Asthma: Public Health Applications

Karen L. Edwards, Ph.D.
Director, UW Center for Genomics and Public Health

Department of Epidemiology and Institute for Public Health Genetics
School of Public Health and Community Medicine
University of Washington
Outline

1. Background
   1. Genes and Environment
   2. Family History
2. Healthy Homes Project
   1. Michigan: Healthy Home University
   2. Washington: Breath Easy Homes
3. Resources
4. Summary
5. Conclusions
Acknowledgements

- Michigan Department of Community Health
  - Deb Duquette
  - John Gehring
  - Courtney Wisinski
The Search for Asthma Susceptibility Genes

“I found one! I found one!”

Kenneth M. Weiss & Joseph D. Terwilliger
nature genetics • volume 26 • October 2000
Used with permission of Deb Duquette, MDCH
Perspectives in asthma

Guest editor: William W. Busse, MD

Perspectives on the past decade of asthma genetics

Carole Ober, PhD Chicago, IL

**TABLE I. Examples of gene-by-environment interaction effects on asthma and atopic disease**

<table>
<thead>
<tr>
<th>Gene</th>
<th>Environmental Exposure</th>
<th>Phenotype</th>
<th>Comment</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>LPAR4</td>
<td>Asthmatic exposure</td>
<td>Asthma</td>
<td>−646C allele is increased among individuals with inspirato-induced asthma compared with individuals with atopic asthma.</td>
<td>Suzuki et al^{7}</td>
</tr>
<tr>
<td>ADRA2A</td>
<td>Cigarette smoke</td>
<td>Asthma</td>
<td>Increased risk of asthma among smokers with Arg16 genotype but not among nonsmokers.</td>
<td>Wang et al^{10}</td>
</tr>
<tr>
<td>ADRA2C</td>
<td>Physical activity</td>
<td>Asthma</td>
<td>Increased risk of asthma among sedentary women with Gly16 genotype but not among active women.</td>
<td>Ibar et al^{11}</td>
</tr>
<tr>
<td>IEM1</td>
<td>HAV</td>
<td>Atopy</td>
<td>HAV protects against atopy in individuals with a 6-amino-acid insertion at residue 157 (157tnMTTVP) but not in individuals without the insertion.</td>
<td>Meltz et al^{12}</td>
</tr>
<tr>
<td>IL14</td>
<td>Endotoxin level</td>
<td>Asthma</td>
<td>At high level of endotoxin exposure, content of the Gly209 and Ilr399 alleles have reduced risk for asthma compared with other genotypes and other exposure groups.</td>
<td>Werner et al^{13}</td>
</tr>
<tr>
<td>C4D4</td>
<td>Dog ownership at birth</td>
<td>AD</td>
<td>−159TT genotype is protective against AD in the first year among children with a dog in the home at birth.</td>
<td>Gern et al^{14}</td>
</tr>
<tr>
<td>GSTM1</td>
<td>Diesel exhaust particle</td>
<td>IgE and histamine</td>
<td>Enhanced responses among GSTM1-null individuals but not among individuals with other genotypes.</td>
<td>Gilliland et al^{15}</td>
</tr>
<tr>
<td>GSTP1</td>
<td>Diesel exhaust particle</td>
<td>IgE and histamine</td>
<td>Enhanced responses among individuals with the Ilr105 allele but not among individuals without this allele.</td>
<td>Gilliland^{15}</td>
</tr>
<tr>
<td>MOS3</td>
<td>Day-care exposure in the first 6 mo of life</td>
<td>Change in cytokine (IL-5 and IL-13) response</td>
<td>Improved responses among children attending day care and largest changes among children not attending day care.</td>
<td>Hoffjan et al^{16}</td>
</tr>
<tr>
<td>FCER1H</td>
<td>Day-care exposure in the first 6 mo of life</td>
<td>IL-5 response at 1 y of age</td>
<td>Gly257 allele associated with decreased IL-5 responses among children attending day care and increased responsiveness among children not attending day care.</td>
<td>Hoffjan et al^{16}</td>
</tr>
<tr>
<td>IL8RA</td>
<td>Day-care exposure in the first 6 mo of life</td>
<td>IFN-γ response at 1 y of age</td>
<td>Vincal hypersensitivity associated with lowest response among children attending day care and highest response among children not attending day care.</td>
<td>Hoffjan et al^{16}</td>
</tr>
<tr>
<td>HLA-DR</td>
<td>Maternal BHR</td>
<td>Asthma-BHR in child</td>
<td>−904G allele is associated with asthma in children of mothers with BHR; −904A allele is associated with atopy and asthma among children of mothers without BHR.</td>
<td>Nicolai et al^{7}</td>
</tr>
</tbody>
</table>

