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

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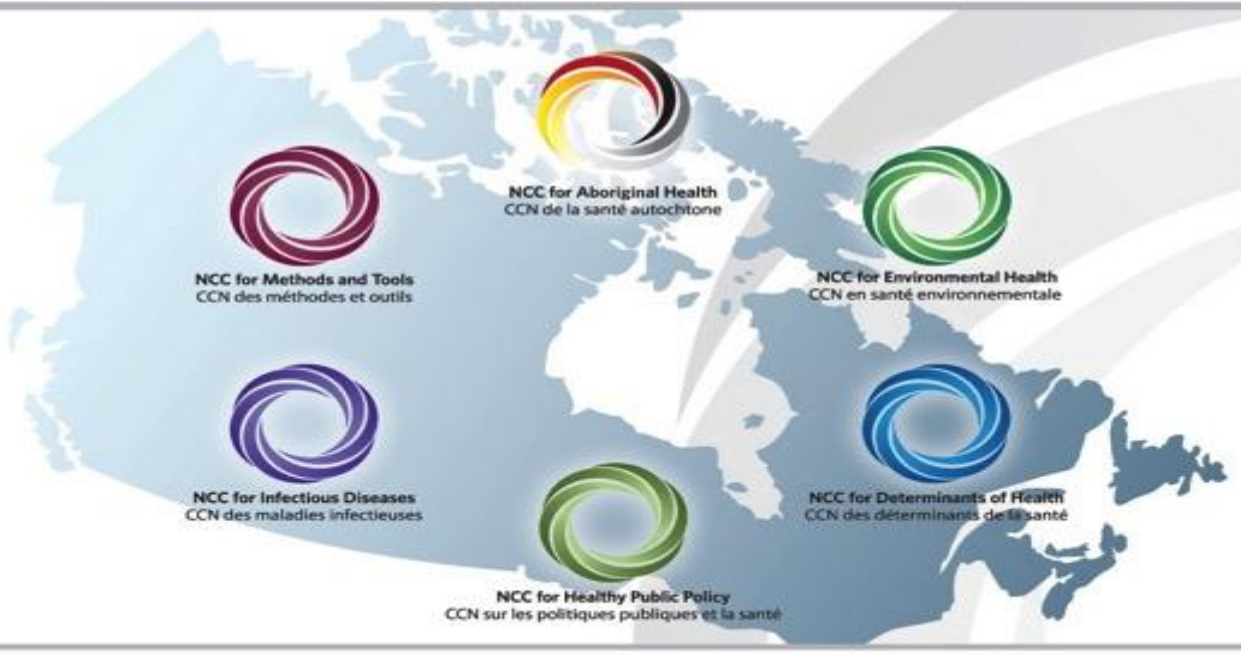

