Community Health Workers
Bringing Asthma Control Home

Jim Krieger, MD, MPH
APHA Annual Meeting 2013

Public Health
Seattle & King County
Acknowledgements

• Community Health Workers
  o Carol Allen
  o Michelle DiMiscio
  o Cindy Mai
  o Maria Martinez
  o Margarita Mendoza
  o Matthew Nguyen

• Project Directors
  o Miriam Philby
  o June Robinson
  o Lisa Ross
  o Kim Wicklund

• Co-Investigators
  o Nancy Beaudet
  o Jill Breysse
  o Lin Song
  o Tim Takaro

• Funders
  o CDC
  o NIEHS
  o RWJF
# Seattle – King County Asthma Program

<table>
<thead>
<tr>
<th>Period</th>
<th>Program Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997-2001</td>
<td>Healthy Homes I</td>
<td>CHW home environment visits Children</td>
</tr>
<tr>
<td>2001-2005</td>
<td>Healthy Homes II</td>
<td>CHW comprehensive home visits Children</td>
</tr>
<tr>
<td>2001-2005</td>
<td>Allies Against Asthma</td>
<td>Coalition-based systems change</td>
</tr>
<tr>
<td>2004-2007</td>
<td>Breathe Easy Homes</td>
<td>New asthma-friendly housing Children</td>
</tr>
<tr>
<td>2007-2012</td>
<td>HomeBASE</td>
<td>CHW comprehensive home visits Adults</td>
</tr>
<tr>
<td>2009-2012</td>
<td>Highline Communities Healthy Homes</td>
<td>Existing asthma-friendly housing Remediation and weatherization</td>
</tr>
<tr>
<td>2009-2013</td>
<td>Medicaid Healthy Homes</td>
<td>CHW comprehensive home visits Children enrolled in managed care</td>
</tr>
</tbody>
</table>
Healthy Homes I

- In-home environmental assessment and education by community health workers
- Low-income children age 4-12
- Comparison of single visit model to more intensive multi-visit model
- RCT of 274 households
- Published in American Journal of Public Health, April 2005
Community Health Worker
Home Visits

- 7 visits over one year
- Assessment
  - Asthma control
  - Trigger control actions
  - Home environment
- Trigger control skills
- Promote tenant-landlord communication
- Liaison with Housing Authority
- Social support
- Advocacy/referral (housing, food, furniture, jobs, etc.)
Participant Supplies
Outcomes

- **Symptom days:** Decrease 1.2 days per two weeks more (p = 0.138)
- **Quality of life score:** Increase 5.4 points more (p = 0.005)
- **Percent with urgent care:** Decrease 62% more (p = 0.026)

---

**Percent with urgent care**

- **p-values:**
  - 0.000 (high intensity, baseline vs. exit, chi-square)
  - 0.414 (low intensity, baseline vs. exit, chi-square)
  - 0.026 (exit, low vs. high intensity, regression)
Outcome: Floor Dust Loading

* p value comparing high vs. low exit values after adjustment for baseline values using linear regression
Healthy Homes II

• Home visits by Community Health Workers
• Address reduction of indoor triggers and improving self-management skills
• Comparison of addition of CHW in-home asthma support to clinic-based nurse-provided education
• RCT of 309 low-income households with children age 3-13 with persistent/poorly controlled asthma
• Archives of Peds and Adol Med 2009
Community Health Worker
Home Visits

• 5 visits over one year

• Assessment
  o Asthma control
  o Trigger control actions
  o Home environment
  o Self-management knowledge and skills

• Self-management support
  o Trigger control
  o Medication use
  o Self-monitoring
  o Working with medical provider

• Tenant-landlord communication

• Social support

• Advocacy/referral (housing, food, furniture, jobs, etc.)
Clinic-Based Interventions

• Clinic Education
  o Received by all participants
  o Initial assessment
  o Average of 1 follow-up clinic visit
  o Asthma action plan

• Allergen-proof bedding covers for all participants

• CHW-Clinic Communication
Outcomes

- **Symptom free days:** Increase 0.94 days per two weeks more (p = 0.046)
- **Quality of life score:** Increase 0.22 more (p = 0.049)
- **Percent with urgent care:** Decrease 31% more (p = 0.23)
Costs and ROI