**Abbreviations:** HAV, Hepatitis A; BHR, bronchial hyperresponsiveness.
Interleukin-1R antagonist gene and pre-natal smoke exposure are associated with childhood asthma


ABSTRACT: The interleukin-1 receptor antagonist (IL1RN) is a potent anti-inflammatory cytokine. In the present study, association of the human IL1RN gene polymorphisms with asthma, bronchial hyperresponsiveness and forced expiratory volume in one second/forced vital capacity ratio was tested and the data was stratified by environmental tobacco smoke exposure in order to investigate a gene-smoking interaction.

In an unselected subset (n=921) of the Isle of Wight birth (UK) cohort, which has previously been evaluated for asthma and related manifestations at ages 1, 2, 4 and 10 yrs, three IL1RN single nucleotide polymorphisms (SNP) were genotyped. Logistic regression and repeated measurement models for tests of association using a representative SNP rs2234678 were used, as all SNPs tested in strong linkage disequilibrium.

In the overall analysis, the SNP rs2234678 was not associated with asthma. However, in the subset with maternal smoking during pregnancy the rs2234678 GG genotype significantly increased the relative risk of asthma in children, both in analyses of repeated asthma occurrences and pre-selected asthma.

In conclusion, the present results show that in the first decade of life, the gene-environment interaction of the interleukin-1 receptor antagonist gene polymorphism rs2234678 and maternal smoking during pregnancy increased the risk for childhood asthma.
Challenge:
How to integrate genomics into asthma activities?
Validity and Relevance of Family History of Asthma?

Family History as a Predictor of Asthma Risk

Wylie Burke, MD, PhD, Megan Fesinemeyer, Kate Reed, MPH, Lindsay Hampson, Chris Carlsten, MD

Background: Asthma, one of the most important chronic diseases of children, disproportionately affects minority and low-income children. Many environmental risk factors for asthma have been identified, including animal, mite, and other allergens; cigarette smoke; and air pollutants. Genetics also play an important causative role, as indicated by familial aggregation and the identification of candidate genes and chromosomal regions linked to asthma risk. Using a positive family history of asthma to identify children at increased risk could provide a basis for targeted prevention efforts, aimed at reducing exposure to environmental risk factors.

Methods: To assess the predictive value of family history as an indicator of risk for childhood asthma, we reviewed population-based studies that evaluated family history of asthma and atopic disease in children with asthma.

Results: Our search identified 33 studies from all geographic regions of the world for review. The studies varied in definitions of positive family history and asthma phenotype and used study populations with asthma prevalence ranging from 2% to 26%. Nevertheless, family history of asthma in one or more first-degree relatives was consistently identified as a risk factor for asthma. In ten studies, sensitivity and predictive value of a positive family history of asthma could be calculated: sensitivity ranged from 4% to 48%, positive predictive value from 11% to 97%, and negative predictive value from 86% to 97%.

Conclusion: Although a positive family history predicts an increased risk of asthma, it identifies a minority of children at risk. Positive family history may have utility in targeting some individual prevention efforts, but the low positive predictive value limits its value as a means to direct environmental remediation efforts. (Am J Prev Med 2005;24(2):169–169) © 2005 American Journal of Preventive Medicine)
Rationale for using Family History as a Public Health Tool

1. Screening for single major gene(s) is unlikely
2. Reflects unique *Genomic* information
   - genomic, ecologic, behavioral and interactions
3. Effective interventions
4. Identify individuals for targeted intervention
5. Family-Centered approaches
Family History Reflects . . .

