Mould and dampness: the problem

- Health effects
  - Asthma exacerbation
  - Asthma/allergy causation (?)
  - Rhino-sinusitis
  - Respiratory infections
  - Hypersensitivity pneumonitis
  - Non-respiratory (skin infections, SBS, neuropsychiatric)

- Odour

- Building/material damage
**Issue**

- Consistent relationships between indicators of mould/damp and health outcomes BUT not between quantitative measures of mould and health outcomes

- No consensus on guideline value or threshold for acceptable levels of contamination (mould or damp) for health outcomes

- Any persistent indoor mould growth or excess dampness in buildings may cause problems and is a potential public health problem.
Solution

- Where possible, dampness and mould-related problems should be prevented and when they do occur they should be remediated.
- Primary prevention: building design and construction (beyond our scope)
- Secondary response: Identify and remediate problems as they occur and prevent further contamination
  - Dept Health Guidelines
Why develop guidelines?

- The Department receives many enquiries about mould contamination in public, government, commercial and residential buildings.
  - 10 - 12 phones calls per week during winter months

- Dept has a fact sheet only (webpage)

- Guidelines provide more in-depth detail of how to identify and remediate mould/dampness problems and prevent further contamination
  - Glorified fact sheet!
Who are they for?

- EHOs
  - More consistency in response to problem
  - But does not confer any greater regulatory powers

- Owners, landlords, and building managers of residential dwellings and public, government and commercial buildings

- Occupants of residential dwellings (home owners and tenants) and public, government and commercial buildings
Development of the Guidelines

- Literature review
  - Not extensive (there are many lit reviews)
    - Eg WHO Europe (2009 and 2010), various systematic reviews
- Review of existing national and international guidelines
  - WHO Europe 2009
  - USEPA
  - NIOSH
  - AIHA
  - IICRC
- Try to make it simple and relevant
Guidelines

- Assessment
- Remediation
- Prevention (of further problems)
- Special considerations
  - ‘Toxic’ mould
  - Surface and/or air sampling
  - Professional help
  - Unfit for habitation
Mould AND Dampness

- Moisture is the key component for mould growth

- Dampness (excess moisture), in the absence of visible mould, is a health risk factor
  - Allergens, bacteria, endotoxin, off-gassing from moisture damaged materials (chemical pollutants)

- Therefore, both mould and dampness need to be treated with the same amount of caution/concern
1. Assessment

- The aims of mould assessment are to
  - Determine the existence of the mould growth and/or dampness (Identification)
  - Assess the extent and nature of the problem (Evaluation)
  - Identify underlying causes (Source)
Identification

- Mostly from visual inspection*
  - Visible mould
  - Visible damp/water damage
  - Condensation/high humidity
  - Odour
  - Occupant illness consistent with mould/damp (very subjective and not a ‘sine qua non’)

- Appendix A
  - Checklist for visual inspection
  - NIOSH (US) document that can be modified

* People undertaking visual inspection should consider PPE
Special issue 1 - Sampling

- Mould (spores, biomarkers)
- Dampness (moisture metres)
- Not recommended to determine health risk or when action is needed
- May help in determining the extent of the problem, identify if there is hidden mould/damp, and post-remediation evaluation (if done pre-evaluation)
- At the discretion of building owner/mgr/occupant
- Needs to be conducted by trained professionals
Evaluation

- What is the extent of the problem
  - to determine the required remediation and risk management procedures

- Important factors
  - Size
  - Distribution (single site, disperse)
  - Chronicity
  - Type of material (porous/non porous)
  - Hidden mould
    - Evidence of mould/damp but no visible signs
Simple v complex

Simple

- It is new, isolated and visible.
- The size of mould contamination is no greater than $1\text{m}^2$.*
- When it is unlikely that the mould affects the HVAC system or building structure.
- When the causes of dampness/condensation can be easily identified and removed or corrected.
- Water incursion, if any, is not highly contaminated.
- When there are no other hazards involved (such as asbestos or toxic chemicals).

