Ensuring Healthy Homes for British Columbians:

Toward a Provincial Standard for the Remediation of Residential Properties Used in Drug Production

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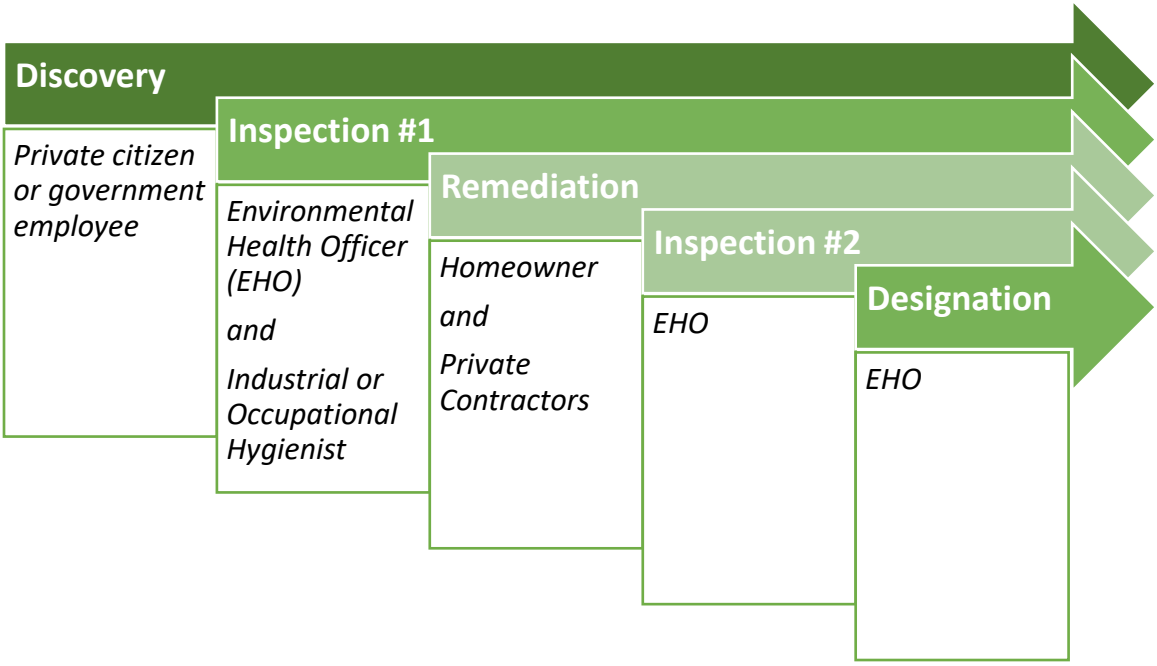
Executive Summary

Research has documented the prevalence of synthetic drug laboratories among residential properties in British Columbia (Diplock, Kirkland, Malm & Plecas, 2005; Diplock & Brar, 2015), and the implementation of the *Cannabis Act* in 2018 creates potential for an increase in homes used in cannabis drug production. Considering the unique harms inflicted upon homes used in the production of cannabis and synthetic drugs, a structured remediation process is essential to ensure such properties are effectively reintroduced into the housing market. The Province of British Columbia (B.C.) does not currently have a policy framework that dictates a specific remediation process, instead leaving this to the jurisdiction of individual municipalities. While individual policies may exist in specific jurisdictions, it is suggested that the existing patchwork approach is insufficient to guarantee healthy homes for municipalities and that a cohesive provincial approach would be an effective solution.

This report draws upon existing literature outlining the impact of drug production on residential properties, as well as existing federal and provincial policy, to identify a standard definition of a healthy home that does not depend on the legality of a drug production operation. This definition is used as a foundation to propose a standardized remediation process that ultimately results in a healthy home that is safe for occupancy and reintroduction onto the housing market. The proposed remediation process takes a public health perspective and considers the policy and legislative structure in B.C., as well as identifies roles and responsibilities for various stakeholders. The proposed process, outlined in the Figure below, includes the following steps: Discovery, Inspection #1, Remediation, Inspection #2, and Designation (DIRID).



It is suggested that the initial inspection and subsequent Orders be issued by a regional environmental health officer under the authority of the B.C. *Public Health Act*, that air quality and specific remediation requirements be the responsibility of certified experts, including Certified Industrial Hygienists or occupational hygienists, and that remediation work itself be carried out by contractors. Further, it is suggested that under Inspection #2 it would be the responsibility of the environmental health officer to designate a home as fully remediated.

It is proposed that further development of the healthy home definition and standards, as well as the standards and processes required as part of the DIRID process, come under the provincial Ministry of Health. It is believed that this process, or one similar to it, would facilitate a holistic provincial response and ensure the safety and health of residences and their occupants in the Province of British Columbia.

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Introduction

Existing literature documents the prevalence of residential drug production across the Province of British Columbia (B.C). Between 2003 and 2005, law enforcement officers discovered 19 residential synthetic drug laboratories in the province (Diplock et al., 2005), and in 2010 it was estimated that there were between 13,200 and 18,500 illegal grow operations across B.C. (Diplock & Brar, 2015). Moreover, Health Canada suggests that as of May 1, 2017, at least 4,480 Canadians hold permits enabling them to grow a varying number of plants within their residences for medicinal purposes (Brown, 2017).

It is anticipated that the federal government will implement the *Cannabis Act* in mid-2018 (Government of Canada, 2017). Along with other recommendations contained within this Act, the federal government has proposed that Canadian citizens be permitted to legally grow up to four cannabis plants in their residence for personal use. While federal, provincial, and territorial governments will assume a shared responsibility for the implementation of the *Cannabis Act*, the regulation and policy related to the growth of cannabis at home, as well as other specifics of the Act, will be left to the responsibility of the provinces and territories to determine (Government of Canada, 2017).

While a threshold at which the damage becomes detrimental has yet to be clearly established, the existing research suggests that the impact of housing a cannabis grow operation or clandestine lab inside a residential home can be substantial. Homes used for residential grow operations may be impacted by structural changes, electrical tampering, chemicals used to facilitate drug production, significant mould growth, and higher-than-average carbon dioxide levels (Garis & Clare, 2013a, 2013b). Compounding the problem, the available literature suggests that illegal cannabis grow operations in British Columbia have increased in complexity

and sophistication since the early 2000s, which has allowed for larger, and more successful cannabis grow operations (Plecas, Diplock & Garis, 2012). This is consistent with statistics from the Royal Canadian Mounted Police (RCMP), which indicate that the average cannabis grow operation in British Columbia consists of 740 plants, the third largest average grow-op size in Canada only behind Alberta (917 plants) and Quebec (905 plants) (RCMP, 2014).

While clandestine or synthetic drug production laboratories may be smaller in physical scale and less prevalent in B.C. than cannabis grow operations, they pose significant risks due to the chemicals used to produce the drugs. Research has identified that residential buildings used for synthetic drug laboratories pose health risks to residents (Barn et al., 2012; McCormick, Plecas, & Cohen, 2007; Garis & Clare, 2013b).

In addition to drug operations' impact on the 'health' of a residence, homes that have housed drug operations can also be affected by the stigma associated with drug manufacturing. Such stigma has the potential to devalue properties, thereby affecting the greater housing market and economy. Further, mortgage companies may be hesitant to provide mortgages for these high-risk homes, and homeowners can experience challenges with securing insurance (Canadian Real Estate Association, 2004) or making claims due to the increased risks associated with former residential drug operations, and may risk voiding their home warranty (Garis & Clare, 2013b). Given the physical and economic impact of a drug operation on residential properties, it is imperative that standards are in place to address these risks and restore residences to both a liveable and sellable state.