Shared Environments

- Secondhand smoke
- Psychological factors
- Location
- Support systems
- Geography
- Neighborhoods

Used with permission of Kris Peterson Oehlke, MDH
Application of Asthma and Public Health Genomics

- Family Health History
- Gene-Environment
- Health Disparities
- Biopsychosocial/Ecological Approach

Used with permission of Deb Duquette, MDCH
Healthy Homes University: Using Family History to Identify and Intervene with Families in a Low-Income Community

Deb Duquette, MS, CGC
Adult Genetics/Genomics Coordinator
Michigan Department of Community Health
Right Time, Right Place: MDCH Moves to New Location

• In Fall, 2005, MDCH Genomics, MDCH Environmental Epidemiology, MDCH Chronic Disease/Asthma Epidemiology moved to same new building and same floor
• MDCH staff had new opportunities to network
• MDCH Genomics and Healthy Homes University staff meet
  – Healthy Homes University project in planning stage
• Healthy Homes University staff open to genomics integration
• Technical Assistance from University of Washington-Center for Genomics and Public Health
• First project for MDCH Environmental Epidemiology and MDCH Genomics

Used with permission of Deb Duquette, MDCH
Healthy Home University (HHU) Program Summary

- MDCH was one of five grantees out of 40 total that received the 2005 grant.
- Healthy Homes Demonstration Grant.
- $989,717 HUD Funds.
- $797,350 Partnering Leveraged Resources.

Used with permission of Courtney Wisinski, Michigan Department of Community Health
Key Partners

- Staff consultation on health and housing issues.
- Client referrals.
- Education and outreach to communities.
- Reduced cost of intervention products.
- Housing rehabilitation and lead based paint remediation.

Used with permission of Courtney Wisinski, Michigan Department of Community Health
Target Area

- Ingham County, Michigan
- Based on housing age, asthma hospitalization rates, income status, race data and asthma coalition

Used with permission of Courtney Wisinski, Michigan Department of Community Health
Participant Criteria

Homes in Ingham County that have:

- Low-moderate income families.
- A child 18 years of age or under with asthma.

Used with permission of Courtney Wisinski, Michigan Department of Community Health
Help for Families and Children with Asthma or Allergies

Who is eligible for services?
- Children less than 18 years old with asthma or allergy symptoms
- Low-income households in Ingham County, Michigan

What is the cost?
- FREE

What help is available?
- We will inspect your home and install the following products to reduce asthma and allergy triggers and prevent injuries.

Basic Products for EVERY Family
- Outlet safety plugs
- HEPA vacuum
- Rug gripper tape
- Fire extinguisher
- Managing the thermometer
- Plastic food containers
- Nightstands and flashlights
- Beach and blanket
- Pest and bed bugs
- Window proof cover
- Low-dust filter screens
- Mattress cover
- Window shade
- Tall order
- Ceiling fan
- Trash can with lid
- Smoking cessation materials
- Fans
- Pillow and mattress covers
- Foam snack seat and stool
- Window security locks
- Desk drawers
- Door locks
- Humidity control
- HVAC duct cleaning
- Plumbing repairs
- Carpet removal
- Pest infestation prevention
- Floor refinishing
- Refrigerant vent installation
- Furniture disposal
- Outdoor play equipment
- Improvements
- Window air-conditioning unit
- Garbage removal
- Dead bolts

Getting started is easy!
If you would like a Healthy Homes University Program application MAILED to you, just complete the information requested below and return this sheet by mail or fax or email.

<table>
<thead>
<tr>
<th>Product/Service</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEPA filter unit</td>
<td>Reduce dust allergies</td>
</tr>
<tr>
<td>HVAC duct cleaning</td>
<td>Improve indoor air quality</td>
</tr>
<tr>
<td>Plumbing repairs</td>
<td>Fix leaks and drips</td>
</tr>
<tr>
<td>Carpet removal</td>
<td>Remove harmful allergens</td>
</tr>
<tr>
<td>Pest infestation prevention</td>
<td>Protect against pests</td>
</tr>
<tr>
<td>Floor refinishing</td>
<td>Enhance home comfort</td>
</tr>
<tr>
<td>Refrigerant vent installation</td>
<td>Reduce energy costs</td>
</tr>
<tr>
<td>Furniture disposal</td>
<td>Reduce clutter</td>
</tr>
<tr>
<td>Outdoor play equipment</td>
<td>Promote health and wellness</td>
</tr>
<tr>
<td>Improvements</td>
<td>Enhance home safety</td>
</tr>
<tr>
<td>Window air-conditioning unit</td>
<td>Control indoor temperature</td>
</tr>
<tr>
<td>Garbage removal</td>
<td>Keep your home clean</td>
</tr>
<tr>
<td>Dead bolts</td>
<td>Secure your home</td>
</tr>
</tbody>
</table>

