Mould and Health Effects

M. Shum, C. Palaty

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CIPHI Saskatchewan
Outline

- What is the NCCEH?
- What is mould?
- What are the health effects ascribed to mould?
- What is the evidence for these health effects?
- How do you know if you have a mould problem?
- What do you do if there is a mould problem?
National Collaborating Centre for Environmental Health
The NCCs

- One of six national collaborating centres
- Funded by the Public Health Agency of Canada (PHAC) – at arm’s length
- Each is hosted by a different institution
- Each focuses on a different aspect of public health
The NCCs

- Environmental Health – BCCDC
- Aboriginal Health – Univ of Northern BC
- Infectious Diseases – International Centre for Infectious Diseases
- Methods & Tools – McMaster Univ
- Healthy Public Policy – Institut national de santé publique du Québec
- Determinants of Health – St. Francis Xavier Univ
Function

- Synthesizing, translating, & exchanging knowledge
- Identifying gaps in research & practice knowledge
- Building capacity through networks of practitioners, policy-makers, and researchers
NCCEH - Focus

- Health risks associated with the physical environment
- Evidence-based interventions to reduce those risks
Our Approach

- Defining the audience
- Listening to their needs
- Linking to what’s already available
- Partnering with researchers
- Providing quality products
- Getting feedback
Welcome to the National Collaborating Centre for Environmental Health (NCCEH) website—bringing together practitioners, policy-makers, and researchers for evidence-based practice and policy.

What’s New
- Presentations from our workshop on risk communication
- Presentations on: Specified risk material, Indoor air quality in First Nations and Inuit communities, Wind turbines and environmental assessment, and Barfenol-A
- Report on our major project on drinking water-related illnesses in Canada
- Small drinking water systems survey
- Health effects from mould exposure in indoor environments
- Presentations from our 2009 safe drinking water course - videos now available
- Contracted reviews on: Impact of pig farms on quality of life**, High burst positives and cardiovascular effects, Monitoring of environmental contaminants, Emerging zoonotic diseases
- Summer institute in knowledge synthesis, translation and exchange - presentations available

Environmental Health News
Stay informed with the latest news in environmental health.
- Traffic pollution may be to blame for miscarriages, say researchers
- Block that stench!
- Stress impact on male fertility
- Air pollution linked to early form of dementia
- Polluted air may give you a headache
- Green spaces ‘improve health’
- Mercury levels similar in autistic, normal kids
- Opportunity for Canada to act on climate change vanishing quickly
- Raising a stink over... The ‘BIG PIPE’
- Global warming: Four degrees of devastation...
Documents – Posted

- Health effects from mould in indoor environments
- Marijuana grow operations cleanup
- Effectiveness of home drinking water filters
- Cellular phone use & intracranial tumours
- Effectiveness of interventions during heat episodes
- Residential indoor radon testing
- Radon testing & remediation programs
Documents – Posted

• Effectiveness of interventions to reduce radon levels in homes
• Effectiveness of interventions to reduce UV exposures
• Cleanup of clandestine drug labs
• Conclusions of major reviews concerning environmental tobacco smoke (ETS) exposure
• Cleanup instructions for small mercury spills
• Polybrominated diphenyl ethers - What do we know
What We’re Doing

- Producing additional documents
- Offering secondments & practicums
- Conducting a major project on small drinking water systems
- Enhancing our website, e.g., a listing of recent journal articles
- Offering workshops on drinking water, risk communication, evidence-informed decision making
- Evaluating our work through an independent process
Mould and Health Effects
Objectives

• To identify:
  – Update state of knowledge about mould in indoor environments and health effects since the IOM’s Damp Indoor Spaces and Health (2004)
  – Recommendations for mould testing and remediation
What is mould?

- Eukaryotic, microscopic, spore-bearing (except yeasts)
- Separate phylogeny from plants and animals
- Grows in mat of intertwined filaments (hyphae)
- Relies on dead or decaying organic matter

What does mould need to grow?

- Food (organic matter)
- Right temperature (preferably 18-32°C)
- Water

Only component in indoors that can be controlled is water
What are the components of concern?

- Mycotoxins
- Spores
- Structural components
- Volatile organic compounds

How can I get exposed?

- Ingestion
- Dermal contact
- Inhalation

Photo: http://commons.wikimedia.org/wiki/File:Heart-and-lungs.jpg
What are they types of ascribed health effects?