Identification of these challenges led the Province of Alberta to task the Alberta Urban Municipalities Association (AUMA) with prioritizing the recommendations posed in the Grow Op Free Alberta Final Recommendations Report (Fraser, 2014), which culminated in a

subsequent report recommending the development of a standardized remediation process (AUMA, 2015). Alberta is currently the only province to have a consistent provincial approach to remediating homes used in drug production, the responsibility for which lies with the Environmental Public Health division of Alberta Health Services (L. Navratil, personal communication, January 17, 2018). Along with the remainder of provinces and territories, B.C. lacks a provincial standardized process for remediating former drug residences, leaving many municipalities to adopt individualized bylaws to respond to this issue.

Further, the absence of a clear and actionable provincial standard as to what constitutes a 'healthy' home leaves the standards to the discretion of local governments and/or individual remediation companies. The use of discretion offers no guarantee about the degree of remediation processes, thus creating insecurities for future homeowners, renters, banks and mortgage brokers, and insurance companies. These consequences are of significant impact to the physical and economic health of British Columbians.

Purpose and Scope

A significant quantity of literature from B.C. documents the need for a standardized remediation process for the Province; pleas have been made by the B.C. Chamber of Commerce (2012), the B.C. Real Estate Association (2017), and professionals and academics conducting research in the field (Garis, 2010; Garis & Clare, 2013a). Current remediation processes and procedures in B.C. are scarce and differ across municipalities (Garis, 2010; Garis & Clare, 2013b), resulting in inefficiencies and inconsistencies that cause confusion for stakeholders, including bylaw officers, firefighters, police officers, homeowners and residents, real estate agents, and contractors.

A standardized remediation process would seek to restore houses used in drug production according to a minimum set of criteria, here referred to as the criteria for a 'healthy home'[1]. This report proposes a policy framework for the remediation of properties used for drug production that rests on a standardized definition of a 'healthy' home and a public health approach. As will be outlined throughout this report, the main goal of this process is to describe a remediation process from discovery to a declaration stage whereby fully remediated homes would be designated healthy homes and safe for re-occupancy. This report outlines ways this procedure can fit within existing policies, roles, and responsibilities within the provincial and municipal government structure, as well as calls for policy in the areas where gaps have been identified. Ideally, a standardized remediation process, such as the one suggested in this report, would be consistently applied across municipalities and jurisdictions throughout British Columbia, ensuring efficiency and clarity for all stakeholders involved in the treatment of former drug production residences.

This report is specifically focused on residential drug operations. Commercial operations are subject to federal regulations and have a clearly identified five stage application and licensing process (AUMA, 2015). Further, under Section 23 of the Federal Government's *Access to Cannabis for Medical Purposes Regulations* (2016), commercial operations are prohibited from occurring in 'a dwelling place'; therefore, they are considered outside the scope of this report.

Methodology

For the purpose of this report, relevant legislation and literature was reviewed. Additionally, ten interviews were conducted with stakeholders from the following sectors:

[1] Criteria for determining a 'healthy home' is discussed later in this report.

police, fire, bylaws, remediation assessment, indoor air quality remediation, provincial health services, provincial Ministry of Environment and Climate Change Strategy and municipal planning and development. Qualitative data from these interviews was grouped into themes for consideration in this report. Finally, recommendations were developed from an analysis of the research and literature, current legislation, and qualitative interview data.

Definitions

To provide clarity to the suggested remediation process, definitions for what constitutes a residential drug operation and what defines a healthy home are required. The definition of what constitutes a residential drug operation will be crucial in identifying when a remediation process is triggered. Further, an accurate definition for a 'healthy home' is essential to the efficiency of a standardized remediation process so that participants have a standard against which they can measure the progress of the remediation process. This definition should also assist in determining whether a home is ready for re-occupancy. These concepts are explored below.

Defining a Residential Drug Operation/Identifying Remediation Triggers

In order to effectively implement a property remediation process, it is crucial to identify a baseline for which the remediation process is triggered. This report is not intended to provide an exhaustive list of criteria, but rather identify common patterns of risk factors present in residential drug operations. Further, it is suggested here that the risks posed by a residential drug operation do not hinge on the legality of the operation, but rather the way in which the drugs are produced.

While clandestine drug laboratories and the production of synthetic drugs are inherently harmful due to the use of chemicals and unsafe practices, it is acknowledged that the process of cannabis growing can also be done naturally in a manner that is unlikely to have such a significant environmental impact on a residence or its occupants. To this point, however, Surrey Fire Chief Len Garis prepared a comprehensive report for the Department of Justice Canada that addressed some of the risks posed by legal drug operations. He identified that, 'licensed [marijuana grow operations (MGOs)] displayed a similar array of safety and health risks as illicit MGOs. In some cases, the risks in medical MGOs were even more severe than their illegal counterparts, in particular, structural and chemical hazards' (p. 5). This is further supported by anecdotal information from Royal Canadian Mounted Police (RCMP) Corporal (Cpl.) Shane Holmquist, who worked on the B.C. Coordinated Marijuana Enforcement Team between 2011-2016. Cpl. Holmquist identified that, in his experience, the structural and environmental changes associated with large-scale and optimized drug production are what had the potential for the most significant damage to a residential home (personal communication, December 15, 2017). In a 2011 report to the Fraser Valley Real Estate Board, Garis and Clare also addressed that the risks posed by a residential drug operation are not restricted to illegal operations, but that the issue lies with any drug operation that causes damage to a residence that could, in turn, be a risk to future occupants.

Given this, **it is suggested that a definition of a residential drug operation for the purposes of triggering a remediation process is not based on the legality of the operation**. However, specific to cannabis grow operations, there is an absence of research that addresses the quantity of plants at which point the operation begins to pose a risk to a residence. In its report, A Framework for the Legalization and Regulation of Cannabis in Canada, the Government of

Canada specifies that the recommendations made in the report, including the four-plant allowance, take a public health approach intended to minimize harms (2017). However, the report does not discuss the rationale used to develop the four-plant allowance, and there is no discussion of the potential impact of more than four plants on a residential property. Further, Johnson and Miller (2011) found that the ability of a house to tolerate moisture related to cannabis growth depended, in part, on the size of the residence and the existing ventilation capacity.

Given the lack of available research around the number of plants that would trigger the remediation process, and the variance in the housing environments in which these grow operations are conducted, it is unreasonable to define a set number of plants that would trigger the process. Instead, it is proposed here that the trigger for remediation processes be based on the presence of certain structural alterations and/or the presence of specialized equipment intended to optimize drug production. Research indicates some common elements include: electrical changes and by-passes, chemicals, pesticides, fertilizers, and drug 'cooking' equipment, among others (Plecas, Diplock, & Garis, 2009). While a review of research does not explicitly identify this, it is suggested here that this equipment, which is typically intended to facilitate large-scale production, is responsible for the significant damage caused to residential homes.

It is acknowledged that it is possible that damage can occur to residential properties through the occupant's use of equipment designed to produce non-drug related materials, including the use of hydroponic equipment to support vegetable growing. Given the added potential for homes to be 'unhealthy' as a result of the specific practices utilized in the production of drugs, however, this policy is intended to specifically address residential properties where drugs have been produced.

