



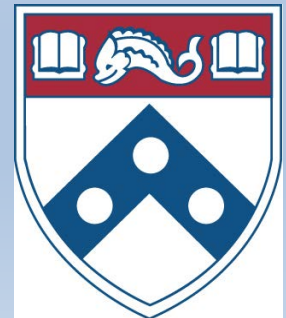
Community and 21st Century Asbestos Exposure and Disease

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Waves of Asbestos Related Disease

1st

**Mining,
Occupational**

2nd

**Industrial Use,
Occupational**

3rd

**Asbestos in
place, natural
asbestos, high-
risk
communities**



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Asbestos-Related Diseases (ARD)

◆ Major Fatal Diseases

- Asbestosis
- Lung Cancer
 - Multiplicative risk from smoking
- Mesothelioma
 - Pathognomonic for Asbestos
 - No association with smoking

◆ Variants Associated with Different Fiber types?



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Epidemiology of Non-Occupational ARD

- ◆ **Mesothelioma most apparent, increases in asbestosis and lung cancer infrequent**
- ◆ **Indicators of non-occupational mesothelioma**
 - Increased risk in women
 - Younger age distribution
- ◆ **Latent period for Mesothelioma**
 - Risk increases for 45 years after first exposure, then starts to plateau (Reid et al 2014), no one survives long enough for risk to disappear
 - Short Life expectancy (~9 mo.) post diagnosis



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Communities at High Risk for ARD

Sources of Asbestos Exposure

- ◆ Occupational
- ◆ Paraoccupational / Familial
 - Resident in same household as worker
 - With some genetic component*
- ◆ Residential Environment
- ◆ Lifestyle

* DeKlerk et al, 2013



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The Community of Ambler, PA

- ◆ **Suburban Philadelphia, 18 Miles from City**
- ◆ **1897- Discovers insulating and strength properties of dried Milk of Magnesia + Asbestos- Sectional Pipe Coverings containing asbestos**
- ◆ **1910-1920- Worlds largest producer of asbestos products “The BEST in asBESTos”**
- ◆ **1930s-1984- asbestos contamination and waste sites**
- ◆ **1970s-1980s- plants close, leads to urban decay**
- ◆ **1990s- renaissance, art and restaurant scene, family friendly community, top schools**



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Ambler, PA - the Asbestos Legacy

Ambler South

- Asbestos piles, the “White Mountains”
24 acres, 30 meters high, ~ 800,000 cu
meters of ACM & other wastes

1984-1996- Declared an EPA

“Superfund Site” capping, slopes
graded, hydroseeded, fencing and
signs, dismantled playground

- Subsequent erosion, uprooted trees,
animal burrows, unauthorized access

Current- Remains fenced off



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The Asbestos Legacy: Family Photo - Ambler 1960s

Credit: Joe Marincola



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Playground after fence c.1984 adjacent to the White Hills of Ambler



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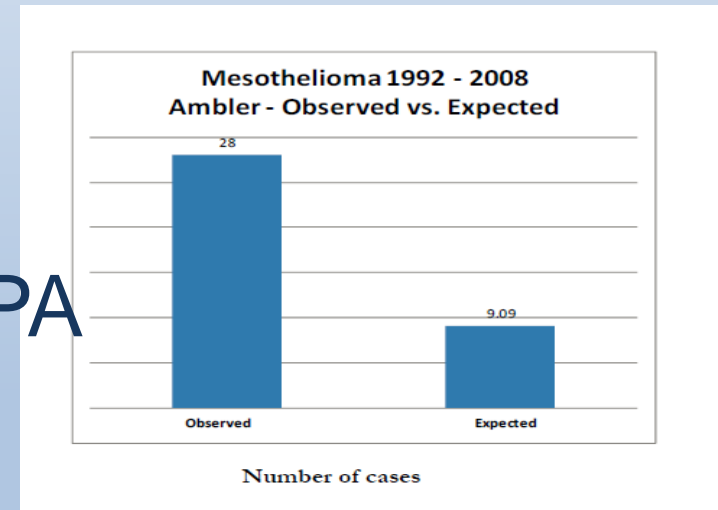
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Ambler, PA – The Mesothelioma Legacy

Results:

- 2.7x higher incidence in men
- 4.5x higher incidence in women
- No elevation in neighboring post-codes
- Rates for all cancers combined and lung cancer lower in all three locations vs PA



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Lifestyle/behavioral Exposures in Ambler PA

- Socialization in public venues after work (wearing dusty clothing, no hair washing or showering)
- Playing on asbestos waste piles as a child and **particularly as an adolescent**
- Picnicking or spending time near asbestos piles as an adult
- Outdoor sports
- Gardening
- Using asbestos waste for cooking (e.g. putting potatoes into asbestos laden pipes for cooking)
- Flooding into basements
- Flooding into gardens then eating produce from gardens



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Ambler and Bo-Rit Superfund Sites

◆ Sources of Continuing Exposure- U-Tube

How to Access the Fenced –off Superfund Site Undetected

Paintball fights in the old factory Source: <http://www.youtube.com/watch?v=IH-SsjoDFuw>



