

## Testimony In Opposition to L.D. 40

An Act to Protect Liberty and Advance Justice in the Implementation, Administration and Enforcement of the Cannabis Legalization Act and To Implement Certain Recommendations of the Subcommittee on Non-substantive Changes to the Maine Medical Use of Cannabis Act

*Before the Joint Standing Committee on Veterans and Legal Affairs  
March 4, 2024*

Senator Hickman, Representative Supica, and members of the Joint Standing Committee on Veterans and Legal Affairs:

My name is Hannah King, and I am a resident of the State of Maine. I have been practicing cannabis law in the State of Maine since 2015 and am currently a Partner in the cannabis law practice group at Dentons, an international law firm with a US and global cannabis law practice. I represent hundreds of cannabis businesses in the State of Maine. I also represent cannabis companies in states across the country including New York, Massachusetts, Kentucky, and New Jersey. I am writing on my own behalf as a Maine citizen who provides professional services to cannabis businesses in Maine to urge you, for the reasons outlined below, to vote ought not to pass on L.D. 40.

As a professional who represents cannabis businesses in Maine, my two primary concerns with L.D. 40 are: (1) that, while generally stripping the Office of Cannabis Policy of discretion, it gives the agency discretion to implement group cannabis product tracking; and (2) when read in combination with a Sponsor's amendment to L.D. 48, which we understand will be introduced at the work session on Friday with no opportunity for public comment, will effectively eliminate meaningful health and safety testing of cannabis in the adult use market (note that because we do not have mandatory testing in the medical market, Maine consumers will have NO access to product that has been safety tested to ensure that it is free of harmful chemicals and toxins).

### **Robust Seed to Sale Track and Trace is a Best Regulatory Practice**

Every state in the country except for Maine's medical cannabis program requires state licensed operators to use electronic tracking software to track their inventory from seed to sale. **Of the 40 states that have legalized medical or adult use cannabis, none utilize group tracking.** The group tracking proposed by the bill is not only not a best regulatory practice, it is not used by any state that has legalized cannabis and will not afford businesses and professional service providers the important protections provided by mandatory tracking using electronic seed to sale software that is currently required for all adult use cannabis businesses.

**Robust Seed to Sale Tracking Provides Protections for Professional Service Providers/Without Robust Seed to Sale Tracking Cannabis Businesses in Maine will Lose Access to These Services**

Cannabis is a Schedule I drug under the federal Controlled Substances Act and the possession, cultivation, manufacturing, and sale, even pursuant to state law, is a crime under federal law. That will continue to be true even if cannabis is rescheduled. As evidenced by the illicit operations that have been in the news in Maine lately, there also continues to be a robust illicit market for cannabis and, because state legal cannabis businesses continue to be a cash heavy business, are vulnerable to money laundering. To provide professional services to cannabis companies and comply with our own licensing and regulatory requirements, financial institutions, insurance providers, attorneys, and accountants need to have some way to assure that the clients we are working with are not operating in violation of state law or federal anti-money laundering laws. Electronic seed to sale tracking software, which helps ensure that cannabis and cannabis products being sold to consumers came from state licensed businesses and allows for reconciling actual sales with deposits, helps provide such assurance. With the voluntary tracking proposed by the bill many of my clients will lose access to critical services such as banking and insurance (including, but not limited to product liability insurance) and it would make it more difficult for me to continue to work with cannabis businesses in Maine. See attached testimony opposing LD 1757 from the Maine Credit Union League, bates stamped **EXHIBITS TO TESTIMONY IN OPPOSITION TO L.D. 40 – 000001**.

The group tracking proposed in the bill will not provide adequate protection to service providers. Many service providers do not provide services to Maine medical cannabis businesses because the tracking is subject to manipulation and, thus, does nothing to ensure that companies are complying with state law and not laundering money.

**Robust Seed to Sale Tracking Protects Small Businesses and Consumers**

Without seed to sale tracking, products produced on the illicit market can easily enter the state legal program and be sold to unwitting consumers. This allows a market to be flooded with illicitly produced products (which are often cheaper, so attractive to licensees trying to lower overhead) and force state licensed cultivators and manufacturers to compete against illicit operators. It also creates criminal and civil liability as a licensee could unknowingly purchase product that was illicitly produced.

**Mandatory Health and Safety Testing is Meaningless Without Robust Seed to Sale Tracking, Mandatory Testing Protects Consumers and Businesses, and Serves to Keep the Illicit Market from Participating in the Legal Market**

Mandatory health and safety testing is meaningless without electronic tracking. Again, Maine's medical program is the only state legal cannabis program that does not mandate that cannabis be tested to ensure it is properly dosed and does not contain harmful toxins, heavy metals, or residual solvents prior to sale to patients/consumers. The adult use program is the

only program in the state where Mainers can be assured that the product they are purchasing is free from harmful contaminants. Maine consumers deserve access to cannabis that has been health and safety tested in at least one of its programs, and they will no longer have that option of you eliminate mandatory testing and/or robust seed to sale tracking. Group tracking also makes it very difficult to recall harmful or contaminated products, putting consumers at risk. [Vermont Removes Possibly Contaminated Marijuana From Stores \(usnews.com\)](https://www.usnews.com), see attached bates stamped **EXHIBITS TO TESTIMONY IN OPPOSITION TO L.D. 40 – 000002-000003** [E-cigarette, or vaping, product use-associated lung injury: a review - PMC \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/), see attached bates stamped **EXHIBITS TO TESTIMONY IN OPPOSITION TO L.D. 40 – 000004-000011**

Maine's medical market has been targeted by illicit operators because of its lack of regulation, such as its voluntary tracking and lack of mandatory testing. [Maine again asks for DOJ crackdown on illicit Chinese cannabis grows \(mjbizdaily.com\)](https://www.mjbizdaily.com), see attached bates stamped **EXHIBITS TO TESTIMONY IN OPPOSITION TO L.D. 40 – 000012**. If mandatory electronic track and trace and testing are removed from the adult use program it will similarly become a target of illicit operators. The medical market is flooded with cheap product produced by in state and out of state illicit operators forcing wholesale prices down and making it almost impossible for state licensed, compliant businesses to compete. [Triad Weed: How Chinese Marijuana Grows Took Over Rural Maine - The Maine Wire](https://www.themainewire.com), see attached bates stamped **EXHIBITS TO TESTIMONY IN OPPOSITION TO L.D. 40 – 000013-000078**. In a 2022 survey completed by the Office of Cannabis Policy looking into the mass exodus of licensed operators from the medical program, individuals who had withdrawn their licenses reported oversupply in the market and competition with the illicit market as two of the top five reasons for leaving the market. [OCP Caregiver Exodus Report.pdf \(maine.gov\)](https://www.maine.gov), see attached bates stamped **EXHIBITS TO TESTIMONY IN OPPOSITION TO L.D. 40 – 000079-000084**. The same would happen to the adult use program if the state eliminates mandatory electronic tracking and testing requirements.

Thank you for taking these comments into consideration.



# Maine Credit Union League

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Neither for Nor Against LD 1757

## **An Act to Amend the Laws Governing the Reporting and Tracking of Adult Use Cannabis**

Joint Committee on Veterans and Legal Affairs

*April 24, 2023*

Senator Hickman, Representative Supica, and Distinguished Members of the Joint Committee on Veterans and Legal Affairs,

My name is Robert Caverly and I serve as the Vice President of Advocacy & Outreach at the Maine Credit Union League. The League proudly represents Maine's 50 credit unions and more than 725,000 members statewide. Please accept our testimony neither for nor against LD 1757; An Act to Amend the Laws Governing the Reporting and Tracking of Adult Use Cannabis.

As this committee is aware, providing financial services to the cannabis industry is a challenge that requires compliance with federal requirements. Despite the challenge, Maine has credit unions that remain committed to providing this important community service, as they have done since 2014.

Maine's current regulations for the adult-use cannabis industry more closely align with national standards. This consistency means that it is far easier to provide financial services to adult-use cannabis providers and is part of why we have consistently urged this committee to make the medical program reporting requirements more similar to adult-use, rather than widening the gap.

Deviating from the current law will likely decrease the access to financial services that these businesses have due to financial regulatory requirements. It is our concern that if LD 1757 were to pass, adult-use providers that reduce the tracking requirements as proposed will lose access to financial services due to being out of compliance with the expectations of federal financial regulators.