For the purposes of this report, then, a residential drug operation that would trigger the remediation process is defined as the production of drugs, including but not limited to cannabis and synthetic drugs, in a residential property that may involve some element of modification intended to optimize drug production. While a more precise and evidence-based list will need to be established with additional future research, the following list provides a framework of indicators that could trigger a remediation inspection:

> a) modifications made to the home to facilitate the growth or production of drugs;
>
> b) the use of certain chemicals or fertilizers designed to enhance the growth of plants beyond what is typically expected for a personal cannabis grow operation or which are used to facilitate illicit drug production;[2]
>
> c) the absence of tools or instruments designed to mitigate the impact of drug production;[3]
>
> d) readings in excess of the defined exposure limits on air contaminants, including CO, CO_2, NOx, and mould, as outlined in the healthy home definition, below; or
>
> e) readings in excess of the defined pesticide surface residue limits, as outlined in the healthy home definition, below.

This list of criteria is intended to preliminarily identify some minimum standards by which a remediation process may be triggered. As more becomes known about the harms inflicted upon a healthy home as a result of drug production, other quantifiable health hazards related to the production of drugs should be added to this threshold. Methods of discovery are discussed later in this report.

[2] A full list of chemicals or fertilizers should be developed to accompany this definition. At present, the researchers have identified a partial list of such chemicals and fertilizers, as discussed in the following section of the report.
[3] This may include, for example, a fumigator or fan. A full list of tools and instruments should be developed to accompany this definition.

Defining a Healthy Home

As discussed above, an accurate definition of a healthy home should form the baseline against which all remediation standards are judged. An adequately remediated home would be fit for occupancy and could be effectively reintroduced into the real estate market, having mitigated the risks and harms posed by housing a drug operation. An extended discussion of the criteria required for a home to be considered healthy is outlined below. Of note, the bulk of the literature on the dangers posed by residential drug production is based on illegal cannabis and synthetic drug production. These risks may not all be present in legal residential cannabis grow operations; but this baseline of potential hazards can be used to identify whether a legal grow operation poses a health risk to occupants and requires remediation prior to safe re-occupancy.

Hazards associated with homes used in drug production. Examining the hazards associated with the production of drugs in residential homes assists in identifying factors that should be assessed during a remediation process, and in turn helps to identify elements essential to an appropriate definition of a healthy home. While some factors discussed below are unique to either cannabis or synthetic drug production, others are likely to be present in any form of residential drug production.

Carbon dioxide (CO_2). To speed up the growth of cannabis plants, residential cannabis grow operations may seek to enhance the carbon dioxide (CO_2) concentration in the environment. This process depletes oxygen in the atmosphere, which increases the risk of explosions and poses a significant hazard for individuals occupying the space without an oxygen breathing apparatus (Gustin, 2010). A study conducted in the United States (U.S.) analyzed 30 cannabis grow operations and found that the CO_2 levels ranged from between 400 parts per million (ppm) to 1400ppm. Toxic levels of CO2 in the U.S. were established as 5000ppm,

however, and the observed CO_2 levels in the sample of grow operations were deemed non-hazardous (Martyny, Serrano, Schaeffer, & Van Dyke, 2013). Nonetheless, concern lies with the harmful air pollutants that are freed into the atmosphere when grow operations release fossil fuel combustion sources. While the CO^2 concentration alone may not be considered hazardous, this process also builds up levels of carbon monoxide (CO) and nitrogen oxides (NOx), which poses another significant health hazard (Martyny et al., 2013).

Chemicals. Chemical residue from synthetic drug laboratories also pose a significant risk to health of residences. Chemicals commonly found in synthetic drug laboratories in B.C. include acetone, hydrochloric acid, and red phosphorous (Diplock et al., 2005). As highlighted by Barn, Wiens, and Dods (2012), the vapours produced by synthetic drug production have a high potential to contaminate surfaces. In one sample, Barn et al. (2012) found chemical residue on a child's training toilet seat, located three stories above the basement where the drug production had taken place.

While inhalation of vapours from a detected synthetic drug laboratory poses health risks to first responders, the 'cooking of chemicals' produces fumes that can be absorbed into the porous walls of a residence (McCormick et al., 2007). Further, oral and dermal contact poses a significant health risk to current or future occupants of a residence (Barn et al., 2012).

Other chemical hazards, such as the use of pesticides and fertilizers, also pose a significant risk when dealing with homes that have been used specifically for cannabis production. A recent study estimated the extent of pesticide contamination inside 139 B.C. residential homes that had been used as cannabis grow operations (Blair & Wedmen, 2009) and found that permethrin, an insecticide, was the most commonly found pesticide in these homes. The study calculated proposed safe levels of any pesticide that was found in two or more of the

former grow operations based on the acceptable daily intake (ADI) as determined by the World Health Organization. While the tested level of permethrin was below the proposed safe levels, the study suggests that it may be common to find elevated levels of these pesticides in residential cannabis grow operations.

Mould. Perhaps of greatest concern in terms of damage done to homes used in drug production is the build-up of mould and moisture issues. As highlighted by Martyny et al. (2013) and Garis (2010), excessive mould growth is likely to occur in homes used for drug production due to the heightened temperature and humidity levels inside these residences. Mould build-up is known to cause damage to building structures and presents significant health concerns (Martyny et al., 2013). One study found that, while the maximum tolerable number of cannabis plants depended on the house volume and air change rate, the mechanical ventilation capacity of Canadian homes built after 1980 was largely incapable of handling excess moisture produced by residential cannabis grow operations (Johnson & Miller, 2011). The Canada Mortgage and Housing Corporation recommended that a combined infiltration and mechanical ventilation for a residential dwelling is 0.3 air changes per hour ($ac \cdot h^{-1}$), assuming reasonable occupancy (2008). Johnson and Miller (2011) analyzed ventilation capacity data and concluded that the number of plants that could be grown in a residence depended, in part, on the starting ventilation capacity of a residence, as well as the size of the residence. However, the authors noted that, based on their data, at least one-third of Canadian households could not tolerate the additional water vapour released by the growth and drying of cannabis plants (Johnson & Miller, 2011). Given this, ventilation capacity should be considered when remediating homes.

According to Martyny et al. (2013), there are no specific levels that indicate acceptable levels of mould exposure in the U.S., but generally speaking, inside mould counts in excess of

ten times the outside level of mould species are considered harmful to humans, especially to children and sensitive individuals. The research conducted by Martyny et al. (2013) also found that growing cannabis indoors resulted in a major shift between inside and outside mould species (2013). Mould species observed indoors were primarily composed of penicillium, a type of fungi, *Penicillium*, which is known to be significantly hazardous. These findings are consistent with findings from Canadian researchers Johnson and Miller (2011), who also discovered the presence of penicillium species inside mould samples taken from cannabis grow operations. Elevated mould levels inside residential homes pose a significant health concern, as they have been linked to pulmonary illnesses like asthma, lung inflammation, and chronic lung disease, or may trigger allergic reactions (Government of Canada, 2012; Johnson & Miller, 2011; Manitoba Department of Labour & Immigration, 2001; Martyny et al., 2013).

