Growing at Home: Health and Safety Concerns for Personal Cannabis Cultivation

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2018
**The NCCEH Mandate: Knowledge Translation**

**Synthesize & exchange knowledge**
- Incorporate evidence from research and experience for the purpose of improving or developing policy/practice

**Identify gaps in knowledge**
- Catalyst for new research or application of research

**Build capacity**
- Provide tools, establish networks, foster partnerships

- **Target Audience:** MHOs, EHOs, PHIs, other EH practitioners
- **Disclosure statement:** The NCCEH does not have financial interest in the cannabis industry (nor does the speaker)
Framing Questions

1. What **environmental health hazards** are associated with cannabis cultivation, processing, or use?

2. How will legalization affect the **extent**, **scale**, and **conditions** under which cannabis is cultivated (commercial and personal)?

3. What measures can be implemented to **reduce exposures in all phases**?
Scope

- Access & Accidental Poisoning
- Indoor Air Quality
- Pesticides
- Electrical and Fire
- Radiation
When you need to present health effects info

- From the National Academies of Sciences, Engineering and Medicine (NASEM, 2017)

- **Strength of evidence approach:** rates health evidence as insufficient, limited, moderate, substantial, or conclusive.

- Allows us to present health information *in context* – avoid reefer hysteria!

- On the NCCEH Cannabis Page
Extent, Scale, and Conditions of Cannabis Cultivation

• Commercial operations:
  – Medium to large scale
  – Currently 67 active licenses for medical growers
  – Subject to inspection and (sporadic) testing

• Personal cultivation:
  – Up to 4 budding plants, < 100 cm tall
  – Extremely difficult to regulate (CACP)
    • Likelihood of overproduction high, but ability to enforce the Act very problematic.¹
  – Limited guidance on how to grow/process/dispose safely
  – Illegal (hazardous) grow-ops are not going away!
Access & Accidental Poisoning

- Presence of cannabis plants, products and waste, increases risk of inadvertent consumption
- A lack of in-home possession limit → accumulation of significant quantities of cannabis
- Poison control data: ingestion of cannabis resin (e.g. hashish) was more common than edibles, and there were many cases of intoxication due to ingesting a waste product
Access and Poisoning: Policy Considerations

- Promote safe practices for cannabis plants, products, and waste at home
- Promote and capacitate poison control centres
- Surveillance for cannabis poisoning
- Making provisions for waste disposal
Indoor Air Quality: Humidity and Mould

- Young plants need high humidity (70 to 40%)
- Mature plants produce moisture
  - 432 g H$_2$O per day
- Growers may try to seal the premises for moisture, temperature, or odor control
- Most Canadian homes are winterized with relatively low ventilation rates
- Even a few plants can increase moisture burden
Indoor Air Quality: Cannabis-related odours

• Derive from a complex mixture of volatile compounds (terpenes and terpenoids)
• Odours increase with flowering and may intensify during drying
• No evidence to suggest that cannabis odours are detrimental to human health
• Can be argued that the odour itself impacts well-being through annoyance, disruption, and stress
Indoor Air Quality: Carbon Monoxide

• CO$_2$ enrichment (1200-1500 ppm) promotes plant growth and increases yield.

• Can be achieved by:
  – CO$_2$ generators
  – Compressed CO$_2$ in cylinders
  – Installing ignition devices,
  – Venting furnace *into* home
Indoor Air Quality: Policy Considerations

- Limit plant numbers
- Grow outside of the home
- Consider the use of indoor air cleaners
- Discourage the use of ignition devices indoors
Pest Management in Cannabis Cultivation

• **Key Issue #1:** Cultivation conditions can make cannabis susceptible to pests, which can wipe out a whole crop ($$$)
  – Strong financial incentive to use more potent options

• **Key Issue #2:** Cannabis is prohibited, therefore no EPA-registered pesticides
  – No guidance on what pesticides may or may not be appropriate
Pesticides for Cannabis in Canada

- Regulated at the federal level by Health Canada and Pest Management Regulatory Agency (PMRA)
- Currently **20 pesticides** registered for use on medical cannabis
- Mix of oils, salts, detergents, and “biologicals”
- However, strong incentive to use more potent “synthetics” exists
Pesticides: Policy Considerations

- Growing outside
- Identification and promotion of low-risk products
- Develop cannabis-specific pesticide guidance
Electrical and Fire Hazards

- Electrical hazards related to improperly used/installed equipment and/or tampering with electrical supply

- Fire hazards related to:
  - Lighting requirements
  - Overloads
  - During an actual fire (compressed gas, fertilizers/pesticides, obstacles)
Solvent Extraction

- Solvents are used to extract the cannabinoids, after which solvent is purged by heating.
- Produces concentrates (30-90% THC)
- Risk of fires of explosions
- US legalization: ↑↑↑ explosions, 100+ burns, 3 deaths\(^\text{12}\)
- Processing cannabis using organic solvents prohibited under proposed *Cannabis Act*

Electrical and Fire Hazards: Policy Considerations

- Regulate the sale of equipment
- Encourage the use of lower-risk equipment
- Interventions for hash oil production
  - Limit or restrict materials necessary for hash oil production
  - Increasing penalties
  - Legalizing commercial concentrates
- Promote less hazardous methods
Radiation Hazard: All the UV!