If the goal of this committee is to ensure a well-run cannabis industry that has access to financial services, we would encourage the alignment of Maine law with national standards and to look to states that have a robust and well banked cannabis industry. Indeed, that is the perspective we have represented in our testimony on LD 355, 788, and 1529, as well as in our letter to this committee and legislative leadership in January 2022.

Thank you for the opportunity to offer testimony on this important topic. If the League can be of any assistance during the deliberations of this bill or others similar, please do not hesitate to contact us.

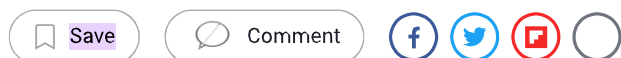


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# Vermont Removes Possibly Contaminated Marijuana From Stores

Vermont regulators have removed marijuana potentially contaminated with a pesticide from five retail stores after a consumer reported feeling sick after smoking some

By [Associated Press](#) | Feb. 10, 2023 |



Vermont regulators have removed marijuana potentially contaminated with a pesticide from five retail stores after a consumer reported feeling sick after smoking some.

Vermont's Cannabis Control Board issued a consumer protection warning last week for all strains of marijuana produced by grower Holland Cannabis Co. due to pesticide contamination. Customers who purchased marijuana grown by Holland Cannabis at the five particular stores are asked to return it to the retailers.

The stores are Zenbarn, in Waterbury; The High Country Cannabis, in Derby; The Green Man, in St. Johnsbury; Lamoille County Cannabis, in Morrisville, and Capital Cannabis Company, in Montpelier.

The person who purchased marijuana from the Derby store reported headaches, stomach ache and nausea, James Pepper, chairman of the Cannabis Control Board, said Friday. That product was tested and contained the fungicide myclobutanil, which is prohibited in legal cannabis cultivation, Pepper said. Samples from the other four retailers are being tested and the board expects to have some results as soon as Monday, he said.

"I think this next round of testing will rule out kind of the questions that are still open and then we'll be able to take an appropriate action against the responsible person," Pepper said.

Using an unauthorized pesticide is a violation that leads to automatic destruction of the contaminated products and a penalty, Pepper said.

Brice Simon, a lawyer representing Holland Cannabis, said his client is fully cooperating with the board and wants to find the source of the contamination, whether it happened before or after the product left the grower.

Among other things, growers are required to get their product tested for pesticides, potency, and pathogens, Pepper said.

Holland Cannabis had a clean test for the marijuana, which Pepper now calls suspicious.

"I think we'll kind of rule out whether that was accidental or lucky, you know, versus intentional or negligent," Pepper said.

He said the grower had applied for state registration but had not yet been approved. Simon said approval of registrations was backed up and Holland Cannabis was not selling the marijuana unlawfully.

In December, [Oregon](#) recalled some marijuana products because of pesticide contamination and in 2021, the Arizona Department of Health Services announced that [dispensaries were voluntarily recalling](#) eight marijuana products because of possible contamination after Salmonella bacteria and Aspergillus fungus were detected in some samples.

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Rathke reported from Marshfield, Vermont.

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REVIEW

Open Access



# E-cigarette, or vaping, product use-associated lung injury: a review

Samuel H. Belok<sup>\*†</sup>, Raj Parikh<sup>†</sup>, John Bernardo and Hasmeena Kathuria

## Abstract

**Background:** E-cigarette, or Vaping, Product Use-Associated Lung Injury (EVALI) is a disease entity related to the use of battery-operated or superheating devices that create an aerosolized form of nicotine and tetrahydrocannabinol (THC) and/or other substances for inhalation.

**Methods:** We performed a literature review to document epidemiology, pathogenesis and risk factors, diagnosis, clinical presentation, evaluation and management of EVALI.

**Results:** In the summer of 2019, an outbreak of EVALI cases brought this disease entity into the national spotlight. Since being recognized as a serious pulmonary disease with public health implications, more than 2600 cases have been reported to CDC with 68 deaths as of February 2020. The pathophysiology of EVALI remains unknown. Substances such as Vitamin E acetate have been implicated as a possible causes of lung injury. The CDC has established case definitions of “confirmed EVALI” cases to help guide identification of the disease and assist in surveillance. While clinical judgement by healthcare providers is imperative in the identification of EVALI cases, the heterogeneous presentations of EVALI make this difficult as well. Ultimately most investigative studies should be aimed at ruling out other disease processes that can present similarly. Treatment is centered around removing the offending substance and providing supportive care.

**Conclusions:** EVALI is a serious pulmonary disease with public health implications. Diagnosis requires a high degree of suspicion to diagnose and exclusion of other possible causes of lung disease. It may be beneficial to involve a pulmonary specialist early in the management of this disease which is generally supportive care.

**Keywords:** EVALI, Vaping, Inhalational injury, E-cigarettes

## Background

Electronic cigarettes (e-cigarettes) are known by many different names, including e-cigs, mods, vapes, and electronic nicotine delivery systems [1]. E-cigarettes are battery-operated devices that produce an aerosol by heating substances typically containing nicotine and/or other materials or flavorings on an internal metal coil until the material is aerosolized and can be inhaled [2, 3]. “Vaping” is a broad term which denotes inhaling the aerosol produced by an e-cigarette or other vaporizing device. E-cigarettes began to appear in US markets in

2006, and enjoyed a growing demand among youth and adults, culminating with the US Surgeon General naming e-cigarette use a growing public health “epidemic” [4]. Since entering the US marketplace, several generations of e-cigarette products have been developed with newer versions that can deliver higher concentrations of aerosol [5, 6]. Over 7000 flavors and other chemical constituents have been identified within the e-cigarette makeup, including some with carcinogenic potential [7–9]. Outside of nicotine-based use, e-cigarettes have also become popular as a mode of tetrahydrocannabinol (THC) delivery.

Since the introduction of these devices, it has been postulated that inhalation of microparticles and volatile chemicals produced by the vaping process could injure

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the lungs. Isolated reports of lung injury considered to be due to vaping began in 2012 [10–14]. Then, in July, 2019, the Illinois Department of Public Health (IDPH) and Wisconsin Department of Health Services (WDHS) began a joint public health investigation after receiving reports of clusters of cases of lung injury that occurred after vaping. The New England Journal of Medicine published the first series of 142 reported cases of “Pulmonary Illness Related to E-cigarette use in Illinois and Wisconsin” from this collaboration [15]. This disease was ultimately termed “EVALI” (E-cigarette, or Vaping, Product Use-Associated Lung Injury). Since then there has been a rapid increase in reporting of this disease to public health authorities peaking in September of 2019, accompanied by policy efforts to restrict the distribution of these devices and materials. As of February, 2020, there have been 2668 hospitalized EVALI cases reported to the Centers for Disease Control and Prevention (CDC) [16, 17]. In this article we will review the epidemiology, pathogenesis, and clinical features important to managing patients with suspected EVALI.

### Epidemiology and demographics

Precise data concerning the epidemiology of vaping and its associated lung injury are difficult to confirm. Information is often self-reported by patients and/or family and is subject to recall and willingness to report various and possibly illegal activities, such as THC use – a Federal crime despite being legal in many states. It is known that vaping has been gaining immense popularity among young people and e-cigarettes are the most commonly used tobacco product among youth [4]. In 2019 over 5 million children and adolescents were using e-cigarettes. This represented an increase in e-cigarette use by high school students from 11.7% in 2017 to 27.5% in 2019 [18].

Since being recognized in the summer of 2019 as a serious pulmonary disease with public health implications more than 2600 cases have been reported to CDC with 68 deaths as of February 2020 [17]. Among these cases, 66% were male and approximately 76% were under the age of 35 years. Given the age distribution and rapid increase in e cigarette use by young people, it is not surprising that the reports of EVALI are primarily among adolescents and young adults. A large portion of these patients reported using THC-containing products in conjunction with nicotine-containing products [17]. It is important to note that while sporadic reports of severe lung disease associated with using e-cigarette products have been reported since 2012 [10–14], patients from these earlier reports less frequently reported cannabis use, unlike the 2019 outbreak [10].

### Pathogenesis/etiology and risk factors

EVALI is a form of acute lung injury with varying pathologic findings, ranging from acute fibrinous pneumonitis to organizing pneumonia to diffuse alveolar damage [19]. In conjunction with these histopathologic findings, cases of EVALI have presented as acute eosinophilic pneumonia, lipoid pneumonia (although this diagnosis is controversial and will be addressed later in this review), and respiratory-bronchiolitis interstitial lung disease (RB-ILD) [13, 20, 21]. Differences in clinical and radiographic appearances may be due to a variety of factors, such as underlying lung disease, individual variations in host responses to the inhaled substance, and the specific material inhaled, which is often difficult to determine. Hence, a universal, single etiology has not been determined.