Electrical and fire risk. Residential drug operations often carry an increased risk of electrocution. It is common for cannabis grow operators to illegally bypass electrical meters and direct ductwork into toilets to avoid high levels of electricity usage or strong odours, both of which may otherwise increase the risk of detection (Gustin, 2010). These processes increase the chance of electrocution for occupants and first responders due to modifications including exposed connections, electrical wiring, and unsafe electrical panels. Further, an increased fire risk is often the result of non-compliant electrical work (Plecas, Malm, & Kinney, 2005). This is substantiated by research that found cannabis grow operations in British Columbia are 24 times more likely to experience a fire than a typical residential home (Plecas et al., 2005), in part due to the risk posed by electrical bypasses (Plecas et al., 2009). Moreover, fires that occur inside marijuana grow operations are more likely to grow quickly out of control (Garis, 2010; Gustin, 2010). Cannabis grow operations are often well-insulated to ensure heat is not unnecessarily lost

(Gustin, 2010), and the level of warmth may result in an environment conducive to an increased fire risk. Further, overhead insulation may inhibit detection of fires in the attic, increasing the likelihood of a fire that causes significant damage to a residence. With respect to synthetic drug production, chemicals used in this process are often toxic, corrosive, or flammable, and the process of mixing these chemicals to produce drugs causes an increased fire risk (McCormick et al., 2007).

Existing provincial and federal policy and guidelines. Given the above issues with homes used in drug production, a definition of a healthy home should include exposure limits on air contaminants including CO, CO_2, and NOx, as well as address acceptable levels of pesticides, mould, and requirements for air ventilation.

Some Provincial and Federal policy and guidelines exist regarding the above risks associated with homes used in drug production. Long-term exposure rates are considered the best standard for a healthy home definition as a healthy home, necessarily, needs to be fit for occupancy. The Health Canada Residential Air Quality Guideline for Carbon Monoxide (2010) recommends that long-term exposure (24+ hours) to CO not exceed 11.5 milligrams per cubic metre (mg/m^3). A similar report for Nitrogen Dioxide suggests long-term exposure to NO_2 not exceed 20 micrograms per cubic metre (ug/m^3) or 11 parts per billion (ppb) (Health Canada, 2015). A 1995 Health Canada report suggested a long-term exposure limit for Carbon Dioxide (CO^2) of 6300 mg/m^3 (3500 ppm) or less.

As mould is symptomatic of humidity and moisture issues, it is these issues that should be addressed in order to maintain a healthy and mould-free home. Health Canada indicates humidity levels above 50% are known to contribute to mould growth, and consequently recommended relative humidity levels between 40-50% (1995). The B.C. Building Code requires

residential rooms to have an air change rate of 0.5 per hour (0.5 $ac \bullet h^{-1}$) (2015), while a 2008 assessment conducted by the Canada Mortgage and Housing Corporation suggested a slightly lower air change rate of 0.3 air changes per hour (0.3 $ac \bullet h^{-1}$).

As pesticides are unlikely to be found in a typical home, there are currently no federal or provincial standards for acceptable levels of pesticide use. Pacific Environmental Consulting, however, has proposed the following limits on pesticide residue on surfaces in former cannabis grow operations:

Table 1: Proposed Maximum Allowable Pesticide Residue Concentrations (Blair, 2009)

Component	Allowable Value (Micrograms per Square Foot)
Permethrin	0.8 ug/ft^2
Imadacloprid	0.9 ug/ft^2
Malatholn	0.3 ug/ft^2
Methoxychlor	1.6 ug/ft^2
Cholorothalonil	0.5 ug/ft^2
Dicofol	0.03 ug/ft^2

Recommendation for a definition of a healthy home. At a minimum, a healthy home must meet the standard requirements of a residence, including those outlined in the: *B.C. Fire Code*, *B.C. Building Code*, and *B.C. Plumbing Code*. Additionally, taking into account the damage caused to a residence used for drug production and existing policies and guidelines, a healthy home can be defined as a residence that meets the following criteria:

Table 2: Healthy Home Criteria[4]

Component	Allowable Value	Source
Carbon Monoxide	≤ 11.15 mg/m^3	Health Canada (2010)
Nitrogen Dioxide	≤ 20 ug/m^3	Health Canada (2015)
Carbon Dioxide	6300 mg/m^3	Health Canada (1995)
Air change rate	0.5 ac•h^{-1}	B.C. Building Code (2012)

As emphasized by Barn et al. (2012), the variation in chemical contamination across clandestine drug lab sites makes it challenging to recommend standardized safe levels for specific chemicals found in association with drug laboratories inside residences. It is therefore suggested that, rather than adding specific safe levels of chemical residue in a definition of a 'healthy home', key stakeholders in the remediation of drug production residences be obligated to pay specific attention to the following: heating/ventilation/air-conditioning systems, chemical spills/residues, plumbing systems, sewer systems, septic systems, porous and non-porous surfaces, household appliances, and ensure the encapsulation of surfaces in order to control for chemical residues that may have been overlooked.

Definition Limitations. Any remediation should strive to meet the above standards, at a minimum. It is acknowledged, however, that this definition covers merely some of the problems posed by residential drug operations, and that additional research and the development of more technically specific guidelines may be necessary. The impact of a drug operation on a home is dependent on numerous factors, including the size of the operation, the existing ventilation and

[4] In addition to the criteria outlined in Table 2, recommended exposure limits for mould must also be established and included in the criteria. Currently, Health Canada does not provide recommended exposure limits for mould in regards to residential indoor air quality. This is an area where future research can provide evidence-based guidelines.

structure systems of the residence, and number of alterations made. The different methods and products of drug production, including cannabis grow operations, fentanyl laboratories, or methamphetamine or other synthetic drug operations, pose differing risks to a home, and each unique case needs to be responded to as such. Further, the rapidly evolving nature of drug production may produce future hazards unaccounted for in this report. Therefore, this report should not be considered an exhaustive resource for remediation standards, and that additional testing will likely need to be conducted to ensure a house is habitable. The recommendations portion of this report provides a suggestion about where the responsibility for ongoing research and technical specifications should lie, and also suggests that the standards for a healthy home should be overseen by a Certified Industrial Hygienist and/or Professional Engineer.

Encouraging Healthy Homes

The majority of this report addresses options for remediating homes after they have been affected by drug production. With the pending legalization of cannabis, and the continued evolution of drug production in the forms of fentanyl and other potent synthetic drugs, it is important to consider opportunities to encourage homeowners to maintain healthy homes. In addition to consistent enforcement, the absence of which, according to one interview participant, posed challenges following the legalization of medical cannabis, consideration should be given to incentivizing healthy homes from a public health perspective.

Potential avenues for this may include increased awareness and education campaigns for homeowners, advising them of their rights to inspect premises on a monthly basis and encouraging them to do so regularly. Compliance with standards tends to increase when the underlying reasons for and costs of compliance are made clear (Hall, Flynn, & Grant, 2008; Suurmond, 2007). Providing a clear overview of the benefits of compliance (e.g., increased

health of and safety for occupants, greater access to insurance policies, increased marketability of the home) in relation to the costs may encourage owners to inspect rented properties more regularly, occupants to attempt to minimize the impact the drug production has on the home, and owners/occupants to follow the suggested inspection and remediation practices to keep their property in good standing.