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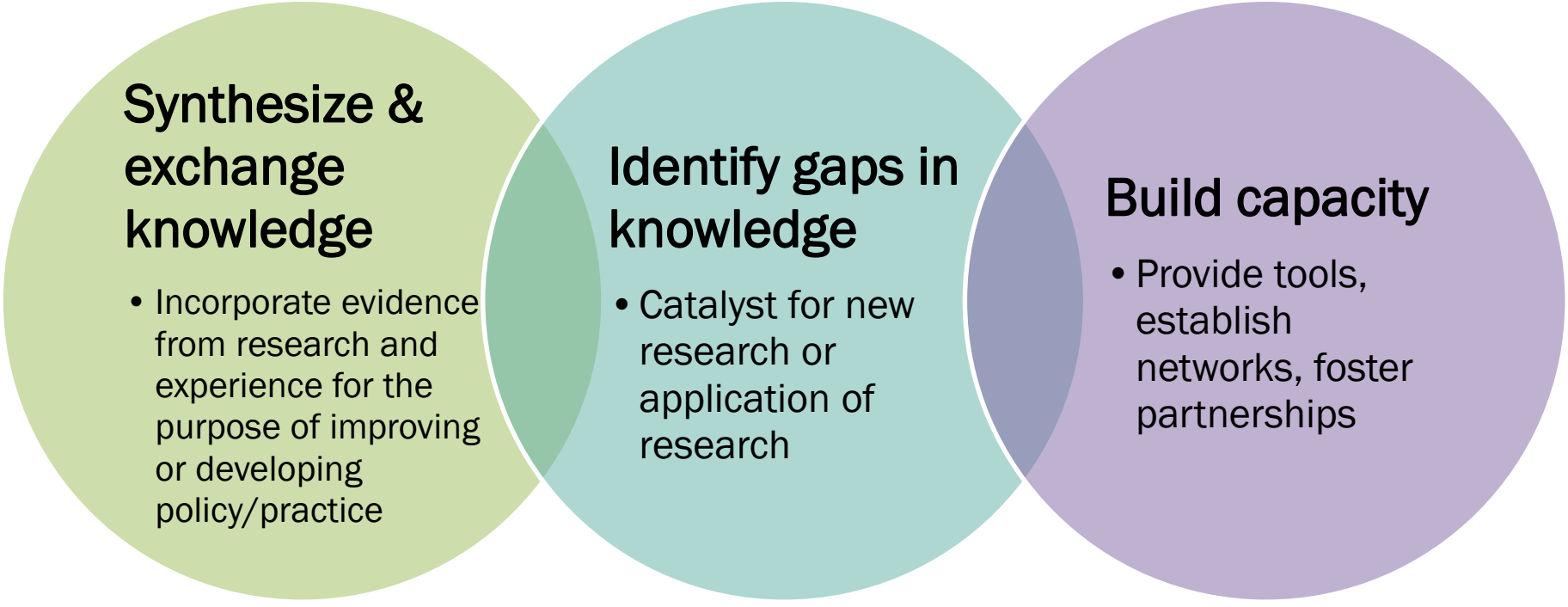
The NCCEH Mandate: Knowledge Translation