- **Costs of asthma treatments**
  - Home Visits: $1341/year
  - Inhaled Steroids: Fluticasone 110 ug: $2160/year
  - Xolair: $10,400-20,800+

- **High vs. Low Intensity projected over 4 years (HH-I)**
  - Net savings: $189-721

- **Medicaid Demonstration Project Preliminary Analysis (annual)**
  - Net savings: $14 -634
  - ROI: 1.3
  - Cost-effectiveness: $18 per symptom-free day
How About Adults?
HomeBASE

- Randomized controlled trial comparing intervention to usual-care
- 366 participants
  - Age 18-65
  - Not well controlled asthma or worse
  - Speak either English or Spanish
  - Household income below 250% of federal poverty level
- Intervention
  - Intake visit and 4 follow-up visits by CHW
  - Self-management support
  - Supplies (bedding covers, bedding encasement, cleaning supplies, HEPA air filters, medication boxes)
  - Coordination with primary care
Symptom-Free Days

- **Symptom free days:**
  Increase 2.1 days per 2 weeks more in CHW group (p < 0.000)
- **Quality of life score:**
  Increase 0.50 more in CHW group (p < 0.000)
- **Number urgent care episodes:**
  No difference (p = 0.89)
Beyond Seattle/King County
Many, Many CHW Asthma Programs

- Tacoma, WA
  - [http://www.tpchd.org/health-wellness-1/diseases-conditions/asthma/](http://www.tpchd.org/health-wellness-1/diseases-conditions/asthma/)

- Long Beach/San Bernardino, CA
  - [http://www.asthmapartners.org/component/content/article/64/236.html](http://www.asthmapartners.org/component/content/article/64/236.html)

- Imperial Valley, CA

- NYC (Harlem):
  - [http://www.harlemasthma.org/air/Services/](http://www.harlemasthma.org/air/Services/)

- NYC
  - [http://nyp.org/services/acn_outreach_win.html](http://nyp.org/services/acn_outreach_win.html)

- Boston
  - [http://www.childrenshospital.org/cai](http://www.childrenshospital.org/cai)

- Springfield, MA

- Baltimore
  - [http://baltimorehealth.org/asthma.html#services](http://baltimorehealth.org/asthma.html#services)

- Indianapolis:
  - [http://www.asthmaindy.org/](http://www.asthmaindy.org/)

- Chicago

- Portland
  - [https://web.multco.us/health/healthy-homes](https://web.multco.us/health/healthy-homes)

- Philadelphia
  - [http://www.chop.edu/service/community-asthma-prevention-program-capp/](http://www.chop.edu/service/community-asthma-prevention-program-capp/)
The Task Force recommends the use of home-based multi-component, multi-trigger environmental interventions in children with asthma on the basis of strong evidence of effectiveness in reducing symptom days, improving quality of life or symptom scores, and reducing the number of school days missed.

- Reviewed 760 articles and included 25 studies
- Included studies published 1966-2008
Summary of Key Findings

- Studies with satisfactory program cost information report the range of program costs from $231 to $1,720 per participant.
- Cost-Benefit studies show net positive returns on investment with a benefit-cost ratio ranging from 5.3 to 14.0.
- Cost-Effectiveness studies demonstrate that costs per SFD range from $12 to $57, and could be lower if all direct and indirect cost were included.

Based on this evidence, the economic benefits from these interventions have the potential to match or even exceed the cost of intervention.
Cost: ICER Review (2013)

- 14 studies
- Contexts:
  - Chronic disease support: asthma, diabetes, and HIV
  - Cancer screening
  - Interventions for high consumers of healthcare resources or other high-risk individuals.
- Majority of studies showed net cost savings over 6 months to 2 years relative to control groups
What Next?
Issues to Think About

• Who should be a CHW? Peers or professionals?
• Where should CHWs “live?”
• Specialist or generalist?
• Certification? Credentialing?
• And of course, remuneration
• *What else?*
Sustaining and Scaling

• Contracting with Medicaid Health Plans
  o ROI and clinical effectiveness data captured the attention of clinical leadership at Molina Healthcare of Washington.
  o Active conversation regarding contracting for CHW home visits for Molina members with asthma and diabetes.
  o Hopeful other four plans in the state will follow.