The use of a permit is a possible avenue for incentivizing healthy homes in cases where a home is involved in legal cannabis growth. Homeowners who wish to legally grow cannabis inside their residence could be required to obtain a permit, authorized by provincial legislation, with the associated permit fee offsetting administration and inspection costs. Inspections conducted by a private company can cost several hundred dollars (Home Inspections Vancouver, 2018). An alternative could be having provincial Environmental Health Officers (EHOs) conduct these inspections, although that would likely require significantly more EHOs than presently exist. Further review should be conducted with respect to the feasibility of a permit process, although it is suggested it may be beneficial with respect to maintaining healthy homes. Of note, permits should only be issued with permission of the homeowner; tenants should not be able to apply for a permit without providing documentation indicating the owner's knowledge and assent. Issuance could also benefit landlords as it may enable them to modify the residential tenancy agreement to be inclusive of forthcoming costs associated with inspections or remediation requirements.

Requiring homeowners (who wish to cultivate cannabis indoors) to operate under a growing permit would allow for random inspections by an Environmental Health Officer to ensure permit holder compliance with provincial legislation. This inspection could trigger the remediation process if a permit holder is non-compliant. The existence of a permit should also

trigger an inspection prior to a house being allowed back onto the real estate market. This process would allow homeowners to communicate to prospective buyers and renters that a home is in good condition, and prevent the sale of homes damaged by legal drug production.

Obtaining a permit to operate a grow operation for residential use could also be used to facilitate the insurance brokerage for the property. Currently, Canadians who have legal permits to grow marijuana for medical purposes can apply for residential insurance.[5] Similarly, those who wish to grow marijuana for personal consumption could also be required to provide evidence of a personal grow permit at the time property insurance is obtained. This would likely result in higher annual insurance costs, and should the home later require remediation, the property owner may have to pay a higher deductible or provide coverage for any costs not included in the policy. Should the homeowner not obtain a permit and/or insurance to operate a personal residential grow operation, any associated remediation charges going forward would be the responsibility of the homeowner to cover.

It is recognized that, with the current system, homeowners may be unwilling or unmotivated to self-report their home as requiring remediation and, further, may be motivated to superficially address remediation concerns due to the financial strain associated with a thorough remediation. While being reported by another person should carry the full cost of remediation, one potential option is that self-reporting come with subsidized remediation costs with funds obtained through a government grant or Civil Forfeiture funds. This type of grant would function on the premise that providing these funds would cost the government less than the financial and

[5] Following the introduction of Access to Cannabis for Medical Purposes Regulations, several insurance companies, such as AC&D Insurance and CannaCover introduced medical marijuana insurance premiums that include property, liability, and specialized insurance options. These insurance packages are available to those with a legal permit issued by Health Canada to grow cannabis for medical purposes (e.g., https://www.acdinsurance.com/acmpr-insurance/).

health costs associated with the continued sale and occupation of a former drug operation residence. An alternative option for homeowners who wish to have their property remediated prior to putting it on the market may be the use of a loan program, whereby the provincial government loans the funds required for remediation and recovers them upon sale of the house.

Consideration could also be given to implementing processes to allow potential homebuyers to trigger inspections; homebuyers who wish to do so should not lose their buyer's agreement as a result of ordering a certified inspection. In the current climate in British Columbia, homeowners are increasingly willing to forgo a house inspection in order to remain competitive in the housing market (Azpiri, 2017). Mandating an inspection process for all homes would assist to ensure unhealthy homes are not transferred unawares to new buyers.

Remediation Policy Literature Review

The below section overviews existing municipal, provincial or state, and national policies and legislation intended to address drug property remediation.

Existing Municipal Bylaws Regarding Drug Operation Property Remediation

British Columbia. Absent a consistent remediation process across the Province of B.C., many municipalities have adopted local bylaws to address the public safety inspection and remediation of residential drug operations. This dispersed approach has led to varying processes; while some aspects of these bylaws are consistent across municipalities, others have incorporated unique components.

Among others, the District of Kent, and cities of Abbotsford, Chilliwack, Delta, New Westminster, Port Coquitlam, Surrey, and White Rock, all have bylaws that recognize and are

intended to address the damage and health concerns associated with residential drug production. While many of these bylaws contain similar components, including prohibitions, remediation requirements, and penalties, some have unique differences. The City of Chilliwack and District of Kent have nearly identical bylaws, both of which outline the responsibility of residential property owners to inspect premises subject to a tenancy agreement at least once every three months. These bylaws also outline the duty to report the discovery of an illegal residential grow operation within 24 hours to the city and require that homeowners take necessary actions to bring the property into bylaw compliance within two months. For instance, the Remediation Requirements under s.17 of the City of Chilliwack Bylaw No. 3044 require that the owner must:

> '(1) either remove and dispose of all carpets and curtains in the Residential Premises, or have all carpets and curtains in the Residential Premises cleaned by a Professional Cleaner;
>
> (2) if the Residential Premises are heated by forced air heating, have all air ducts cleaned by a Professional Cleaner or by a duct cleaning company; and
>
> (3) have all walls and ceilings in the Residential Premises cleaned and disinfected by a Professional Cleaner…'

Similarly, the cities of Abbotsford, Surrey, and White Rock each have a professional cleaning requirement and require written proof from a certified individual to ensure that the building is free of pesticides, fertilizers, toxic chemical contamination, moulds, or fungi. However, they fail to specify what constitutes a professional cleaner or certified individual. While these cities have tried to outline remediation requirements, many others have not; as one example, the City of New Westminster's Controlled Substance Property Bylaw does not specify any remediation requirements.

A review of these bylaws identifies some degree of consistency with respect to components and language used; however, no municipal bylaw in B.C. defines a healthy home or a step-by-step remediation process.

Other Provinces. At the municipal level, both Ottawa and Toronto have bylaw requirements. The City of Ottawa introduced a bylaw in 2012 to address cannabis grow operations, utilizing both the Ontario *Municipal Act* and *Building Code Act* to form the basis for authority to take action. In this process, a Property Standards Officer, Inspector, or municipal law enforcement or police officer, has the authority to issue an Order requiring property remediation in situations where a cannabis grow operation is determined to be present (City of Ottawa, 2012). It is the responsibility of the property owner to contract remediation services, and, once remediation is completed, the property will be re-inspected to determine whether it meets the requirements for a certificate of compliance. The *Toronto Municipal Code* has a chapter dedicated to addressing cannabis grow operations (Toronto Municipal Code, 2007) that outlines a similar procedure for addressing these properties. Of note, both processes are specific to cannabis grow operations and do not address clandestine laboratories.

Provincial Policy Approaches to Residential Drug Operation Property Remediation

Alberta. While British Columbia currently leaves residential drug operation remediation processes to the discretion of municipalities, the Province of Alberta employs a public health approach. Alberta's *Public Health Act* provides the legislative structure required for drug property remediation, allowing designated officials to deny occupancy when a health risk, such as those posed by a drug operation, is identified (AUMA, 2015). In 2008, a regional health approach was collapsed to create one health authority, the Alberta Health Services. This agency

is responsible for the overarching process, whereby an Executive Officer conducts an inspection, issues an Order to Vacate, and outlines the required procedure. Alberta is currently the only Canadian province to employ a provincial framework for remediating homes used in drug production. It is noted that one reason that a unified approach is feasible in this case is that Alberta is one of the few provinces, along with Prince Edward Island and, as of December 2017, Saskatchewan, to maintain a single provincial health authority. Additionally, the framework for a provincial health approach to residential drug operation remediation is provided by the inclusion of Minimum Housing and Health Standards within the Alberta *Public Health Act*.