* Size is arbitrary but based on USEPA and WHO recommendations.
Complex

- Mould contamination is larger than 1 m$^2$ or is found in multiple rooms or places.
- Recurring and persistent mould or dampness.
- Mould growth is confirmed or suspected in the HVAC system.
- When the underlying causes are due to the faults in building design or structure and are difficult to repair.
- Where there is highly contaminated water incursion.
- When there are mouldy odours and/or unexplained illness associated with occupancy but no obvious visual signs of water or mould damage i.e. suspected hidden contamination.
- When other hazards are involved.)
Special issue 2 - Toxic mould

- A term used to describe moulds that produce mycotoxins
- Different health effects of different mould species

BUT

- Health effects associated with presence of mould/damp and not necessarily with number or type of species
- Hazards presented by moulds that may produce mycotoxins should be considered the same as other common moulds which can grow indoors
- Therefore, **all mould/damp** should be treated as potentially harmful and same precautions taken (remediation)
Source

- Obviously source has to be identified so that the problem does not return
- Sources include:
  - Water accumulation
    - Indoor spills/plumbing leaks
    - Outdoor sources (irrigation, rising damp, rainwater/floods)
  - Condensation/humidity
    - Poor building design
    - Ventilation
    - Occupant behaviour
      - Appendix B provides information for occupants to reduce moisture generating activities
Remediation

- Depends on complexity
- ↑ complexity will probably require professional help
- Guidelines provide advice for ‘in-house’ remediation
- Remediation of complex problems requiring professional help should be discussed with the professionals
  - We don’t tell them how to do their job!
Remediation – general principles

- Remove the mould
- Dry the area
- Fix the source

Precautions (for any remediation)
- PPE: mask (P2 or >), gloves, safety goggles
- Isolation of area: reduce contamination elsewhere
- Signage and communication
Remediation – DIY

- **Remove** mould
  - Scrubbing with soapy water*
    - Natural biocides (vinegar, alcohol, essential oils) can be used
    - Commercial products can be used (follow instructions)
  - Scrub beyond the visible contamination
  - Clear spores
    - Damp cloth
    - Vacuum with HEPA

* Soapy water as recommended by USEPA. No published data on effectiveness of natural or commercial biocides compared to soapy water

- Clean mouldy material (Appendix C)
- Remove/discard mouldy materials that cannot be cleaned
Remediation – DIY

- **Dry** any damp areas
  - Towels, dehumidifiers, fans (unless there are spores), natural ventilation

- **Fix** the source
  - Leaks/spills
  - Outdoor sources
  - Moisture generating activities (Appendix B)

* Could be easy but may require professional help
Special Issue 3 – Professional help

- Professional help may be required for assessment and/or remediation (inc fixing the source)

- Professional advice for assessment
  - Mould experts, IEQ experts, EHOs

- Professional advice for remediation
  - Mould remediators, IEQ practitioners
  - Technical/trades: eg plumbers, bldg engineers, HVAC engineers, builders

- We make no specific recommendations or endorsements, but

- provide some advice particularly regarding mould/IEQ expert
Prevention

- Secondary prevention
  - Prevent future contamination

- Advice to bldg owners/mgrs
  - Inspections (inc HVAC)
  - Indoor humidity/ventilation
  - Take action quickly (eg. repair water leaks/damage)

- Advice to occupants
  - Reduce moisture production activities
  - Adequate ventilation
  - Outdoor sources (eg drainage, irrigation)
  - Take action quickly
Currently there are no quantitative or qualitative exposure limits, for either mould or dampness that can be recommended to declare that a premise is unfit for habitation.

Therefore, status quo - ie EHO judgement (could be based on expert advice) whether level of mould considered nuisance and whether action is required.

However, as any mould/damp has the potential to be harmful we recommend that it should be remediated.