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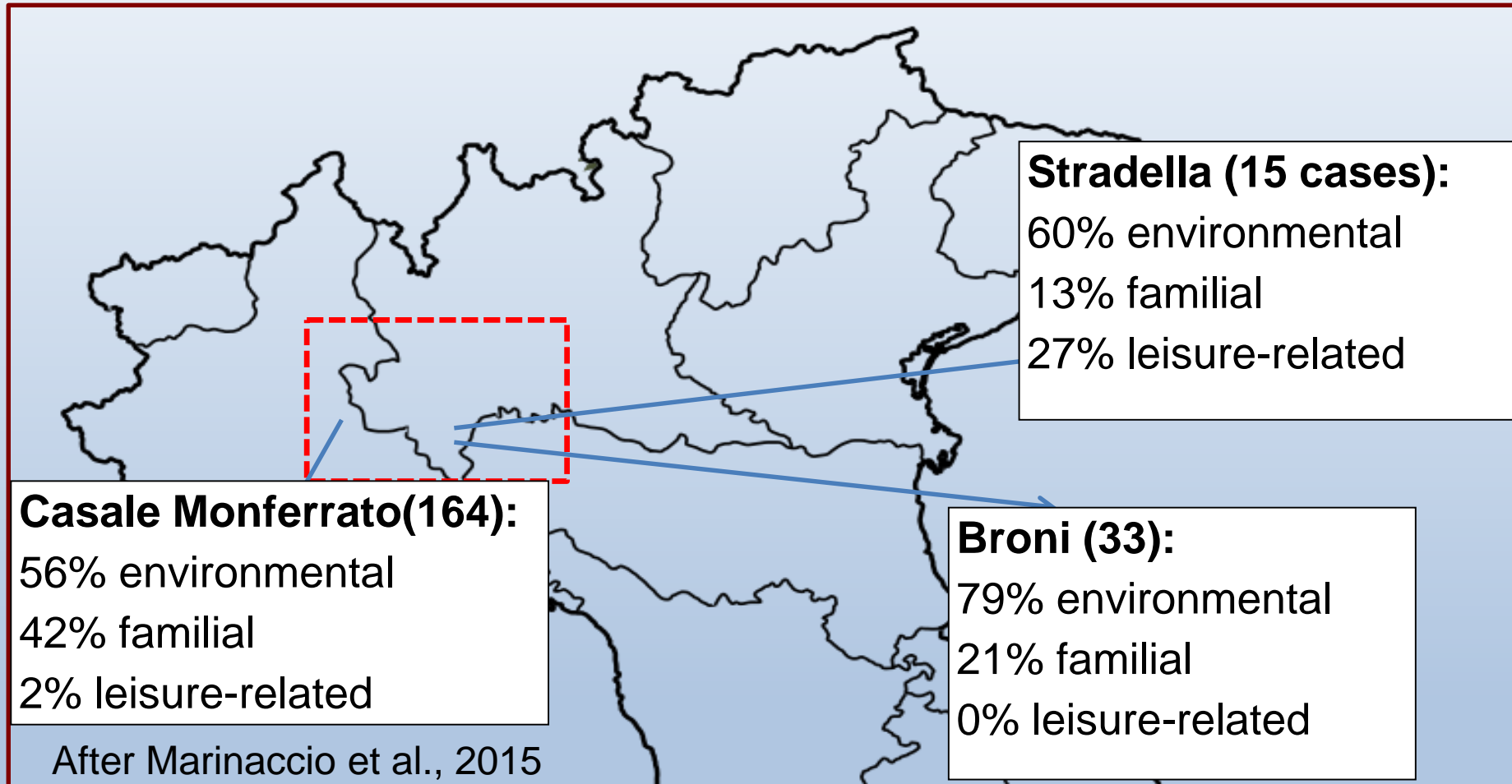
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Asbestos Exposures in High Risk Italian Communities

-- Previous Manufacturing Sites using Asbestos

Identified from Italian Mbesothelioma Registry



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Other High-Risk Communities

Karain, Turkey

- Erionite in native rock
- Houses made of rock



Genetic Vulnerability

- families with 50% mesothelioma incidence/fatality rates



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More Well-Studied High-Risk Communities

- ◆ **Wittenoom, Western Australia.**

Former Asbestos Mining and Milling Site

- ◆ **Libby, Montana.**

Former vermiculite mining and processing site.....

Many more unstudied?



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Selected Other Non-occupational Asbestos Exposures

◆ Do-it-yourself Home Renovators

- Significant increase in mesothelioma from Australian mesothelioma registry studies (Olsen et al 2011).

◆ Natural Asbestiform Fibers

◆ Disasters and Exposures

- Asbestos & 9/11 World Trade Center disaster
- Asbestos Exposures from Weather-related events



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Selected Issues with Non-Occupational Asbestos

- ◆ **Banning the use and import of asbestos will not effect asbestos in place**
- ◆ **Non-regulated forms of asbestos cause ARD in non-occupational situations**
- ◆ **Responsibility for exposure control is much more diffuse than in occupational settings**
- ◆ **Mesothelioma registries (e.g. Italy, Australia) very helpful in establishing sources of risk**
- ◆ **Legal responsibility for exposure may not always be as clear as in occupational settings**
- ◆ **Vulnerabilities of groups in communities may include**
 - Genetic predispositions
 - Social- Environmental justice and indigenous, ignorance of risks, non-English speaking
 - Behavioral –adolescents, home-renovators
 - Associated with Adverse events including weather related
- ◆ **Very Diverse attitudes and perceptions of risk amongst communities**
- ◆ **Medical surveillance, diagnosis and treatment, social support, prophylaxis - needs of high-risk communities**



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