Ontario. Similar to B.C., the Province of Ontario has deferred to municipal jurisdiction when it comes to remediating residential properties used in drug production. Bill 139 of 2010 and Bill 29 of 2013, both entered in the legislature of Ontario, proposed amendments to the *Building Code Act*, *Municipal Act*, and *Residential Tenancies Act* in order to better address clandestine drug operations across the Province (Legislative Assembly of Ontario, 2010, 2013); however, neither bill progressed past the first reading stage.

National Policy Approaches to Residential Drug Operation Property Remediation

New Zealand. New Zealand's Ministry of Health Guidelines for the Remediation of Clandestine Methamphetamine Laboratory Sites (2010) identifies the process of residential drug operation remediation as a public health issue. The New Zealand Police are responsible for initial removal of clandestine laboratory components along with the help of scientists from the Institute of Environmental Science and Research. The property owner, deemed the responsible party, is required to ensure the decontamination of the residence and may employ a decontamination contractor to assist. However, New Zealand's Guidelines for the Remediation of Clandestine

Methamphetamine Laboratory Sites are of an ‘advisory nature’ (Ministry of Health, 2010), with no requirements mandated in legislation. As such, there is no guarantee of remediation up to the suggested standard.

In June 2017, New Zealand introduced new standards for the remediation of properties used in methamphetamine production, adopting a single level of 1.5 micrograms of methamphetamine per 100 square centimetres of surface sampled (µg/100 cm^2) (Standards New Zealand, 2017). There has been debate about the application of these guidelines; a news article posted by the New Zealand Property Investors’ Federation (NZPIF) discussed instances where these guidelines were applied in circumstances where methamphetamine was simply being consumed by a tenant rather than being produced (New Zealand Property Investors’ Federation, 2016).

Australia. As part of a National Drug Strategy, the Attorney General’s Department and the Australian Crime Commission created a guideline in 2011 for addressing the remediation of clandestine laboratories (Al-Obaidi & Fletcher, 2014). This guideline provides a framework for a remediation process triggered by police seizure of a clandestine lab. This framework, intended for synthetic drug production rather than cannabis grow operations, is broad, intended to be adaptable to each state in the Commonwealth of Australia. As such, it simply refers to the ‘appropriate authority’ rather than naming the authority for each specific stage, which includes identifying risk and contamination, addressing these issues, and final validation of remediation. Al-Obaidi and Fletcher (2014) noted that, as of 2014, three Australian states had implemented set guidelines, and that ‘the majority of state and territory jurisdictions are yet to provide clear, unambiguous directives for [environmental health officers]’ (p. 8). All three of the states that have adopted procedures, including Western Australia, Victoria, and Queensland, allocated the

primary oversight responsibility to Environmental Health Officers, using legislation under either a Public Health Act or Health Act as the authority for action (Al-Obaidi and Fletcher, 2014).

United States of America. In 2005, the American Drug Enforcement Administration authored Guidelines for Law Enforcement for the Cleanup of Clandestine Drug Laboratories. This document is similar to the national guidelines put forth by the Commonwealth of Australia in that it is not considered legislation and the responsibilities for carrying out a remediation procedure still lie with the state and local municipalities. As a state-level example, Washington State utilizes the Department of Health to certify workers, supervisors, and contractors to clean up illegal drug laboratories. To this end, they have put out resources including guidelines for remediation and have legislated allowable values for methamphetamine, lead, mercury, and volatile organic compounds (Washington Administrative Code, 2003). One participant interviewed for this report noted their agency used the standards set out by Washington State as the standards they adhered to, in the absence of provincial standards in B.C.

Similarly, the State of Oregon has situated the responsibility for drug operation property remediation with the Public Health Division of the Oregon Health Authority (Oregon Health Authority, 2017). The guidelines set out by the state address clandestine drug laboratories specific to methamphetamine production, with no mention of cannabis grow operation remediation. In this process, a licensed contractor must be enlisted by the homeowner. The contractor is responsible for preparing a work plan and submitting it to the Department of Human Services for approval prior to remediation work being carried out. Oregon does not require an independent assessment from an inspector other than the contractor. A flowchart for this process notes that homeowners may be mandated to decontaminate under local and/or state nuisance abatement laws (Oregon Department of Human Services, 2017); state legislation

addressing the regulation of methamphetamine labs include Oregon revised statute Chapter 453 – Hazardous substances and the Department of Human Services Division 40 – Decontamination of Illegal Drug Manufacturing Sites. Alternative options to remediation for homeowners include sale with written disclosure or demolition.

The above review indicates that existing residential drug operation remediation policies and legislation at the municipal, state/provincial, and national levels are in their infancy stages, with literature on the topic being similarly limited. Available policies suggest a varied and inconsistent approach to this issue, although it is noted that a public health approach is frequently employed in responding to homes used for drug production.

Recommendations for a Standardized Remediation Process for British Columbia

The following recommendations are made based on the review and analysis of available research, existing municipal, provincial, and national policies regarding remediation in British Columbian municipalities, and interviews with professionals employed in related fields.

Each of these recommended steps is outlined below, including the relevant existing policy and legislation and any gaps, as well as roles and responsibilities of relevant stakeholders. A summary of supporting recommendations to fully elucidate this process is provided in Appendix 1. The specific actions required to return a home to a ‘healthy’ status will differ depending on the nature and extent of the drug operation. While the authors provide a suggested framework for a standardized remediation process, the standards are meant to elucidate the steps that should be followed in order to restore a property to a ‘healthy home’.

Proposed Legislative Framework

In B.C., remediation of drug residences is currently considered a problem at the municipal level, addressed by local bylaws. The provincial government has established the Cannabis Legalization and Regulation Secretariat, which holds the responsibility for policy and regulatory oversight of cannabis legalization in B.C. However, it is suggested that residential drug property operation remediation does not simply involve legal cannabis grow operations, and, as such, is outside the scope of the Secretariat. Additionally, while the Ministry of Environment and Climate Change Strategy has some authority to address properties affected by drug production in the *Environmental Management Act*, Contaminated Sites Regulation, they have no jurisdiction over private residences. In order to overcome some of the current gaps in residential drug production remediation, then, it is proposed that overarching responsibility for the remediation process lie with the Ministry of Health. This is in keeping with the approach pursued by the Province of Alberta, which identified drug property remediation as a public health problem.

Under the B.C. *Public Health Act*, a health hazard is defined as 'a condition, thing, or activity that … endangers, or is likely to endanger, public health' (*Public Health Act*, 2008, 120(1)(b)). Residences involved in drug production could fall under the category of a health hazard as they pose risks to current and future occupants. As will be explored below, the B.C. *Public Health Act*, which forms the legislative grounds on which the Ministry of Health and its officers can take action, contains several clauses that would allow for effective oversight.

There are notable differences between the existing *Public Health Act* in B.C. and the policy landscape in Alberta. While Alberta maintains one primary health authority, B.C. has multiple health authorities, with only the Provincial Health Services Authority serving the entire

province. Further, the role of the province in ensuring housing standards differs. In Alberta, the *Public Health Act* outlines the Minimum Housing and Health Standards, and the *Manitoba Public Health Act* has a Dwelling and Buildings Regulation; in B.C., the same responsibility falls under various individual Standards of Maintenance bylaws at the municipal level. Alberta's provincial housing legislation has enabled a provincial approach to residential drug operation remediation; this is a notable legislation gap and difference that may be prohibitive to the development of a similar approach in B.C.