The essential identifiable risk factor for development of EVALI is the use of an e-cigarette or similar device [1]. E cigarette products and aerosols may contain tobacco-specific nitrosamines, aldehydes, metals, volatile organic compounds, phenolic compounds, polycyclic aromatic hydrocarbons, tobacco alkaloids, flavorings and drugs. For example, there is substantial evidence showing that propylene glycol, vitamin E acetate, and metals such as lead and arsenic are important components of some e-cigarettes [22–24]. Propylene glycol and glycerol are typically used as diluents in nicotine-containing e-cigarette products, whereas oils (e.g. medium chain triglycerides) are often used as diluents in THC products [25]. In a murine model, inhalation e-cigarette vapor containing propylene glycol and glycerol has been shown to impair lipid homeostasis and host immune defense [26].

Specific to the outbreak of EVALI in 2019, investigations have shown evidence of THC and/or vitamin E acetate in the majority of affected patients, either by history or confirmed by toxicology [15, 19, 27–30]. Further, vitamin E acetate was widely used as a diluent in THC-containing e-cigarettes between 2018 and 2019 [31]. Vitamin E acetate may alter lung surfactant function and cause respiratory impairment [32]. Heating vitamin E acetate may also generate ketene, a highly reactive compound that acts as a lung irritant [29, 33]. While vitamin E acetate may be a major causative agent, other constituents are likely playing a role as well, including cannabinoid (CBD) oils, petroleum distillates, and limonene [27–29]. Another important risk factor that has been identified includes the source of the material that is vaporized. Studies have shown that a large portion of EVALI cases have been associated with the use of e-cigarettes purchased from an illicit or informal distributor [17, 28]. Additionally, the practice of super-heating the liquid by “dripping” and “dabbing” it onto a torch-flamed spike (nail) using specific devices designed for inhalation of the concentrated vapors produced by the procedure may also lead to production of toxic new agents [27].

## Diagnosis

EVALI should be suspected in patients with a history of vaping within 90 days, a pneumonia-like illness, progressive dyspnea, and/or worsening hypoxemia. CDC has established case definitions of “confirmed EVALI” cases to help guide identification of the disease. The criteria used for a case definition of EVALI (See Table 1) include 1) use of an e-cigarette or related product within 90 days, 2) lung opacities on chest imaging, 3) exclusion of lung infection including viral polymerase chain reaction, basic urine antigen tests for *Legionella* and *Streptococcus pneumoniae*, blood cultures, and sputum culture, and 4) absence of a likely alternative diagnosis such as cardiac or neoplastic conditions [34]. Despite the established CDC criteria to assist in identifying EVALI cases, there are a variety of respiratory diseases that may present similarly or even in association with EVALI [15, 19]. The differential diagnosis,

outside of community acquired pneumonia (CAP) and viral pneumonia, includes parenchymal lung diseases such as acute eosinophilic pneumonia, organizing pneumonia, hypersensitivity pneumonia, lipoid pneumonia, diffuse alveolar hemorrhage, giant cell pneumonitis, and RB-ILD, and cardiac causes such as congestive heart failure [11, 13, 15, 20, 21, 35–40].

## Clinical presentation and evaluation

EVALI remains a clinical diagnosis and one of exclusion as the symptoms, physical examination, serologic, radiologic, and bronchoscopy findings are not specific to the disease. While clinical judgement by healthcare providers is imperative in the identification of EVALI cases, the heterogeneous presentations of EVALI make this difficult as well. Additionally, bacterial or viral co-infection can occur. This is particularly important to

**Table 1** CDC Surveillance Case Definitions<sup>a</sup> for Severe Pulmonary Disease Associated with Cigarette Use – August 30th 2019 [34]

Case Classification	CDC Criteria	Additional investigations to consider:
Confirmed	Using an e-cigarette (“vaping”) or dabbing <sup>b</sup> during the 90 days before symptom onset (and)	Consider toxicology to assess for THC or other inhalational agents
	Pulmonary infiltrate, such as opacities on plain film chest radiograph or ground-glass opacities on chest computed tomography (and)	Consider CT scan for increased sensitivity
	Absence of pulmonary infection on initial work-up: Minimum criteria include negative respiratory viral panel, influenza polymerase chain reaction or rapid test if local epidemiology supports testing. All other clinically indicated respiratory infectious disease testing (e.g., urine antigen for <i>Streptococcus pneumoniae</i> and <i>Legionella</i> , sputum culture if productive cough, bronchoalveolar lavage culture if done, blood culture, human immunodeficiency virus–related opportunistic respiratory infections if appropriate) must be negative (and)	HIV testing SARS-CoV-2 testing Procalcitonin CBC with differential
	No evidence in medical record of alternative plausible diagnoses (e.g., cardiac, rheumatologic, or neoplastic process).	Echocardiography Differential on CBC ANA RF ANCA ESR CRP
Probable	Using an e-cigarette (“vaping”) or dabbing <sup>b</sup> in 90 days before symptom onset (and)	Consider toxicology to assess for THC or other inhalational agents
	Pulmonary infiltrate, such as opacities on plain film chest radiograph or ground-glass opacities on chest computed tomography (and)	Consider CT scan for increased sensitivity
	Infection identified via culture or polymerase chain reaction, but clinical team <sup>c</sup> believes this is not the sole cause of the underlying respiratory disease process <b>OR</b> minimum criteria to rule out pulmonary infection not met (testing not performed) and clinical team <sup>c</sup> believes this is not the sole cause of the underlying respiratory disease process (and)	HIV testing SARS-CoV-2 testing Procalcitonin CBC with differential
	No evidence in medical record of alternative plausible diagnoses (e.g., cardiac, rheumatologic, or neoplastic process).	Echocardiography Differential on CBC ANA RF ANCA ESR CRP

<sup>a</sup>These surveillance case definitions are meant for surveillance and not clinical diagnosis; they are subject to change and will be updated as additional information becomes available if needed

<sup>b</sup>Using an electronic device (e.g., electronic nicotine delivery system (ENDS), electronic cigarette (e-cigarette), vaporizer, vape(s), vape pen, dab pen, or other device) or dabbing to inhale substances (e.g., nicotine, marijuana, tetrahydrocannabinol, tetrahydrocannabinol concentrates, cannabinoids, synthetic cannabinoids, flavorings, or other substances)

<sup>c</sup>Clinical team caring for the patient



acknowledge during flu-season or in the era of COVID-19, both of which can present similarly or even concurrently with EVALI.

### History

Patients with EVALI may present with respiratory symptoms, constitutional symptoms, and/or gastrointestinal symptoms and assessments for these symptoms are imperative when evaluating patients suspected of EVALI. As of October 2019, 342 EVALI patients with medical abstraction data were submitted to CDC for chart review, 3 of which were excluded due to incomplete data. Respiratory symptoms (including cough, chest pain, shortness of breath) were reported in 95% (323/339) of patients; 85% (289/339) reported constitutional symptoms (including weight loss, fevers, chills) and 77% (262/339) had gastrointestinal symptoms (including nausea, vomiting, diarrhea, abdominal pain) [41]. Similar numbers were reported by the Illinois/Wisconsin Cohort in which 142 patients were submitted for review 30 of whom were excluded after chart review and 14 were excluded due to pending classification leaving 98 to be evaluated. Of these patients, reported symptoms included shortness of breath in 85% (83/98) patients, cough in 85% (83/98), chest pain in 52% (51/98), pleuritic chest pain in 36% (35/98), hemoptysis in 8% (8/98), fevers in 84% (82/98), chills in 60% (59/98), and gastrointestinal symptoms in 77% (75/98) [15]. It is also important when taking the history to assess other potential causes of the patient's illness such as infectious, cardiac, autoimmune, or inflammatory disorders, as part of the diagnosis of EVALI is ruling out alternative diagnoses.

Additionally, there are specific components to the evaluation of a patient with suspected EVALI. Non-judgmental, open-ended, and private questioning should be used in order to obtain an accurate history. This is particularly important in the adolescent population [42]. Some specific details related to substance use should be asked including: start date, last use, method of use (aerosol, dabbing or dripping), duration of use, frequency of puffs, and concomitant tobacco or other drug use. Additionally, details regarding the actual device should be obtained including: product brand name, delivery system, types of substances used for vaping (THC, cannabis, nicotine, modified products), and the product source [43].

