton County, Ohio: 190,000 children across ~90 neighborhoods

Source: Cincinnati Children's Hospital Medical Center, U.S. Census Bureau
A. Beck & J. Besl (2013)
Working toward integration

- **SCREEN** to begin a conversation
- **ASK** families about barriers + enrollment in key public programs, housing, school, etc.
- **EDUCATE** medical personnel and families about importance of the SDH
- **KNOW** community resources and refer
- **BUILD** connections with community experts and organizations
Building relationships and operations

Schools

Pharmacies

Community Councils

Payers
Critical community partners

- Home health care providers
- Pharmacies
- Cincinnati Public Schools
- Community health workers
- Cincinnati Health Department
- Legal Aid Society
Cincinnati Asthma Admissions and Neighborhood Asthma Hotspots

Asthma admissions 9/1/10-8/31/11

- Asthma admissions
- City of Cincinnati

Admission rate per 1000
- 0.00 - 0.78
- 0.79 - 3.40
- 3.41 - 5.76
- 5.77 - 10.99
- 11.00 - 27.24

- Census tract

Northside Clinic
Hopple St. and Millvale
Price Hill Clinic
Elm St. Clinic
Mount Auburn
Crossroads
Walnut Hills
PPC
Hopples
Mt. Auburn

Bridgetown Rd
Rosen Rd
Salem Rd
Lonsdale Rd
Bridgetown Rd
Delhi Ave
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Anderson Ferry Rd
Legal Aid Housing Cases Mapped Against Neighborhood Asthma Hotspots

Asthma admissions 9/1/10-8/31/11

- Legal Aid housing cases
- City of Cincinnati

**Admission rate per 1000**

- 0.00 - 0.78
- 0.79 - 3.40
- 3.41 - 5.76
- 5.77 - 10.99
- 11.00 - 27.24
- Census tract

Northside Clinic

Hopple St. and Millvale

Price Hill Clinic

Elm St. Clinic

Walnut Hills

Mt. Auburn

Crossroads
Using QI to enhance partnership

Success Rate of Referrals to Intake

<table>
<thead>
<tr>
<th>% of successful handoffs</th>
<th>Jan-14</th>
<th>Feb-14</th>
<th>Mar-14</th>
<th>Apr-14</th>
<th>May-14</th>
<th>Jun-14</th>
<th>Jul-14</th>
<th>Aug-14</th>
<th>Sep-14</th>
<th>Oct-14</th>
<th>Nov-14</th>
<th>Dec-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>94%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td># of Referrals</td>
<td>78</td>
<td>65</td>
<td>54</td>
<td>66</td>
<td>66</td>
<td>67</td>
<td>68</td>
<td>74</td>
<td>75</td>
<td>79</td>
<td>73</td>
<td>51</td>
</tr>
<tr>
<td>In both Epic &amp; Pika</td>
<td>78</td>
<td>65</td>
<td>54</td>
<td>66</td>
<td>81</td>
<td>63</td>
<td>68</td>
<td>74</td>
<td>75</td>
<td>79</td>
<td>73</td>
<td>51</td>
</tr>
</tbody>
</table>
Finding solutions & testing

- Understanding our population
  - Hot-spotting, distribution of risks and assets

- Staging small scale tests of change
  - Clinical co-management
    - General and sub-specialty care
    - Nursing
    - Pharmacies
  - Removing barriers to access and adherence
    - Social work
    - Care coordination
    - Home health provision
    - Medication delivery
  - Community agencies and partners
Further upstream – Avondale

181 total utilizations – 130 ED visits, 51 admissions