- Systemic fungal infections
- Allergic reactions
- Irritant/non-allergic reactions
- Toxic effects

Photo: http://www.flickr.com/photos/hairopject/3947206219/

Photo: http://upload.wikimedia.org/wikipedia/commons/d/d3/Aspergillosis.jpg
Ascribed Health Effects

Range of health effects blamed on mould exposure:

- Lower, upper respiratory effects
- Asthma
- Respiratory tract disorders
- Pulmonary hemorrhage
- Neurological, reproductive, immune effects
- Cancer
Methodology for Reviewing Evidence for Health Effects

Looked at guidelines, position papers, reviews and metanalyses where most

• were written by subject area experts or were reviewed by a committee of experts in the field;
• critically evaluated the research that has been done in the field, taking into account limitations;
• were either endorsed by a professional or scientific body, or published in peer-reviewed journals.
## Key

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<tr>
<th>++</th>
<th>Sufficient evidence of a causal relationship</th>
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<td>Limited or suggestive evidence of an association</td>
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<td>Inadequate or insufficient evidence to determine whether an association exists</td>
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<td>Association not examined (blank)</td>
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## Evidence for Health Effects

<table>
<thead>
<tr>
<th>Study</th>
<th>Agent of Interest</th>
<th>Asthma symptoms</th>
<th>Asthma development</th>
<th>Allergy/hypersensitivity</th>
<th>Upper respiratory</th>
<th>Lower respiratory</th>
<th>General/toxic effects</th>
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<td>Curtis (2004)</td>
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<td>Douwes (2005)</td>
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*regarded IOM study as benchmark
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<td>Richardson et al., (2005)</td>
<td>Other agents incl mould</td>
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<td>NYC (2008)</td>
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<td>Bush (2008)</td>
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Summary of Evidence for Health Effects from Indoor Mould Exposure

- **Causal relationship**
  - None

- **Sufficient evidence for association**
  - Asthma symptoms (in asthmatics)
  - Upper respiratory symptoms (i.e., sore throat, conjunctivitis, allergic rhinitis, nasal symptoms)
  - Cough, wheeze
  - Hypersensitivity pneumonitis in susceptible people
Summary of Evidence Cont’d

• Limited or suggestive evidence for association
  – Lower respiratory tract symptoms in otherwise healthy children

• Inadequate or insufficient evidence for association
  – Asthma development (although more evidence is accumulating)
  – Other respiratory disease not mentioned above
  – GI tract problems
  – Skin symptoms
  – Non-occupational inhalation fevers
  – Neuropsychiatric symptoms
  – Cancer
  – Rheumatologic and other immune diseases
  – Reproductive effects
  – Acute idiopathic pulmonary hemorrhage in infants
How do you know if you have a mould problem?

Visual inspection most important
- Signs of water intrusion
- Building envelope
- Sometimes not visual

• Testing can supplement

AIHA “Green Book” – Recognition, Evaluation, and Control of Indoor Mold (2008)

Photo: http://images.google.ca/imgres?imgurl=http://coastalhomeinspections.org/mold_house.jpg&imgrefurl=http://coastalhomeinspections.org/services.html&usg=__e6NGopW6nTFTtN0FbMQU4yCLRE=&h=311&w=400&sz=46&hl=en&start=22&um=1&tbnid=kRd4U8blXAD_M:&tbnh=96&tbnw=124&prev=/images%3Fq%3Dmold%2Btesting%2Bphotos%26ndsp%3D20%26hl%3Den%26sa%3DN%26start%3D20%26um%3D1
What do you do if you have a mould problem?

• Remove source of water
• Remove/replace porous, semiporous materials
• Clean hard surfaces
• Many guidelines
  – NYCDOH, 1993, 2000
  – Health Canada, 1995
  – ACGIH, 1999
  – US EPA, 2001
  – AIHA, 2001

Photo courtesy of Terry Brennan,
http://www.epa.gov/mold/moldcourse/imagegallery7.html
Limitations

• Limited understanding of “dampness”
• Limited dampness and mould sampling and assessment methods
• Lack of knowledge of which mould or components in indoor air are problematic
• Lack of biomarkers for assessing exposure
• Reported health effects not standardized
• No dose-response curve established
• Other agents in damp environments can contribute to health effects
Conclusions

• Mould in indoor environments associated with asthma and upper respiratory effects
• Mould, as the identified agent, not proven to cause any health effects
• Mould growth in indoor environments should be remediated and moisture source stopped
Next Steps

• Based on previous feedback, the NCCEH is commissioning additional documents on
  – Mould Assessment
  – Mould Remediation

• Reviewing the evidence behind assessment recommendations and guidelines for remediation
Questions?

- contact@ncceh.ca
- mona.shum@bccdc.ca