However, given the other authority afforded to the Ministry of Health by way of the *Public Health Act*, giving authority to the Ministry of Health to oversee remediation of drug productions would be the most effective route to addressing the inconsistencies across the province. While further research would be needed to address the implications of a shift to provincial oversight of minimum housing standards, the existing B.C. *Public Health Act* would allow health officers to take the necessary action to provide property remediation. Specifically, Section 25 allows health officers to conduct inspections, and Section 32 allows for health officers to make Orders, including Orders prohibiting entry or requiring remediation, with respect to health hazards and contraventions.

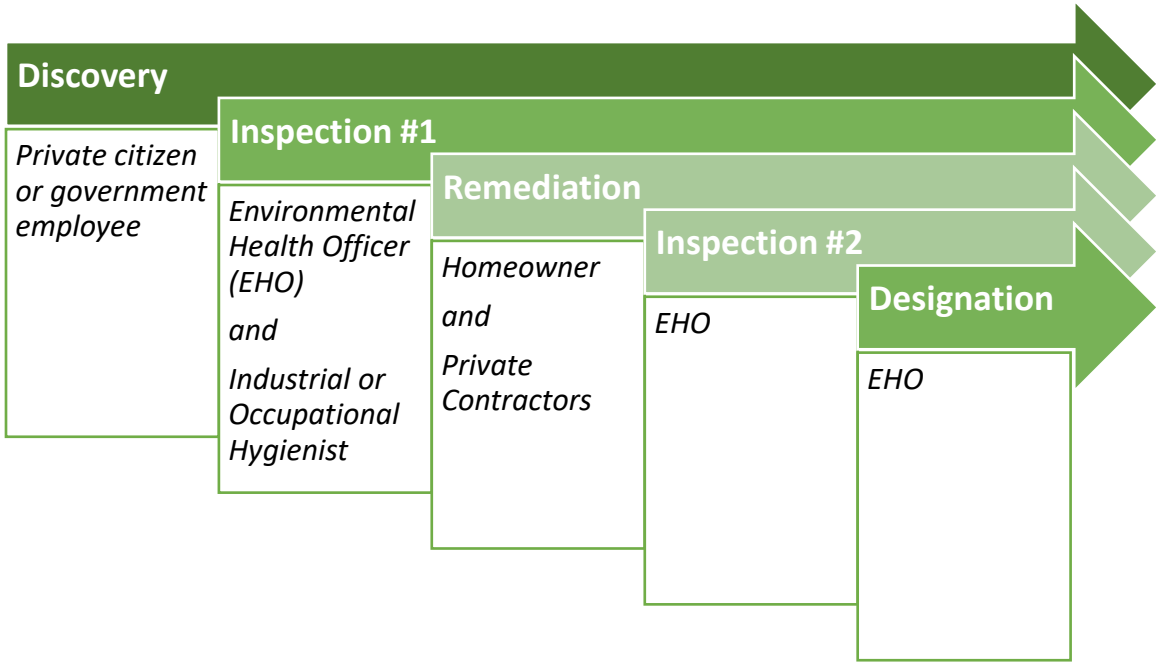
Proposed Process for British Columbia

It is proposed that the Ministry of Health provide the policy framework to allow for Environmental Health Officers in the regional health authorities to assume the main responsibilities of the proposed remediation process. Additionally, it is suggested that the Ministry of Health develop a remediation standards regulation document that outlines the minimum requirements for industrial/occupational hygienists and certified environmental consultant companies or other professionals who may be contracted for the remediation work to

follow. This document should bear a resemblance to that produced by Standards New Zealand and the Drug Enforcement Agency of the United States of America and should consider the varying types of drug operations, including cannabis grow operations, synthetic drug laboratories, and fentanyl pill production operations. Finally, the Ministry of Health should be responsible for the oversight of a communication strategy and dictate minimum remediation standards, including the definition of a healthy home. The framework should dictate the roles and responsibilities of regional health authorities.

Assuming Ministry of Health oversight of housing health under the auspice of an amendment to the B.C. *Public Health Act*, it is proposed that a standardized remediation process in British Columbia follows this path:

Figure 1: The DIRID Process for Residential Property Remediation



As outlined below, the Inspection #1 and #2 stages are to be conducted by an Environmental Health Officer (EHO) with the Ministry of Health, as they possess the authority to mandate a homeowner to pursue remediation. The remediation stage would involve a Certified

Industrial Hygienist, whose technical knowledge and expertise would allow them to assess the home and specify remediation steps that need to be taken, along with contractors to carry out the work. Following Inspection #2 and approval by the EHO, the Orders could be removed and the home could be designated healthy again. This status would indicate that the issues identified to date had been rectified; if new damage were identified in the future, the remediation process would be re-triggered.

All costs incurred throughout this process will be at the expense of the homeowner. Homeowners shall be legislatively required to adhere to all Orders issued by an EHO. In instances of non-payment or non-compliance, Section 34 and 35 of the B.C. *Public Health Act* contain cost recovery provisions that allow for the health authority to file a certificate in the Supreme Court.

Discovery. There are three general methods by which a residential drug operation is 'discovered,' and the triggers identified earlier in this report could help identify drug operations. Those who apply for a government issued permit to operate a drug operation in the home would be self-reporting the presence of a drug operation. These individuals would be informed that an Environmental Health Officer has the authority to conduct a random inspection of their property to ensure compliance with the 'healthy home' designation. Similar to a landlord's inspection of a rental property, the Environmental Health Officer could give 48 hours' notice of the pending inspection.

The second discovery method may involve an individual or agency representative. Under Section 29(1)(b)(i) and (ii) of the *Residential Tenancy Act*, landlords have the authority to inspect a home, providing they give at least 24 hours' notice. During the inspection they may observe indicators that a drug operation is present in the home. Alternatively, a representative of

an agency such as a local fire department, law enforcement, bylaw officer, or a real estate agent may come across the drug operation in the course of their typical duties.

A third form of discovery could be by a neighbour who suspects that the property is being used to produce drugs. In this third instance, the complaint may first need to be assessed for authenticity by a legal authority. This may include a request for hydro data, as one example, as the excessive consumption of electricity is considered an indicator of a potential grow operation (Garis, 2005; Garis & Clare, 2013b).

Following discovery, written notice of a discovery of a drug operation should be provided to the B.C. Ministry of Health within 48 hours, providing the details of the suspected drug operation and requesting that the DIRID process be initiated. This would then trigger a request to an Environmental Health Officer with the Ministry of Health to investigate the complaint and conduct an inspection.

Currently, there are insufficient processes to encourage and protect homeowners and renters in reporting residential drug operations. A standardized process, with an option for anonymity, should be created to enable complaints to reach the Ministry of Health level. Still, the Ministry of Health should document the date and content of discovery reports and the subsequent outcomes of the DIRID process.

Inspection #1. Following notification of a drug operation being discovered, Ministry of Health Environmental Health Officers (EHOs) should conduct an initial inspection, the cost of which will be billed to the homeowner. During this inspection, the EHO will investigate whether there are identified health hazards present, using the framework of suggested triggers and the healthy home criteria set out in Tables 1 and 2 of this report to guide their assessment.

In instances where a health hazard is identified, such as by a contravention of one of the triggers, it is the EHO's responsibility to issue an Order where appropriate for protection of public safety. This Order may prohibit entering the property under Section 32(2)(b)(ii) of the B.C. *Public Health Act*:

'Without limiting section 31, a health officer may order a person to…not enter the place'.