If you are interested in referring families, please contact:

- Courtney Wisniski
  - Phone: 617.335.6262
  - Fax: 617.335.6830
  - Email: wisniski@alexandria.va.us

- Linda Stewart
  - Phone: 617.335.6262
  - Fax: 617.335.6830
  - Email: stewartl1@alexandria.va.us

Address:
Phone:
City, State, Zip:
Referred by:
Name:
State:
Referred by:

Department of Community Health
Healthy Homes University: Desired Outcomes

- Positive change in the family’s knowledge, attitudes and behaviors regarding asthma triggers and injury reduction within the home.
- Reduced frequency of asthma and injury emergency care events and school absenteeism.

Used with permission of Courtney Wisinski, Michigan Department of Community Health
Healthy Homes University and Genomics: Desired Outcomes

- To apply principles of gene-environment interactions and family history knowledge in an actual public health project

- To show impact of collection of family history of asthma and collection of number of household members with asthma
  - “Think Genomically, Act Locally” – Kris Peterson Oehlke
  - Consider 300 households with potential to reach greater than 300 children and adults
    - Broader impact than one affected child per household
    - Reaches more than just 300 children/households
    - Document actual number of children and family members in household

- To demonstrate genomics value in allocation of limited resources
  - Families at greatest risk with greatest number of affected receive greater amounts of resources
  - Helping largest number of people with least costs
    - “More bang for the buck”
Technical Approach

- 300 homes will be enrolled.
  - Family history of asthma collected on all 300 homes at first visit

- Each family will enroll for a 6 month period.

- The HHU staff will complete four visits per home.
  - Provide asthma and injury control education and material.
  - Install asthma or injury reduction products or services.
  - Evaluate knowledge, attitudes, and behaviors.

Used with permission of Courtney Wisinski, Michigan Department of Community Health
Technical Approach

- Two levels of intervention:
  - Basic Intervention
    - All 300 homes
  - Custom Intervention
    - At least 40 homes will receive additional custom intervention products and services.
    - More family members with asthma in household, more resources provided

- HHU staff will refer lead-based paint, radon, asbestos, etc. to the appropriate agency or program

Used with permission of Courtney Wisinski, Michigan Department of Community Health
Basic Intervention Products

- HEPA Vacuum
- Outlet plug covers
- Carbon monoxide detector
- Smoke detector
- Skid-proof bath mats
- Fire extinguisher
- Gun trigger locks
- Mercury-free thermometers
- Trash can with lid
- Food containers
- Smoking cessation kits
- Nightlights
- Poison control stickers

- Fans
- Bleach and detergent
- Pillow and mattress covers
- Roach and mice baits/gels
- Foam crack sealant/Caulk
- Mildew-proof shower curtain
- Low-allergen furnace filters
- Safety gate
- Mini-blind cord wind-ups
- Door mat
- Flashlights

Used with permission of Courtney Wisinski, Michigan Department of Community Health
Custom Intervention Products or Services

- Pillows (hypoallergenic)
- Mattresses
- HEPA room filter
- A/C unit
- Furniture slipcovers
- Moisture control
- Plumbing repair
- Minor roof repair

- IPM/Extermination
- Landscaping/bush removal
- Bathroom vent installation
- House cleaning services
- Garbage removal
- Outdoor play area improvements

Used with permission of Courtney Wisinski, Michigan Department of Community Health
Study Surveys

Surveys conducted at 4 time points:
- Baseline intervention
  - Includes Family History Collection
- 1, 3, and 6-month post-intervention
HHU Family History Questions

**SECTION B: FAMILY HISTORY INFORMATION**

**FOR INTERVIEWER** The following questions ask you about the history of asthma and allergy symptoms within the biological family of [CHILD].