• Building Infrastructure
  o State and local training

• Implementing health reform
  o WA SIMS Grant
  o State CHW Task Force
Emerging Opportunities

• ACA
  o ACOs and CCOs—aligning incentives for use of CHWs?
  o Prevention and Public Health Fund—funding?
  o Community benefits—funding?
  o Patient-Centered Medical Home—integrate CHWs?

• More...
  o CMS Medicaid regulation—reimburse for preventive services by unlicensed professionals (including CHWs) recommended by licensed professional
  o Health Impact Bonds

• What else?
Policy Priorities

• Home visits for *all* low-income people with uncontrolled asthma
  o Inclusion as a covered benefit by health plans
  o Incorporation into medical homes
  o Certification of community health workers
  o Development of community capacity to provide home visits

  o **What else?**
The End...Thanks

http://www.kingcounty.gov/healthservices/health/chronic/asthma.aspx
Or Google – King County Asthma Program
Additional slides – not for main presentation...
What Have We Learned from Visiting 1400+ Homes?
Implementing Home Visits

- **Visitor:** CHW with caseload of 50-60 clients
  - Shares culture and life experiences
  - Personal or family experience with asthma
  - Well trained: 40 hour initial training, weekly in-service training
  - Well supervised: structured work environment, activity monitoring, clinical backup

- **Client:** Poorly controlled asthma

- **Number of visits:** Initial and 3 follow-up

- **Visit Content**
  - Assessment
  - Medical self-management skills
  - Trigger reduction self-management skills
  - Effective communication with medical provider
Implementing Home Visits

• **Approach**
  o Client-centered, motivational interviewing
  o Address psychosocial needs and resource barriers
  o Systems linkages
  o Provide social support

• **Supplies**
  o Vacuum

• **Client tracking and follow-up**

• **Program infrastructure**
  o Quality monitoring
  o Data system
# Home Environment Checklist

**Home Walk Through:** Answer with Yes/No or Don’t Know unless otherwise noted
(If living area and bedroom are same for client, complete living room walk through and enter 99 for bedroom)

<table>
<thead>
<tr>
<th>ASK/OBSERVE</th>
<th>Inspection</th>
<th>Living Room</th>
<th>Child Bedroom</th>
<th>Kitchen</th>
<th>Bath</th>
<th>Basement</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Type of floor covering: 1 = Carpet loop, 2 = Carpet shag, 3 = Hardwood, tile, linoleum or vinyl, 4 = Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Cloth covered furniture? Enter # (N=0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2b</td>
<td>Stuffed toys? Enter # (N=0)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3a</td>
<td>Can at least one window be opened? 1 = Y, 2 = N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3b</td>
<td>Type of window covering: 1 = curtains/drapes, 2 = blinds or shades, 3 = None/not applicable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Level of dust on surfaces in the room: (flat surfaces, do not include floors) 1 = None, 2 = Slight, 3 = Moderate, 4 = Heavy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Structural Problems**

<table>
<thead>
<tr>
<th>Inspection</th>
<th>Living Room</th>
<th>Child Bedroom</th>
<th>Kitchen</th>
<th>Bath</th>
<th>Basement</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>5a</td>
<td>Cracks (larger than thickness of a dime)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5b</td>
<td>Holes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5c</td>
<td>Peeling Paint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5d</td>
<td>Other, ________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5e</td>
<td>See evidence of water damage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5f</td>
<td>See evidence of water leaks/drips</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5g</td>
<td>Source of leaks/drips: 1 = Outside, 2 = Inside, 3 = Both</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5h</td>
<td>See evidence of condensation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[http://www.kingcounty.gov/healthservices/health/chronic/asthma.aspx](http://www.kingcounty.gov/healthservices/health/chronic/asthma.aspx)
# Baseline Assessment

## SECTION 1: MEDICATION (M)

<table>
<thead>
<tr>
<th>Q.#</th>
<th>M1. All medicines taking</th>
<th>M1a. # of Days taken in last 14 days</th>
<th>M1b. Time per day (controller only)</th>
<th>M1c. Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>77 As needed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>88 No longer use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>99 Don't know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## SECTION 2: MEDICATION ADHERENCE (MA)