### Physical examination

In patients diagnosed with EVALI reported to CDC, tachycardia, tachypnea and oxygen saturation < 95% have been documented in 55% (169/310), 45%(77/172) and 57% (143/253) of cases respectively. Denominators are different for selected characteristics to account for exclusion of patients with missing data [41]. In the Illinois/

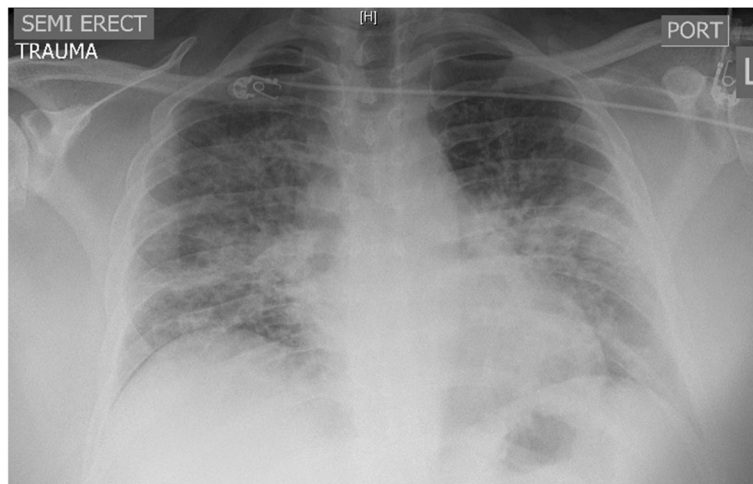
Wisconsin Cohort, fever was recorded in the vital signs in 33% of patients [15]. The physical exam should target the cardiopulmonary system including vital signs and pulse oximetry, not only to assess for severity of respiratory distress, but also to assess for other etiologies of respiratory illness such as chronic lung disease, congestive heart failure or community acquired pneumonia.

### Laboratory testing

Because EVALI is a diagnosis of exclusion, lab testing should focus on ruling out alternative diagnoses. Viral respiratory panel testing should be considered as well as specific influenza A and B testing during flu season [41]. Additionally, testing of infectious disease including but not limited to *Streptococcus pneumoniae*, *Legionella pneumophila*, fungal infections, HIV, COVID-19 and opportunistic infections should be considered. Case reports and case series including the Illinois/Wisconsin Cohort have documented elevation in inflammatory markers such as C-reactive protein, erythrocyte sedimentation rate and white blood cell count [15]. The CDC, in its Morbidity and Mortality Weekly Report in October 2019, noted reports of elevated inflammatory markers in EVALI patients, but commented that these laboratory findings remain non-specific and may not be particularly helpful in ruling out other etiologies [41]. In order to evaluate etiologies of lung diseases precipitated by other illicit substances, toxicology testing should be considered with appropriate consenting [41].

### Imaging

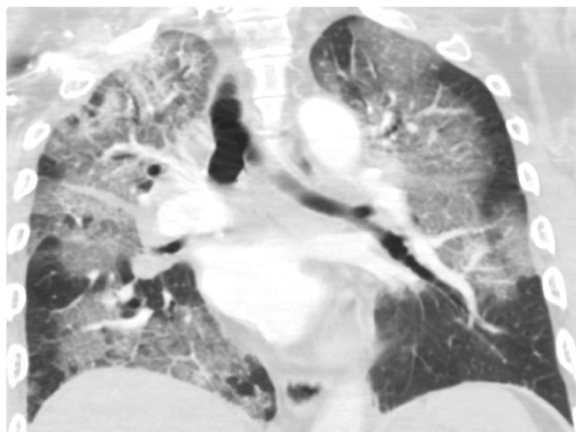
Although abnormalities are frequently found on chest imaging, the findings are non-specific and variable. In the Illinois/Wisconsin cohort, 83% were found to have abnormalities on chest radiograph and 100% were found to have abnormalities on Computed Tomography (CT) of the chest [15]. A chest x-ray should be obtained in patients with e-cigarettes use who present with respiratory, GI, or constitutional symptoms. Typical of findings on chest radiograph of EVALI is diffuse hazy bilateral opacities with occasional subpleural sparing (Fig. 1). Involvement of all lung lobes can be seen, but is not universal. Additionally, increased interstitial markings can be seen characterized by Kerley B lines. A CT chest should be pursued if there is high suspicion for EVALI but the chest radiograph is normal given the improved sensitivity of CT and/or to assist in ruling out other etiologies. While imaging findings are variable in EVALI, typical findings on chest CT are bilateral ground glass opacities (Fig. 2). Additionally, upper lobe predominant centrilobular nodules are often seen on chest CT [44]. Since findings on chest imaging are non-specific, other etiologies of lung injury should be considered.



**Fig. 1** Chest XRay of a patient with EVALI Showing bilateral patchy opacities

### Bronchoscopy

Bronchoscopy has been used both to obtain bronchoalveolar lavage (BAL) and biopsy specimens. Cellular analysis of BAL specimens are of little diagnostic utility since there is no specific cellular pattern in EVALI. A common finding in BAL specimens in patients with EVALI is lipid-laden macrophages [19, 30, 31]. This finding initially prompted concern that this was a disease of lipid pneumonia. However, radiographic features are not typical of lipid pneumonia. Additionally in multiple series, biopsy specimens revealed foamy (lipid-laden) macrophages within airspaces but did not have features consistent with lipid pneumonia such as coarse vacuolation or giant cells of lipid pneumonia [19, 45]. Lipid-laden macrophages may therefore instead represent an endogenous response to e-cigarettes.



**Fig. 2** Computed Tomography coronal image through the chest of a patient with EVALI showing bilaterally patchy ground glass opacities

CDC also has reported finding vitamin E acetate in the BAL specimens submitted from 29 of 29 patients from 10 states [30]. A follow-up study of 51 patients found that 94% (48/51) of patients with EVALI had detectable vitamin E acetate in BAL with no detectable vitamin E acetate in the BALs of the healthy control group. While not firmly established as the universal cause of this injury, Vitamin E acetate found in lavage fluids strengthened evidence considerably. However multiple factors could potentially limit the value of negative results such as: time elapsed between last use of E-cigarette and bronchoscopy, variations in bronchoalveolar lavage technique and uncontrolled dilution of alveolar fluid by instilled saline [46]. Additionally, vitamin E acetate testing is not performed routinely by many laboratories.

In a case series of 8 biopsy specimens (7 of which were obtained by transbronchial biopsy via bronchoscopy, 1 by open surgical lung biopsy) from patients with EVALI, pathology revealed a mix of organizing pneumonia and diffuse alveolar damage [47]. In a case series submitted to the New England Journal of Medicine, all 17 cases showed a combination of acute lung injury in nonspecific patterns including fibrinous pneumonitis, diffuse alveolar damage, and organizing pneumonia [19]. These are all patterns of injury which can result from multiple different insults. Since there are no specific findings on biopsy for EVALI, routine biopsy for confirmatory testing of EVALI is generally not recommended.

Given that EVALI remains a diagnosis of exclusion, bronchoscopy can help evaluate and rule out alternative or concomitant diagnoses such as infection, malignancy, or eosinophilic pneumonia. The decision to pursue a bronchoscopy is made on a case-by-case basis and should be made by the clinical team in consultation with pulmonary specialists.

## Treatment

The approach to treatment for EVALI is focused primarily on elimination of the insult and supportive therapy. Outpatient management can be considered in patients with  $S_aO_2 > 95\%$  on room air. The CDC recommends that patients managed in the outpatient setting should have reliable access to care and social support systems so as to ensure follow-up within 24–48 h to assess for worsening lung injury [41]. Patients should also be provided instructions to seek prompt medical care if respiratory symptoms worsen. The CDC recommends hospital admission for patients who have decreased oxygen-hemoglobin saturation ( $S_aO_2 < 95\%$ ) on RA who or who are in respiratory distress.