B01. Has the biological mother of [CHILD] ever been diagnosed with asthma?
- □ Yes
- □ No
- □ Refused
- □ Don't Know

B02. Does the biological mother of [CHILD] live in the home?
- □ Yes
- □ No
- □ Refused
- □ Don't Know

B03. Has the biological father of [CHILD] ever been diagnosed with asthma?
- □ Yes
- □ No
- □ Refused
- □ Don't Know

B04. Does the biological father of [CHILD] live in the home?
- □ Yes
- □ No
- □ Refused
- □ Don't Know

B05. Have any other biological family members been diagnosed with asthma?
- □ Yes
- □ No
- □ Refused
- □ Don't Know
- □ Skipped

Specify:

□ Refused
□ Don't Know
□ Skipped

B06. What other biological family members have been diagnosed with asthma?

□ Refused
□ Don't Know
□ Skipped

B07. How many of these family members live in the home?

□ Refused
□ Don't Know
□ Skipped

# of family members:

Used with permission of Deb Duquettet, MDCH
## Family History

Reported family history of ever being diagnosed with asthma - 160 families

<table>
<thead>
<tr>
<th>Relative</th>
<th>Positive family history (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1+ siblings</td>
<td>46 (29%)</td>
</tr>
<tr>
<td>Father</td>
<td>48 (30%)</td>
</tr>
<tr>
<td>Mother</td>
<td>61 (38%)</td>
</tr>
<tr>
<td>1+ 2\textsuperscript{nd} degree relatives</td>
<td>101 (63%)</td>
</tr>
<tr>
<td>1+ 1\textsuperscript{st} or 2\textsuperscript{nd} degree relatives</td>
<td>131 (82%)</td>
</tr>
<tr>
<td>Adopted</td>
<td>2 (1.25%)</td>
</tr>
</tbody>
</table>

Prepared by John Gehring, Michigan Department of Community Health
## Family History

Reported family history of ever being diagnosed with asthma - 160 families

<table>
<thead>
<tr>
<th>Relative</th>
<th>Positive family history (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1+ 1&lt;sup&gt;st&lt;/sup&gt; degree relatives</td>
<td>106 (66%)</td>
</tr>
<tr>
<td>1+ parents</td>
<td>91 (57%)</td>
</tr>
<tr>
<td>both parents</td>
<td>18 (11%)</td>
</tr>
<tr>
<td>both parents + sibling(s)</td>
<td>4 (2.5%)</td>
</tr>
<tr>
<td>2+ siblings</td>
<td>19 (12%)</td>
</tr>
<tr>
<td>3+ 2&lt;sup&gt;nd&lt;/sup&gt; degree relatives</td>
<td>32 (20%)</td>
</tr>
<tr>
<td>2+ maternal 2&lt;sup&gt;nd&lt;/sup&gt; degree relatives</td>
<td>38 (24%)</td>
</tr>
<tr>
<td>2+ paternal 2&lt;sup&gt;nd&lt;/sup&gt; degree relatives</td>
<td>16 (10%)</td>
</tr>
</tbody>
</table>

Prepared by John Gehring, Michigan Department of Community Health
Unknown Family History

Parents History of Asthma

- Fathers: 14 FH positive or negative, 3 FH unknown
- Mothers: 14 FH positive or negative, 3 FH unknown

Second Degree Relatives History

- Paternal: 44 FH positive or negative, 15 FH unknown
- Maternal: 44 FH positive or negative, 15 FH unknown

Prepared by John Gehring, Michigan Department of Community Health
Parents Living in Household

Mothers
- Living in the home: 140
- Not living in the home: 20

Fathers
- Living in the home: 120
- Not living in the home: 40

Prepared by John Gehring, Michigan Department of Community Health
Household Members with Asthma

- 160 child probands PLUS
- 150 relatives ever affected with asthma in 93 households
  - 56 Mothers
  - 12 Fathers
  - 82 Others
    - Majority are siblings

Prepared by John Gehring, Michigan Department of Community Health
Case Example: Two for the Price of One

Without collection of family history,
- Would only document one child with asthma in household
- Limits documentation of actual impact

With collection of family history,
- Documentation of significant family history of asthma
  - At least one first degree relative
  - Two second degree relatives
- Documents at least two individuals in household with asthma receiving HHU interventions
- Raises possibility of asthma diagnosis in another sibling

Used with permission of Deb Duquette, MDCH
To date, 137 homes have received the basic intervention (120 proposed for time period).

The average cost of the basic intervention per home is $370 ($415 proposed).
Visual Assessment Findings

Bath tile with water damage.

Roof leak caused ceiling to deteriorate.

Basement foundation leak.