<table>
<thead>
<tr>
<th>Q#</th>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>MA1.</td>
<td>Has your child had any problems in taking his/her medicines as prescribed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA2.</td>
<td>During the last 3 months, has your child at times been careless about or forgotten to use his/her inhaler?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA3.</td>
<td>During the last 3 months, has your child ever stopped using OR USED LESS his/her inhaler because s/he felt better?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA4.</td>
<td>Does your child have a spacer (such as an Aerochamber) to use with inhalers?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MA5.</td>
<td>Have child demonstrate spacer use. Used correctly? If NO or DON’T KNOW/UNSURE Specify: ___________________</td>
<td></td>
<td>98</td>
<td>N/A</td>
</tr>
<tr>
<td>MA6.</td>
<td>Does your child have asthma medication available at school?</td>
<td></td>
<td>98</td>
<td>N/A</td>
</tr>
<tr>
<td>MA7.</td>
<td>Does your child have asthma medication available at daycare?</td>
<td></td>
<td>98</td>
<td>N/A</td>
</tr>
</tbody>
</table>

## SECTION 3: ASTHMA ACTION PLAN (AA)

<table>
<thead>
<tr>
<th>Q#</th>
<th>Question</th>
<th>Yes</th>
<th>No</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA1.</td>
<td>Doctor provided you with a written plan (action plan)</td>
<td></td>
<td></td>
<td>NO ➜ Go to next Section</td>
</tr>
</tbody>
</table>
Protocols

CDC translational grant tools and documents

Community health worker (CHW) and participant protocols:

- Asthma basics
- Colds and asthma
- Communication with provider
- Depression with asthma
- Influenza and flu shots
- Medication adherence
- Peak flow monitoring
- Seeking emergency care
- Unsafe housing
- Using a metered dose inhaler
- Using an action plan
- Warning signs of asthma
- What happens when you call 911
- What to do during an asthma attack

Environmental protocols:

- Air pollution
- Allergies and pollen
- Assessing household products
- Clutter
- Cold homes
- Dust control
- Dust mites
- Environmental tobacco smoke
- Mold and moisture
- Obesity
- Occupational
- Pets
- Roaches
- Rodents
- Using a dust mask and asthma management
- Woodsmoke
Implementing Home Visits

- **Recruitment**
  - Plan
  - Providers
  - Community

- **Coordination with providers**
  - Visit encounters shared with plan and provider
  - Phone, email and or fax link between CHW and provider and plan chronic disease care coordinator
Conclusions

• Home visits by CHWs that address self-management support and indoor trigger exposure improve asthma outcomes

• Addition of home visits by CHWs to clinic-based education improves asthma outcomes

• CHW home visits add 21+ more symptom-free days per year

• CHW home visits reduce exposure to triggers

• CHW home visits help participants make behavior changes
Conclusions

• Benefits in quality of life and urgent health service use are more modest

• Offering families a choice of options for self-management support may be optimal
  o Home visits
  o 1:1 clinic-based education
  o Group activities
What is a Community Health Worker?

- Frontline public health worker
- Trusted member of/unusually close understanding of community
- Liaison/intermediary between health/social services and community
- Facilitates access and improves quality and cultural competence of services
- Builds individual and community capacity by increasing health knowledge and self-sufficiency
- A CHW distinguished from other health professionals:
  - Is hired primarily for his or her understanding of the populations and communities he or she serves;
  - Works a significant portion of the time in the community
  - Has experience in providing services in community settings.
Outcome: Symptom Days

Days in past 2 weeks

p-values:
0.000  (high intensity, baseline vs. exit, chi-square)
0.000  (low intensity, baseline vs. exit, chi-square)
0.123  (exit, low vs. high intensity, regression)
Outcome: Caregiver Quality of Life

p-values:
0.000 (high intensity, baseline vs. exit, chi-square)
0.006 (low intensity, baseline vs. exit, chi-square)
0.001 (exit, low vs. high intensity, regression adjusted for baseline score)
Inner City Asthma Study

21 fewer days with symptoms per year in intervention group

(P<0.001)

ICAS (Morgan et al. NEJM 2004;351: 1068)
Symptom Days

Quality of Life Score: +0.6 points

Acute Care Visits: -0.7 per year