At present, there is no optimal treatment regimen for EVALI. Vaping must cease. The supportive care focuses on supplemental oxygenation with a target pulse oxygen saturation of 88 to 92%; this can be achieved through high flow nasal cannula if nasal cannula, alone, is insufficient. The approach to managing oxygenation in EVALI cases mirrors that of treatment algorithms of acute respiratory distress syndrome (ARDS) since 26% of patients in one cohort required mechanical ventilation [15]. Similar to its function as rescue therapy for severe ARDS not responding to ARDS ventilator management, venovenous extracorporeal membranous oxygenation (VV-ECMO) has been used successfully in cases reports of EVALI [40, 48, 49].

Empiric antibiotics are often initiated to cover likely pathogens of CAP as well as antivirals during influenza season. Antibiotics may be continued during the initial evaluation and if a concomitant infection eventually is ruled out, they can be discontinued. Along with antibiotics, systemic glucocorticoids have also been utilized as adjunct therapy in the majority of EVALI patients [15, 37, 40].

Observational studies have shown clinical improvement in response to corticosteroids, but it is unclear whether clinical improvement was due to steroids since the natural history of untreated EVALI is not known [15, 37, 40]. A retrospective chart review of pediatric EVALI cases at single hospital revealed improvement in multiple pulmonary function testing (PFT) parameters (including forced expiratory volume in 1 s, forced vital capacity, total lung capacity and diffusion capacity of carbon monoxide) in all patients who received steroids and had PFTs performed, however there was no control group [50]. Ultimately, each patient must be evaluated on a case-by-case basis to determine if the benefits of glucocorticoid therapy outweigh the risks [19, 51].

Additional experimental therapeutic options for the treatment of EVALI are being evaluated. Scott et al. reported that e-cigarette vapor condensate is significantly

more toxic to alveolar macrophages when compared to e-cigarette fluid that is not vaporized [52]. In this *in vitro* study, the investigators showed that using the antioxidant N-acetylcysteine (NAC) can significantly attenuate the cytotoxic and pro-apoptotic effects of the e-cigarette fluid vapor condensate. Choe et al. reported a case of EVALI with favorable outcomes following treatment with inhaled NAC that was being used for its mucolytic properties [53]. While there are theoretical benefits for using NAC in patients with EVALI, further investigation into the therapeutic role of NAC in EVALI management is needed.

## Discharge and follow-up

Prior to discharge from the hospital, it is imperative to ensure that the patients' subjective dyspnea has resolved and that vital signs including oxygenation have stabilized for 24 to 48 h. There is little known about whether resuming vaping after an EVALI diagnosis increases risk for recurrent disease. In a multicenter, prospective, observational study on EVALI patients seen in an integrated health system in Utah, USA (June 27 and Oct 4, 2019), 6 (10%) of 60 patients were readmitted to the ICU or hospital within 2 weeks, of which three (50%) had relapsed with e-cigarette use [54]. Since neither the risk factors for reoccurrence nor the exact mechanisms of EVALI are known, recommending that EVALI patients completely stop vaping and providing appropriate cessation counseling should be an integral part of discharge care. Lastly, those admitted with comorbid conditions may require close follow-up after discharge, since re-hospitalization and post-discharge mortality may be high in those of older age and with underlying chronic conditions [55]. The CDC updated their recommendation for follow-up after hospital discharge from 2 weeks to just 2 days.

Outside of the short-term complications following a diagnosis of EVALI, much is unknown about the long-term sequela of the disease process. Therefore, follow-up evaluation with a Pulmonology specialist as well as addiction counseling may be warranted and establishing a multi-disciplinary program to provide comprehensive care for EVALI patients, as well as routine subjective and objective monitoring, is crucial [56].

## Reporting

EVALI is considered a reportable illness in some states and not others. This information can be found at the websites of individual state health departments to which CDC provides a directory and hyperlink [57]. Details on laboratory collection and specimen submission can also be found on the CDC website [58].



## Prevention

The CDC recommends avoidance of all THC-containing e-cigarette and vaping products as a way to prevent EVALI [17]. Multiple policy initiatives have attempted to minimize and regulate vaping. Most prominently, the passage of the Tobacco 21 legislation in November 2019, that was signed into law December 2019, increased the minimum age of sales from 18 years to 21 years nationwide [59]. Additionally, there have been attempts to combat the sale of flavored nicotine products in order to reduce the appeal to younger people. Effective February 2020, the FDA banned flavored cartridge-based e-cigarette products, except menthol and tobacco flavorings. Certain products, however, do not apply to this ban such as flavorings for non-pod devices. Effective e-cigarette control policy should strongly consider a complete ban on all flavored e-cigarette products, restricting online sales, and taxing e-cigarette/vaping products to decrease youth initiation.

## Conclusions

EVALI is a serious pulmonary disease with public health implications. The diagnostic evaluation of patients with suspected EVALI remains focused on ruling out alternative and concomitant diagnoses as EVALI remains a diagnosis of exclusion. This should frequently be done in conjunction with pulmonary specialists familiar with the disease. Chest imaging is relatively sensitive for EVALI but the findings are non-specific. Bronchoscopy is most useful to help in rule out other diagnoses. All patients diagnosed with EVALI should be instructed to abstain from using e-cigarettes or other vaping products in the future. Outpatient follow-up with a pulmonary specialist should be considered because little is known about the long-term sequelae of this disease.

## Abbreviations

EVALI: E-cigarette, or Vaping, Product Use-Associated Lung Injury; CDC: Centers for Disease Control and Prevention; THC: Tetrahydrocannabinol; IDPH: Illinois Department of Public Health; WDHS: Wisconsin Department of Health Services; RB-ILD: respiratory-bronchiolitis interstitial lung disease; CT: Computed Tomography; FDA: Food and Drug Administration

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## Authors' contributions

Contributions: SHB and RP take responsibility for the integrity of the work as a whole, from inception to published article. All authors substantially contributed to the conception and design of this study. SHB and RP drafted the manuscript and all authors revised it critically for important intellectual content. The author(s) read and approved the final manuscript.

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## Competing interests

The authors declare that they have no competing interests.

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## References

- Perrine CG, Pickens CM, Boehmer TK, King BA, Jones CM, DeSisto CL, et al. Characteristics of a multistate outbreak of lung injury associated with E-cigarette use, or Vaping - United States, 2019. *MMWR Morb Mortal Wkly Rep*. 2019;68(39):860–4.
- Orellana-Barrios MA, Payne D, Mulkey Z, Nugent K. Electronic cigarettes—a narrative review for clinicians. *Am J Med*. 2015;128(7):674–81.
- Gotts JE, Jordt SE, McConnell R, Tarran R. What are the respiratory effects of e-cigarettes? *BMJ*. 2019;366:1–16.
- US Department of Health and Human Services (HHS). Preventing tobacco use among youth and young adults: A report of the surgeon general. *Surg Gen Report*, 2016 [Internet]. 2016; Available from: [https://e-cigarettes.surgeongeneral.gov/documents/2016\\_SGR\\_Full\\_Report\\_non-508.pdf](https://e-cigarettes.surgeongeneral.gov/documents/2016_SGR_Full_Report_non-508.pdf). Accessed 29 Aug 2020.
- Hajek P, Etter J-F, Benowitz N, Eissenberg T, McRobbie H. Electronic cigarettes: review of use, content, safety, effects on smokers and potential for harm and benefit. *Addiction*. 2014;109(11):1801–10.
- Bhatnagar A, Whitsel LP, Ribisl KM, Bullen C, Chaloupka F, Piano MR, et al. Electronic cigarettes: a policy statement from the American Heart Association. *Circulation*. 2014;130(16):1418–36.
- Zhu S-H, Sun JY, Bonnevie E, Cummings SE, Gamst A, Yin L, et al. Four hundred and sixty brands of e-cigarettes and counting: implications for product regulation. *Tob Control*. 2014;23 Suppl 3(Suppl 3):iii3–9.
- Goniewicz ML, Knysak J, Gawron M, Kosmider L, Sobczak A, Kurek J, et al. Levels of selected carcinogens and toxicants in vapour from electronic cigarettes. *Tob Control*. 2014;23(2):133–9.
- Williams M, Villarreal A, Bozhilov K, Lin S, Talbot P. Metal and silicate particles including nanoparticles are present in electronic cigarette cartomizer fluid and aerosol. *PLoS One*. 2013;8(3):e57987.
- Jonas A, Raj R. Vaping-related Acute Parenchymal Lung Injury: A Systematic Review. *CHEST J* [Internet]. 2020; Available from: <https://browzine.com/articles/389438362>. Accessed 29 Aug 2020.
- Sommerfeld CG, Weiner DJ, Nowalk A, Larkin A. Hypersensitivity pneumonitis and acute respiratory distress syndrome from e-cigarette use. *Pediatrics*. 2018;141(6):1–6. <https://pediatrics.aappublications.org/lookup/doi/10.1176/pediatrics.141/6/e20163927>.
- Atkins G, Drescher F. Acute Inhalational Lung Injury Related to the Use of Electronic Nicotine Delivery System (ENDS). *Chest*. 2015;148(4):83A. <https://doi.org/10.1378/chest.2281610>.
- McCauley L, Markin C, Hosmer D. An Unexpected Consequence of Electronic Cigarette Use. *Chest*. 2012;141(4):1110–3. <https://doi.org/10.1378/chest.11-1334>.
- Modi S, Sangani R, Alhajhusain A. Acute lipoid pneumonia secondary to E-cigarettes use: an unlikely replacement for cigarettes. *Chest J*. 2015;148:382A.
- Layden JE, Ghinai I, Pray I, Kimball A, Lauer M, Tenforde MW, et al. Pulmonary illness related to e-cigarette use in Illinois and Wisconsin - final report. *N Engl J Med*. 2020;382(10):903–16.
- Krishnasamy VP, Hallowell BD, Ko JY, Board A, Hartnett KP, Salvatore PP, et al. Update: characteristics of a Nationwide outbreak of E-cigarette, or Vaping, product use-associated lung injury - United States, august 2019-January 2020. *MMWR Morb Mortal Wkly Rep*. 2020;69(3):90–4.
- Outbreak of Lung Injury Associated with the Use of E-Cigarette, or Vaping, Products. [Internet]. Centers for Disease Control and Prevention (CDC). 2020 [cited 2020 May 20]. Available from: [https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/severe-lung-disease.html#latest-information](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html#latest-information).
- Cullen KA, Gentzke AS, Sawdey MD, Chang JT, Anic GM, Wang TW, et al. e-cigarette use among youth in the United States, 2019. *JAMA*. 2019;322(21):2095–103.