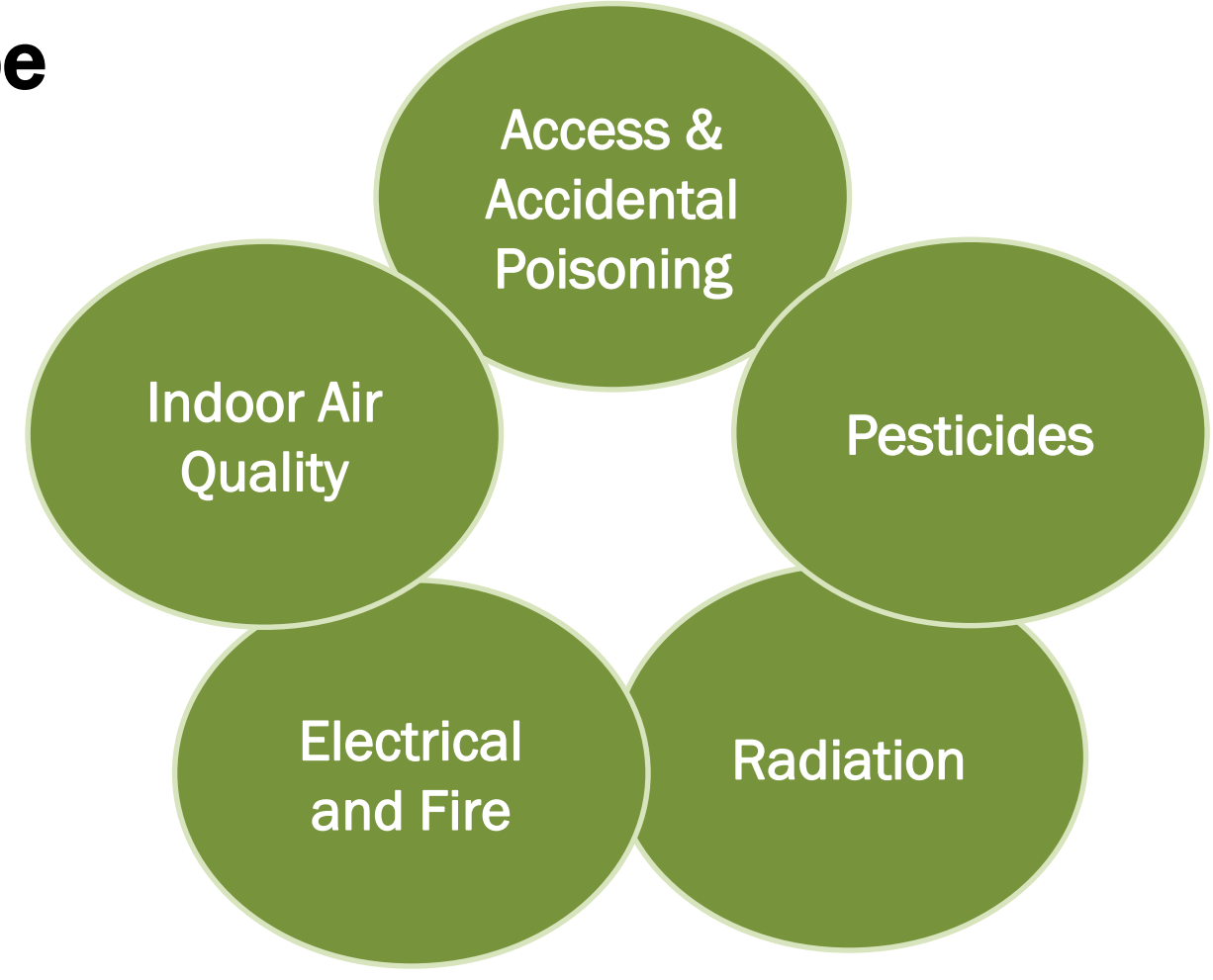


- **Target Audience:** MHOs, EHOs, PHIs, other EH practitioners
- **Disclosure statement:** The NCCEH does not have financial interest in the cannabis industry (nor does the speaker)

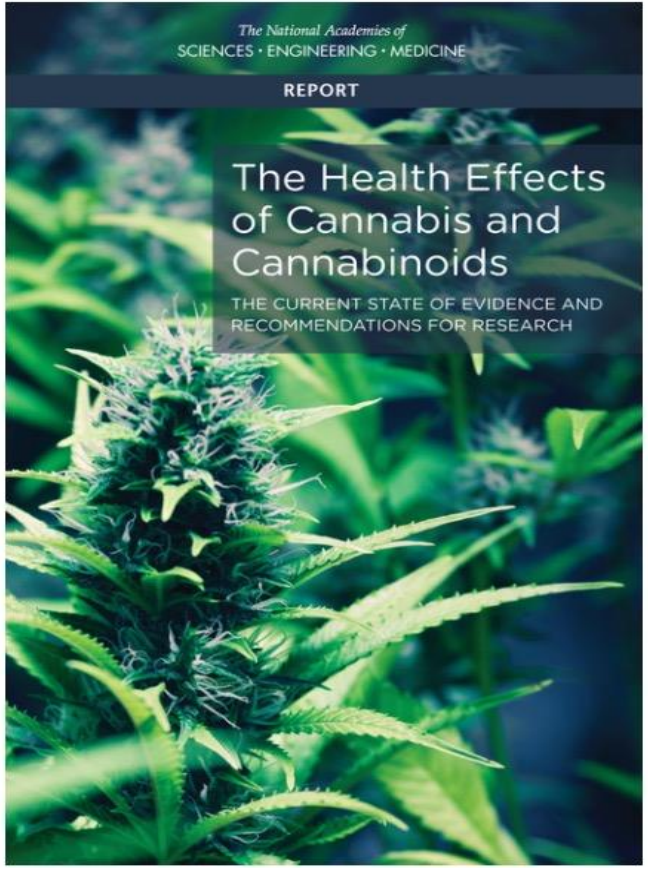
Framing Questions

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_2O per day[3]
- 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

} CO

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[12]
- **Processing cannabis using organic solvents prohibited under proposed *Cannabis Act***

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Photo source: http://s.newsweek.com/sites/www.newsweek.com/files/2015/01/19/hashoilexplosion.jpg

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.
- Chmielinksi et al., University of Washington School of Public Health (poster at AIHA 2017)[10]
  - Higher intensity in nurseries vs. in vegetative growth rooms
  - Working for **8 hours** in the nursery would cause a worker to exceed the threshold limit value (TLV) for UV by about **9 fold**!
- Lieberman et al. 2017 → what personal protective equipment should workers be using?

Radiation Hazard: All the UV!

Photo source: https://ca.news.yahoo.com/blogs/dailybrew/ottawas-new-medical-pot-rules-face-legal-171213387.html

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

Environmental Health Risks	Recommendations for Public Risk Messaging
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).[70] • 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 [16] 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, 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.[39] • 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)!

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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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