Further, an Order may require remediation under the authority of Section 32(2)(k) of the B.C. *Public Health Act*:

> 'Without limiting section 31, a health officer may order a person to…take a prescribed action'.

In summary, the order for remediation issued by the EHO:

- will identify that a residential property does not meet the suggested criteria for a 'healthy home' as one or more health hazards have been identified,
- will identify that some form of remediation is necessary, and
- may require that the homeowner vacate the home while the remediation occurs.

The EHO may also require that the homeowner contract an industrial hygienist who can conduct a technical inspection of the home and identify the detailed description of the work required to meet the minimum standards outlined in the healthy home definition.

This Order should therefore necessitate a technical assessment by a Certified Industrial Hygienist (CIH) in good standing with the American Board of Industrial Hygiene (ABIH) or a Registered Occupational Hygienist certified with the Canadian Registration Board of Occupational Hygienists.[6] Industrial/occupational hygienists possess technical knowledge and

[6] Certified Industrial Hygienists (CIHs) are recommended for this process given their technical skills and independence. However, the authors acknowledge that the number of certified CIHs practicing across the province, and particularly in rural and remote communities, is likely small. Should the proposed healthy home remediation process be adopted and implemented, the provincial government should consider providing grant funding to support the training and certification of additional CIHs across the province.

skills with respect to air sampling, community exposure, industrial health program management, toxicology, and other relevant topics (American Board of Industrial Hygiene, 2018). The use of an industrial/occupational hygienist is recommended as interviews conducted with two professionals in the field indicated the importance of independent companies in order to ensure objective oversight and assessment. Further, the industrial/occupational hygienist will have the technical skills training to be able to provide detailed information about the specific steps required for appropriate remediation.

Orders for remediation should be publicly posted on a searchable website database hosted by the Ministry of Health. A database publicly disclosing orders for a given residence is unlikely to contravene the *Freedom of Information and Privacy Act* (FIPPA) as it does not reveal personal information about an individual (Garis & Clare, 2010). Further, a Fraser Valley Real Estate Board white paper explained that there exists 'a positive duty in law to disclose information about a significant risk to someone's health or safety' (2008, p. 19).

While the B.C. Ministry of Environment currently maintains a provincial Site Remediation website, and the federal government provides a Federal Contaminated Sites Inventory, both are specific to land remediation so neither capture information about privately owned residences. A centralized website database would provide this information, identifying any relevant orders pertaining to an address, as well as documentation designating a former residential drug operation house fully remediated. This would provide an easily accessible track record that highlights the condition of a property, and the public nature of this process may further incentivize homeowners to ensure proper remediation designation.

An alternative option is to formally register a notice of remediation via a 'Land Title Notice' (Fraser Valley Real Estate Board, 2008). This would provide a record of the required

steps for remediation and would remain on the title until the remediation order has been completed, inspected, and approved by the authorized party, at which point information about the completed remediation would be updated on the title. The main challenge with this process is that there is a nominal fee associated with the search of a land title, which could disincentive its use. Further, it is not an easily accessible database where members of the public could search for the specific orders of remediation and document the completed remediation, as typically, land title searches are conducted by REALTORS® or legal professionals and not private citizens (Fraser Valley Real Estate Board, 2008). A two-step process could instead be useful, whereby a general notice of remediation is attached to the land title and removed once remediation is complete, and a more detailed database of the specific steps required for remediation would be held by the Ministry of Health, and would contain official records of the orders issued by the EHO and the specific requirements identified by the industrial/occupational hygienist.

Remediation. Following inspection and issuance of an Order by an EHO, it is the responsibility of the homeowner to have their residence remediated to the satisfaction of the EHO and the issued orders. One or more independent contractors or certified environmental consultant companies may be hired by the homeowner as needed to carry out the work detailed by the industrial/occupational hygienist. The ultimate goal of a remediation should be to restore a home to healthy, following the healthy home definition, the general order for remediation issued by the EHO and the more specific requirements laid out by the industrial/occupational hygienist.

With respect to timelines, interview participants suggested the extent of damage and corresponding scope of remediation can vary substantially. Additional factors include the type of drug produced (cannabis, synthetic drugs, fentanyl, etc.). Further, the timeline is likely to be affected to some degree by the expediency of the homeowner in hiring an industrial/occupational

hygienist and subsequent contractors, particularly if there is a shortage of such specialists in specific geographical areas. Given the numerous variables involved, it is challenging to provide a standard timeline, although it is anticipated that this process could range from weeks to months. Tracking the information on the DIRID process in the proposed Ministry of Health database will enable the provision of more specific time frames for each step, going forward.

Inspection #2. Following the remediation process, it is the responsibility of the EHO to confirm that the problems identified in the initial Orders have been addressed and that re-occupancy is allowable. As local municipal government maintains authority for oversight of the *B.C. Building Code, B.C. Plumbing Code,* and *B.C. Fire Code,* this inspection should include both municipal inspectors and the provincial EHO. Failing to pass inspection should result in the initial Order standing until any ongoing deficiencies are addressed. If a house has addressed the hazards identified in the initial Order and have met housing standards required for re-occupancy, a house may be designated safe.

Designation. The final stage incorporates designation as a fully remediated and healthy home. This designation is to be granted by the Ministry of Health EHO and should include revoking the initial Order. Following designation, a home should be considered fully healthy, having met the requirements outlined in the initial inspection. At this point, any notice attached to the land title would be removed, and the file would be considered closed, although the proposed Ministry of Health database would retain the information on the DIRID process for future reference.

This designation does not serve as an ongoing guarantee of remediation or an ongoing government-backed warranty; the designation simply indicates the home was identified as healthy at the time of post-remediation inspection. The government is not liable for the ongoing

state of the home; should a home experience future drug production or modifications to the home to facilitate drug production, the remediation process would be triggered again.

As the identified risk has been fully mitigated, there is no need for ongoing disclosure to the general public and the initial Order should be formally revoked and removed from the publicly available website database. While the designation as healthy again may address insurance company concerns, it is noted that willingness to issue insurance policies remains at the discretion of insurance companies. In fact, insurance for these properties may continue to be priced higher and be more difficult to obtain than for homes without such a history.

Conclusion

This report considers the current status of residential drug operation property remediation and recommends a provincial approach under the Ministry of Health in order to ensure a consistent strategy for providing healthy homes for British Columbians. The policy landscape concerning residential properties used in the production of drugs in British Columbia is notably more complex than typically present elsewhere, given the patchwork approach of municipal bylaws as well as multiple health authority jurisdictions. This document provides research-informed strategies for developing a consistent approach to the identification, inspection, remediation, and certification of healthy homes across the province.

Given the complex landscape and lack of available research, the potential limitations to the proposed approach include resource strain on the provincial government, minimum standards for a healthy home that will require further elaboration, challenges with incentivizing compliance, and the problems presented by the changing landscape of drug production. While there is room for significant future research to further clarify these issues, at this time, a policy

change is required in British Columbia to ensure a consistent approach to remediating homes used in the production of drugs.

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Appendix 1: Summary of Recommendations

1. Adopt definition of residential drug operation
2. Adopt definition of healthy home
3. Amend Ministry of Health responsibility for minimum housing standards
4. Create remediation framework document
5. Develop remediation standards for each type of drug operation (marijuana grow operation, synthetic drug laboratory, fentanyl pill production)
6. Process overview document for property owners