Used with permission of Courtney Wisinski, Michigan Department of Community Health
Custom Intervention Facts

- Approximately $3,500 per 40 homes proposed for custom intervention during the grant writing.
- To date, 105 homes have been approved for custom intervention.
- Average cost per household for custom intervention is $743
  - Each family member with asthma in household receives products
  - More family members with asthma in household, more resources provided, and greater average costs

Used with permission of Courtney Wisinski, Michigan Department of Community Health
June 27, 2006

Pearl Lilly
800 W. Edgewood Blvd.
Unit # 252
Lansing, MI 48911

Linda Stewart and Courtney
P.O. Box 30195
Lansing, MI 48909

Re: 027-290-01

Dear Linda and Courtney

I am writing to take this time to say thank you both for allowing my family to participate in the Healthy Homes University program.

This program has made a significant difference in my children’s asthma and allergies. My son Steven, whom is nine years old, has not had a cold in the last three to four weeks. Normally he would have had at least two colds back to back. He has a sniffle now and then, but nothing serious that required a breathing treatment or Prednisone. The health of my children has gotten a little better, but the main important thing is that we have not taken any trips to Sparrow’s ER or After Hour. They have just been having normal Dr. appointments. I thank you both. I can now focus on Steven’s internal allergies to foods. I hope that other families are satisfied like my family is.

Again, I would like to thank you both for coming into my home to assist with the knowledge, tools, equipment, and information packages, and being kind to my family.

Thank you,

Pearl Lilly
Anecdotal Reports of Interest

- **Anecdotal reports by families**
  - Feel that HEPA vacuum and covers for mattress and pillows are of greatest health benefit to reduce asthma symptoms and severity

- **Anecdotal reports by HHU staff**
  - Collection of family history appears to build trust and communication with families and HHU staff
  - Positive experiences of one family leads to more referrals to other households within the same extended family

Used with permission of Deb Duquette, MDCH
Making Housing Healthier

New public healthy housing at High Point

Partners

High Point Resident Council, Mithun Architects, Neighborhood House, Public Health, Seattle Housing Authority, University of Washington
Bringing Healthy Innovations Home
There is lot of attention focused on positive lifestyle and environmental changes that reduce the incidence of, and suffering from, the near epidemic of childhood and adult asthma. To address this pressing health issue, Seattle Housing’s High Point Team collaborated with the University of Washington School of Public Health, Neighborhood House, Public Health Seattle and King County and the American Lung Association of Washington to implement a long-range program designed to improve indoor air quality and ultimately reduce the occurrence of asthma attacks in children.

Through the program, 35 innovative Breathe-Easy Homes have been designed and built for rent to qualified low-income families. These homes incorporate special features to reduce indoor air pollutants and increase the quality of life for the residents. The residents of the homes were chosen by completing surveys assessing the severity of their children’s asthma. Once accepted into the program, residents completed a questionnaire that serves as a baseline for monitoring. Specialists then go to the participants’ current homes and, as much as possible, improve the air quality by educating the families. The families are then given a second questionnaire as they leave their old home for their new one at High Point. A final questionnaire will be presented to them after they have lived in their new High Point home for 12 months.

Each of the participants must follow a sensible list of rules to ensure the highest possible air quality for the children. These include no smoking, no pets, and a restriction on using certain cleaning agents.
Breathe Easy Homes: Building New Asthma-Friendly Homes

• Build 35 Breathe Easy units for children with asthma at High Point Public Housing site
  ▪ Insulated slab to keep floor warm and dry
  ▪ Exterior grade plywood (no OSB)
  ▪ Airtight drywall with low-emission joint compound
  ▪ Cement board exterior siding/rain screen
  ▪ Low emission doors, trim, cabinets, finishes, adhesives
  ▪ Hard surface floors (marmoleum)
  ▪ Enhanced ventilation (HEPA whole house continuous fan, kitchen/bath fans with timers/humidistats)
  ▪ Radiant/Hydronic baseboard heat to decrease humidity
Old High Point Housing

New High Point Breathe Easy Home
High Point Neighborhood is Diverse

Primary Languages Spoken at High Point

- English: 47%
- Vietnamese: 20%
- Other: 2%
- Cambodian: 7%
- Somali: 8%
- Oromo: 9%
- Amharic: 4%
- Tigrinya: 3%