19. Butt YM, Smith ML, Tazelaar HD, Vaszar LT, Swanson KL, Cecchini MJ, et al. Pathology of Vaping-Associated Lung Injury. *New Engl J Med*. 2019;381:1780–1.
20. Thota D, Latham E. Case report of electronic cigarettes possibly associated with eosinophilic pneumonitis in a previously healthy active-duty sailor. *J Emerg Med*. 2014;47(1):15–7.
21. Viswam D, Trotter S, Burge PS, Walters GI. Respiratory failure caused by lipid pneumonia from vaping e-cigarettes. *BMJ Case Rep*. 2018;2018:1–4. <https://casereports-bmj-com.ezproxy.bu.edu/content/2018/bcr-2018-224350.long>.
22. Hutzler C, Paschke M, Kruschinski S, Henkler F, Hahn J, Luch A. Chemical hazards present in liquids and vapors of electronic cigarettes. *Arch Toxicol*. 2014;88(7):1295–308.
23. Grana R, Benowitz N, Glantz SA. E-cigarettes: a scientific review. *Circulation*. 2014;129(19):1972–86.
24. Olmedo P, Goessler W, Tanda S, Grau-Perez M, Jarmul S, Aherrera A, et al. Metal concentrations in e-cigarette liquid and aerosol samples: the contribution of metallic coils. *Environ Health Perspect*. 2018;126(2):27010.
25. Giroud C, de Cesare M, Berthet A, Varlet V, Concha-Lozano N, Favrat B. E-cigarettes: a review of new trends in Cannabis use. *Int J Environ Res Public Health*. 2015;12(8):9988–10008.
26. Madison MC, Landers CT, Gu B-H, Chang C-Y, Tung H-Y, You R, et al. Electronic cigarettes disrupt lung lipid homeostasis and innate immunity independent of nicotine. *J Clin Invest*. 2019;129(10):4290–304.
27. Christiani DC. Vaping-Induced Acute Lung Injury. *New Engl J Med*. 2020;382:960–2.
28. Ghinai I, Pray IW, Navon L, O'Laughlin K, Saathoff-Huber L, Hoots B, et al. E-cigarette product use, or Vaping, among persons with associated lung injury - Illinois and Wisconsin, April-September 2019. *MMWR Morb Mortal Wkly Rep*. 2019;68(39):865–9.
29. Blount BC, Karwowski MP, Shields PG, Morel-Espinosa M, Valentin-Blasini L, Gardner M, et al. Vitamin E acetate in bronchoalveolar-lavage fluid associated with EVALI. *N Engl J Med*. 2020;382(8):697–705.
30. Blount BC, Karwowski MP, Morel-Espinosa M, Rees J, Sosnoff C, Cowan E, et al. Evaluation of Bronchoalveolar lavage fluid from patients in an outbreak of E-cigarette, or Vaping, product use-associated lung injury - 10 states, august-October 2019. *MMWR Morb Mortal Wkly Rep*. 2019;68(45):1040–1.
31. Taylor J, Wiens T, Peterson J, Saravia S, Lunda M, Hanson K, et al. Characteristics of E-cigarette, or Vaping, products used by patients with associated lung injury and products seized by law enforcement - Minnesota, 2018 and 2019. *MMWR Morb Mortal Wkly Rep*. 2019;68(47):1096–100.
32. Beattie JR, Schock BC. Identifying the spatial distribution of vitamin E, pulmonary surfactant and membrane lipids in cells and tissue by confocal Raman microscopy. *Methods Mol Biol*. 2009;579:513–35.
33. Wu D, O'Shea DF. Potential for release of pulmonary toxic ketene from vaping pyrolysis of vitamin E acetate. *Proc Natl Acad Sci U S A*. 2020;117(12):6349–55.
34. Schier JG, Meiman JG, Layden J, Mikosz CA, VanFrank B, King BA, et al. Severe pulmonary disease associated with electronic-cigarette-product use - interim guidance. *MMWR Morb Mortal Wkly Rep*. 2019;68(36):787–90.
35. Adams TN, Butt YM, Batra K, Glazer CS. Cobalt related interstitial lung disease. *Respir Med*. 2017;129:91–7.
36. Agustin M, Yamamoto M, Cabrera F, Eusebio R. Diffuse Alveolar Hemorrhage Induced by Vaping. *Case Rep Pulmonol*. 2018;2018:9724530.
37. Davidson K, Brancato A, Heetderks P, Mansour W, Matheis E, Nario M, et al. Outbreak of electronic-cigarette-associated acute lipid pneumonia - North Carolina, July-august 2019. *MMWR Morb Mortal Wkly Rep*. 2019;68(36):784–6.
38. Henry TS, Kanne JP, Kligerman SJ. Imaging of Vaping-Associated Lung Disease. *New Engl J Med*. 2019;381:1486–7.
39. Khan MS, Khateeb F, Akhtar J, Khan Z, Lal A, Kholodovych V, et al. Organizing pneumonia related to electronic cigarette use: a case report and review of literature. *Clin Respir J*. 2018;12(3):1295–9.
40. Maddock SD, Cirulis MM, Callahan SJ, Keenan LM, Pirozzi CS, Raman SM, et al. Pulmonary Lipid-Laden Macrophages and Vaping. *New Engl J Med*. 2019;381:1488–9.
41. Siegel DA, Jatlaoui TC, Koumans EH, Kiernan EA, Layer M, Cates JE, et al. Update: interim guidance for health care providers evaluating and caring for patients with suspected e-cigarette, or vaping, product use associated lung injury — United States, October 2019. *MMWR Morb Mortal Wkly Rep*. 2019;19(12):3420–8.
42. Hashim MJ. Patient-centered communication: basic skills. *Am Fam Physician*. 2017;95(1):29–34.
43. Jatlaoui TC, Wiltz JL, Kabbani S, Siegel DA, Koppaka R, Montandon M, et al. Update: interim guidance for health care providers for managing patients with suspected E-cigarette, or Vaping, product use-associated lung injury - United States, November 2019. *MMWR Morb Mortal Wkly Rep*. 2019;68(46):1081–6.
44. Kligerman S, Raptis C, Larsen B, Henry TS, Caporale A, Tazelaar H, et al. Radiologic, pathologic, clinical, and physiologic findings of electronic cigarette or vaping product use-associated lung injury (EVALI): evolving knowledge and remaining questions. *Radiology*. 2020;294(2):491–505.
45. Pambuccian SE. Testing for lipid-laden macrophages in bronchoalveolar lavage fluid to diagnose vaping-associated pulmonary injury. Are we there yet? *J Am Soc Cytopathol*. 2020;9(1):1–8. <https://doi.org/10.1016/j.jasc.2019.10.002>.
46. Baughman RP, Rennard SI. Bronchoalveolar lavage: general approaches to correct for variability of dilution and lung permeability. *Eur Respir Rev*. 1999;9(66):28–31.
47. Mukhopadhyay S, Mehrad M, Dammert P, Arrossi AV, Sarda R, Brenner DS, et al. Lung biopsy findings in severe pulmonary illness associated with E-cigarette use (Vaping): a report of eight cases. *Am J Clin Pathol*. 2020;153(1):30–9.
48. Baxter RD, Vaquera K, George TJ. Extracorporeal Membrane Oxygenation Support for Vaping-Induced Acute Lung Injury. *Ann Thoracic Surg*. 2020;110:e193–4.
49. Aldy K, Cao DJ, McGetrick M, Willcuts D, Verbeck G, De Silva I, et al. Severe E-cigarette, or Vaping, product use associated lung injury requiring Venovenous extracorporeal membrane oxygenation. *Pediatr Crit Care Med*. 2020;21(4):385–8.
50. Rao DR, Maple KL, Dettori A, Afolabi F, Francis JKR, Artunduaga M, et al. Clinical Features of E-cigarette, or Vaping, Product Use-Associated Lung Injury in Teenagers. *Pediatrics*. 2020;146(1):1–12. <https://pediatrics-aappublications-org.ezproxy.bu.edu/content/pediatrics/146/1/e20194104.full.pdf>.
51. Triantafyllou GA, Tiberio PJ, Zou RH, Lamberty PE, Lynch MJ, Kreit JW, et al. Vaping-associated Acute Lung Injury: A Case Series. *Am J Respir Crit Care Med*. 2019;200:1430–1.
52. Scott A, Lugg ST, Aldridge K, Lewis KE, Bowden A, Mahida RY, et al. Pro-inflammatory effects of e-cigarette vapour condensate on human alveolar macrophages. *Thorax*. 2018;73(12):1161–9.
53. Choe J, Chen P, Falk JA, Nguyen L, Ng D, Parimon T, et al. A Case Series of Vaping-Associated Lung Injury Requiring Mechanical Ventilation. *Crit Care Explorations*. 2020;2:e0079.
54. Blagev DP, Harris D, Dunn AC, Guidry DW, Grissom CK, Lanspa MJ. Clinical presentation, treatment, and short-term outcomes of lung injury associated with e-cigarettes or vaping: a prospective observational cohort study. *Lancet*. 2019;394(10214):2073–83.
55. Mikosz CA, Danielson M, Anderson KN, Pollack LA, Currie DW, Njai R, et al. Characteristics of patients experiencing Rehospitalization or death after hospital discharge in a Nationwide outbreak of E-cigarette, or Vaping, product use-associated lung injury - United States, 2019. *MMWR Morb Mortal Wkly Rep*. 2020;68(5152):1183–8.
56. Parikh R, Belok SH, O'Donnell C, Wakeman CB, Mishuris RG, Potter J, et al. Implementation of a multi-disciplinary team focused on providing Comprehensive Care for Patients Suffering from Vaping-related illness. In: A22 CURRENT TOPICS IN TOBACCO CESSATION AND E-CIGARETTES [Internet]. American Thoracic Society; 2020. p. A1077–A1077. (American Thoracic Society international conference abstracts). Available from: [https://doi.org/10.1164/ajrccm-conference.2020.201.1\\_MeetingAbstracts.A1077](https://doi.org/10.1164/ajrccm-conference.2020.201.1_MeetingAbstracts.A1077). Accessed 29 Aug 2020.
57. CDC - State and Territorial Health Department Websites. <https://www.cdc.gov/publichealthgateway/healthdirectories/healthdepartments.html>. Accessed 29 Aug 2020.
58. Resources and Publications [Internet]. Centers for Disease Control and Prevention (CDC). Available from: [https://www.cdc.gov/tobacco/basic\\_information/e-cigarettes/severe-lung-disease/resources/#hcp](https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease/resources/#hcp). Accessed 29 Aug 2020.
59. Tobacco 21. Food and Drug Administration (FDA). 2020.