• “Grow lamps” produce UV necessary for photosynthesis; growers try to enhance UVB to increase THC content.

• Chmielinski et al., University of Washington School of Public Health (poster at AIHA 2017)\textsuperscript{10}
  – Higher intensity in nurseries vs. in vegetative growth rooms
  – Working for \textbf{8 hours} in the nursery would cause a worker to exceed the threshold limit value (TLV) for UV by about \textbf{9 fold}!

• Lieberman et al. 2017 → what personal protective equipment should workers be using?
Radiation Hazard: All the UV!

Radiation Hazard: Policy Considerations

• Encourage the public to limit UV exposure
  – Read and obey manufacturer’s recommendations on safe use of UV-emitting products

• Educate on other lighting options (LED)
Public Risk Messaging

- Proactive and focused risk messaging is critical
- Enforcement will be challenging, even after regulations and guidelines developed
- Education campaigns and public discourse essential

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<tr>
<th>Environmental Health Risks</th>
<th>Recommendations for Public Risk Messaging</th>
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| **Accidental Poisoning**                    | • Treat all cannabis products as hazardous to children and pets, even those not considered particularly appealing (e.g., unfinished joints).  
• Create a dedicated grow space with controlled access (i.e., strong locks and other safeguards such as an alarm).  
• Label cannabis products and keep them in a locked cupboard or container.  
• Keep information for the local poison control centres on hand for immediate, anonymous assistance with suspected cannabis intoxication. |
| **Indoor Air Quality**                      | • Scale production according to the home’s ventilation capacity, occupants’ sensitivity to indoor mould (i.e., presence of asthmatics), and ability to control odour.  
• Control humidity by assessing and reducing indoor moisture sources, restricting cultivation to a humidity-controlled (ventilated) room or apparatus, and using a dehumidifier as required. Monitor relative humidity using an inexpensive hygrometer.  
• Be vigilant for signs of dampness or mould and consult professionals as needed.  
• Dispose of mould-infested plants safely and quickly.  
• Consider non-ignition methods of CO₂ enrichment.  
• Equip all homes with a CO detector, a proven life-saving intervention, particularly homes with a fuel-burning appliance (regardless of whether cannabis is cultivated). |
| **Pesticides**                              | • Create good production practices as the first line of defence against pests.  
• Limit pesticide use and avoid non-PMRA-approved pesticides.  
• Follow Health Canada’s general guidance on safe use of pesticides indoors.  
• Include general advice on pest control and promote least-risky-means first in cannabis safety kits. |
| **Electrical and Fire Hazards**             | • Legal home grows remain subject to building, electrical, and fire codes.  
• Growers may wish to consider high-efficiency, low-power LED lights intended for cannabis cultivation.  
• Always follow safety and installation instructions or hire certified installers for new equipment.  
• Be aware of the dangers (and legal consequences) of using organic solvents in cannabis processing. |
| **Radiation Hazards**                        | • Limit UV exposure by turning off UV-emitting lights while in the grow space, or keep skin covered and eyes protected. |
Indoor Air Quality – Risk Messages

• Scale production according to ventilation capacity, sensitivity to mould, and ability to control odour
• Control humidity
• Be vigilant for signs of dampness or mould and consult professionals as needed
• Dispose of mould-infested plants safely and quickly
• Consider non-ignition methods of CO$_2$ enrichment
• Equip all homes with a CO detector
What can we do to reduce EH risks?

• Evidence-based policy
  → Extent, scale, and persistence
• Health surveillance (poison control data)
• Knowledge translation and public education
  • Incentivise safe practices
  • Cannabis safety kits
• Leverage cannabis interest to other public health risks
• Gear up for edibles (2019)!
References

References


Thank you!

For more information, please visit the NCCEH Cannabis Topic Page, or reach out!

Growing At Home: Health and Safety Concerns for Personal Cannabis Cultivation can be found at: http://bit.ly/2TPdR17

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Multiple versions of this presentation were given to various stakeholder groups, including regional CIPHI branches, FNHA, and CPHA between May 2018 and March 2019.

Production of this document has been made possible through a financial contribution from the Public Health Agency of Canada.