20%
Breathe Easy Homes: Evaluation

- Test the marginal benefit of new home over education-only intervention in old home
- Longitudinal asthma cohort with pre/post measures
- Measures
  - Changes in home environment
  - Changes in participant behaviors
  - Changes in asthma-related health outcomes
    - Symptoms
    - Quality of Life
    - Health services utilization
    - Airways hyper-responsiveness
- Community-Based Participatory Research
- Findings available in 2008
Selecting Families

- Door to door survey to identify families for new breath easy home
  - Community volunteers administered surveys
  - 244 / 260 high point families surveyed
  - Families were selected based on number of asthmatic children living in the home, severity and willingness to participate
    - No smoking or pets in the household
  - Asthma was validated by medical records
  - Asthma severity defined by Public Health-Seattle & King County based NHLBI’s NAEPP Expert Panel Report Guidelines for the Diagnosis and Management of Asthma-2002 – 4 levels of severity
  - 132 families had a child with asthma living in the home
Integrating Family History

- Evaluate the association between asthma severity and family history
  - MPH thesis project through the UWCGPH (Ms. Kayleen Williams)
  - Added family history to high-point survey
  - Conducted a case-control study
    - Family history defined as parental history of asthma
    - Cases were 40 unrelated children with +FH, controls were 78 unrelated children with –FH

- Findings: Maternal history was associated with asthma severity in the child (p<0.01), but paternal history of asthma was not associated with severity in the child.
Additional Examples and Resources
Family History and Your Health Newsletters

Michigan Department of Community Health (MDCH) disseminates via e-mail to:

- Libraries
- Public health professionals
- Teachers
- Health Plans
- Primary care providers
- Genetic professionals
- Genealogy Groups

May 2006 newsletter focus on asthma, family history, and environmental triggers

- Over half of children who are diagnosed with asthma have a family history of asthma
- Risk of developing asthma is higher if parent and sibling with asthma

863 downloads or this newsletter in month of May 2006

http://www.migeneticsconnection.org/familyhealth.shtml

Used with permission of Deb Duquette, MDCH
Asthma and Family Health History
Fact Cards

• Fact Cards on Family Health History developed on a variety of topics
  – Distributed to providers and the public since May 2007
• Developed by MDCH Genomics and MDCH Asthma staff

http://www.migeneticsconnection.org/factcards.shtml

Used with permission of Deb Duquette, MDCH
Mission: To integrate advances in genomics into public health practice

- Contribute to the knowledge base on genomics and public health, focusing on chronic diseases with modifiable environmental risk factors
- Provide technical assistance to local, state, & regional public health organizations
- Serve as a reliable and credible source of information
- Serve as a regional resource for public health
- Develop and provide training for the public health workforce
- Asthma Genomics: Implications for Public Health
  - Spotlights
  - Compilation of BRFSS Genomics Questions

http://depts.washington.edu/cgph
Funded by the National Office of Public Health Genomics
Centers for Disease Control and Prevention
CDC funded Genomics Centers and States

Chronic Disease Genomics Program, Utah Department of Health
http://health.utah.gov/genomics/

Oregon Genetics Program, Oregon Department of Human Services
http://www.oregon.gov/DHS/ph/genetics/

Chronic Disease Genomics Project, Minnesota Department of Health
http://www.health.state.mn.us/divs/hpcd/genomics/

Public Health Genomics Program, Michigan Department of Community Health
http://www.michigan.gov/mdch/

Michigan Center for Public Health & Community Genomics
http://www.sph.umich.edu/genomics/

University of Washington Center for Genomics & Public Health
www.uwcgph.org
Summary

• Asthma – not due to a single gene
• Gene – environment interactions are important
• Family history is a consistent risk factor for asthma
• Family history can be used in public health settings for a variety of purposes
  – Education
  – Identify undiagnosed cases
  – Motivate behavior change
  – Cost effective?
What can you do?

- A small shift in thinking:
  - Consider how family history could relate to your activities
  - Include family history when appropriate
  - Collect and share information

Think Genomically!

Used with permission of Kris Peterson Oehlke, MDH
What else can you do?

- Include family history as a risk factor in health messages.
- Target messages to high risk groups.
- Get the facts about genomics and asthma in the news - dispel media hype.

Think Genomically!