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## Maine again seeking DOJ crackdown on illicit Chinese cannabis grows



By [MJBizDaily Staff \(https://mjbizdaily.com/about-us/staff\)](https://mjbizdaily.com/about-us/staff)

January 30, 2024 • Updated January 30, 2024

All four members of Maine’s congressional delegation are once again asking the U.S. Department of Justice [to take action \(https://www.king.senate.gov/newsroom/press-releases/maine-delegation-sends-follow-up-letter-to-doj-urging-crack-down-on-chinese-owned-marijuana-operations\)](https://www.king.senate.gov/newsroom/press-releases/maine-delegation-sends-follow-up-letter-to-doj-urging-crack-down-on-chinese-owned-marijuana-operations) against what they called “illegal Chinese-owned marijuana operations” in the state.

The follow-up letter to U.S. Attorney General Merrick Garland, released Tuesday, was signed by Sens. Susan Collins, a Republican, and Angus King, an independent, as well as Democratic Reps. Jared Golden and Chellie Pingree.

The lawmakers sent their [original request for help \(https://mjbizdaily.com/maine-asks-doj-to-halt-alleged-illicit-chinese-marijuana-grows/\)](https://mjbizdaily.com/maine-asks-doj-to-halt-alleged-illicit-chinese-marijuana-grows/) to the Justice Department last August.

In their Jan. 25 follow-up, the delegation wrote, “Since that time, there have been multiple raids across the state; since the beginning of this year, police have arrested eight people and seized more than 4,400 cannabis plants at four growing sites in [Belgrade, China, \(https://mjbizdaily.com/maine-authorities-charge-5-in-illicit-marijuana-grow-crackdowns/\)](https://mjbizdaily.com/maine-authorities-charge-5-in-illicit-marijuana-grow-crackdowns/) and [Cornville, \(https://wgme.com/news/local/3-arrested-after-police-seize-hundreds-of-plants-in-illegal-maine-marijuana-bust-huansheng-mai-yuling-mei-yiming-hu-cornville-somerset-county-sheriffs-office\)](https://wgme.com/news/local/3-arrested-after-police-seize-hundreds-of-plants-in-illegal-maine-marijuana-bust-huansheng-mai-yuling-mei-yiming-hu-cornville-somerset-county-sheriffs-office) Maine.”

The letter called on the DOJ “and other federal partners to provide additional support for these efforts.”

The August letter noted that “illegal growing operations are detrimental to Maine businesses that comply with state laws, and we urge the Department of Justice to shut them down.”

Both letters posed specific questions to the DOJ, seeking information about issues such as the agency’s actions against illicit marijuana production.

The follow-up letter also asks whether the DOJ needs “additional support ... from Congress to support Maine law enforcement in these efforts.”

# Triad Weed: How Chinese Marijuana Grows Took Over Rural Maine

[themainewire.com/2023/11/triad-weed-illegal-chinese-marijuana-grows-are-all-over-maine/](https://themainewire.com/2023/11/triad-weed-illegal-chinese-marijuana-grows-are-all-over-maine/)

By Steve Robinson

November 8, 2023



Illegal Chinese marijuana grows have taken over much of rural Maine.

The government is either incapable — or unwilling — to do anything about it.

The Maine Wire has identified more than 100 properties that are part of a sprawling network of Chinese-owned sites operating as unlicensed, illicit cannabis growing operations in rural Maine.

According to an unclassified memo from the U.S. Department of Homeland Security (DHS) obtained by the Maine Wire, the illicit grows are operated by Asian Transnational Criminal Organizations (TCOs).

The properties cover Somerset County, Penobscot County, Kennebec County, Franklin County, Androscoggin County, and Oxford County.

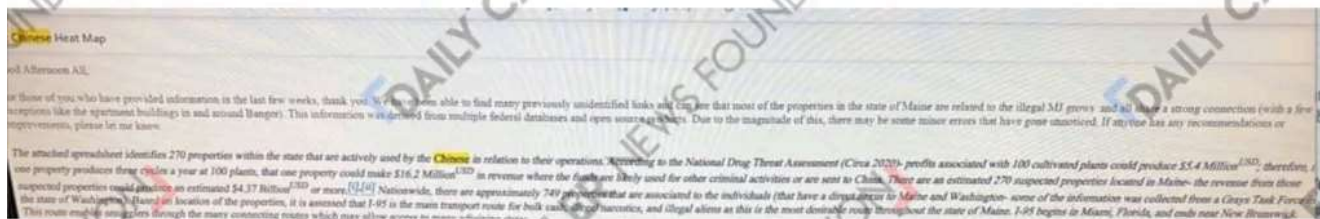
The sites were purchased over the past three years by single adults, primarily from New York and Massachusetts, using cash or financing arranged through a handful of mortgage companies.

The Maine Wire investigation began following the leak of a separate DHS memo that revealed the existence of more than 270 such sites in Maine.

That memo, first reported by Jennie Taer of the Daily Caller News Foundation, offered the first public confirmation of what law enforcement officials have long known, but what neighbors to these properties and legal marijuana entrepreneurs have only suspected.

Namely, that Chinese foreign nationals are exploiting Maine's lax marijuana laws, the Biden Administration's immigration policies, and cheap real estate in rural Maine to grow a fortune using exploited illegal alien laborers.

[RELATED: Illegal Chinese Marijuana Grow Operations Are Taking Over Maine, Leaked Memo Says: DCNF EXCLUSIVE...]



Source: DailyCallerNewsFoundation.org

Nationwide, there are approximately 749 properties that DHS has linked to Asian TCOs.

The leaked memo included a spreadsheet, which has not been made public, that identified "270 properties within [Maine] that are actively used by the Chinese in relation to their operations."



Local, state, county, and federal officials, speaking mostly on the condition of anonymity, have confirmed to the Maine Wire that various law enforcement agencies have known about this foreign network of illicit drug manufacturing and distribution for more than two years.

On Sept. 15, DHS sent the following memo to Maine law enforcement asking for help gathering intel on the properties:

**We are requesting a response by state, county, and/or local law enforcement officials with any information regarding illegal marijuana grows being operated in their areas by suspected Asian Transnational Criminal Organizations (TCO).** This collection effort is supporting a national intelligence gathering initiative to identify a comprehensive picture of the threat posed to national security by Asian TCOs operating illegally in the United States.

A typical response may include:

- confirmation that this activity is occurring
- the number of suspected grows in your area of responsibility
- reports by concerned citizens or local officials relating to illegal grow operations by Asian TCOs
- or any other information respondents may deem of value.

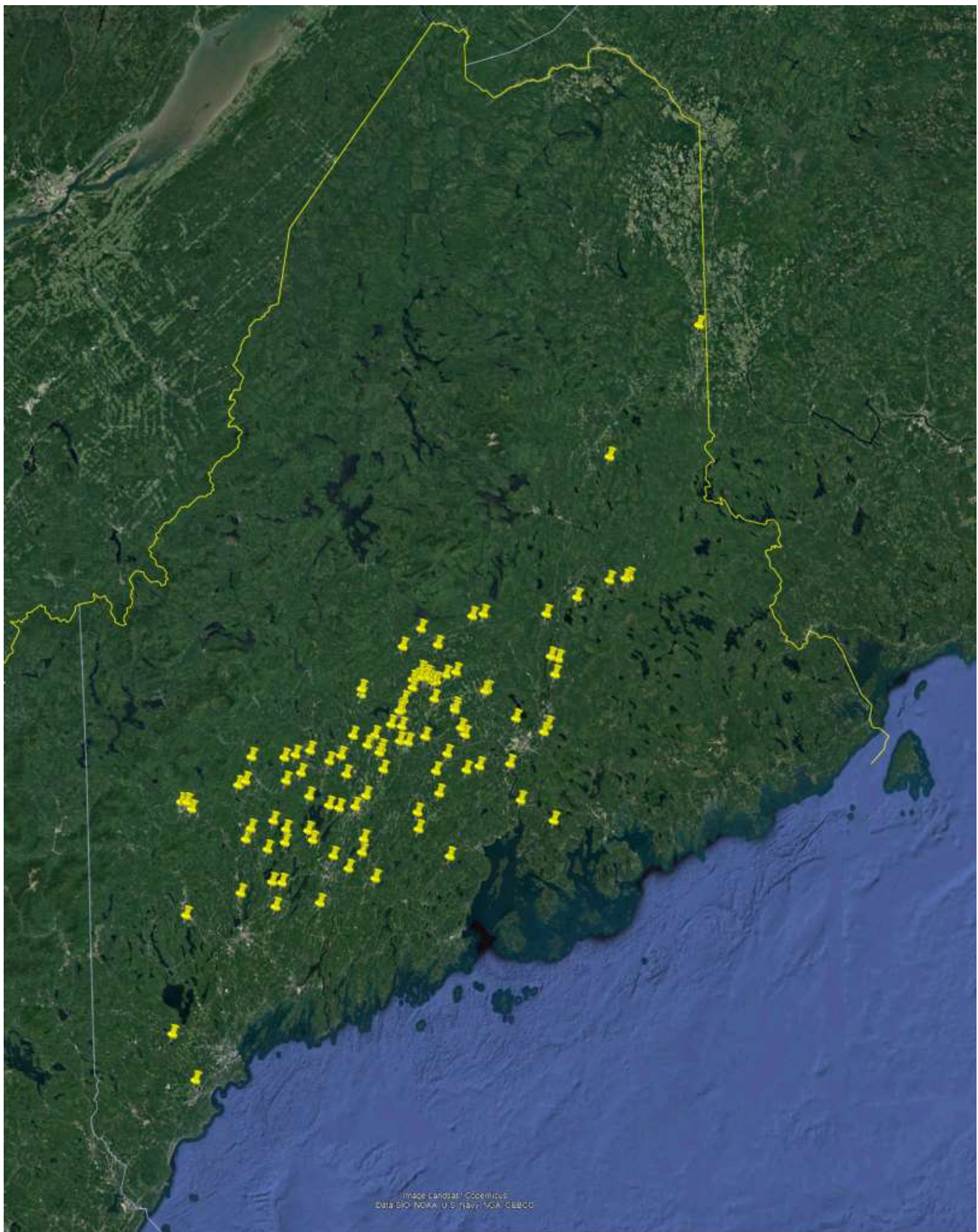
“There are hundreds of these operations occurring throughout the state. It’s upsetting to those who live near these operations, and even those who are following Maine laws and procedures,” Penobscot County Sheriff Troy Morton told the DCNF.

Maine’s congressional delegation has called upon the Department of Justice to shutter the operation, but Attorney General Merrick Garland has yet to respond in writing.

Most of the properties were acquired after Maine legalized the sale of recreational pot in 2020.

According to the DHS memos, the sites are operated by Chinese foreign nationals, some who are in the U.S. illegally. DHS believes the network earns an estimated total income of \$4.37 billion per year, some of which is returned to entities in the People’s Republic of China.

The locations of the sites — and the names of their owners — have not been publicly released.



Each pin represents a property in Maine purchased within the past three years that shows evidence of having been used to cultivate marijuana.

























































**EXHIBITS TO TESTIMONY IN OPPOSITION TO L.D. 40 - 000033**









[Got a tip? Send us an email!]

## Triad Weed in Rural Maine

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Marijuana grown at these sites is notorious in Maine's legal cannabis industry as "Triad weed."

"When I say they function like a mafia, it is absolutely true," one longtime veteran of Maine's medicinal and recreational pot industry told the Maine Wire. "They have a very intricate network."

Scrupulous dispensaries avoid purchasing or selling marijuana from the illicit grows because it has a reputation for containing pesticides, fungicides, and other banned or harmful contaminants.

But legal growers all agree that at least some Triad weed is entering Maine markets.

"I would say most of their product ends up skipping across the border," the industry veteran said. "But the shit that stays in Maine is what is helping to contribute to the collapse of flower prices."

The operators of these foreign-owned sites are also notorious around grow supply shops in Maine, where they are often found buying thousands of dollars in cultivation supplies.

Speaking little to no English, the operators acquire supplies by pointing at images on their phones or by having someone out-of-state translate over the phone.

According to DHS, the Asian TCOs use the proceeds of the marijuana grows to fund other illegal activities, including narcotics trafficking and human trafficking.

The DCNF reported, based on Maine and federal sources, that many of the participants in the operation are either in the U.S. illegally or have applied for asylum status or permanent residency.

Morton, the sheriff of Penobscot County, told DCNF most individuals under investigation for being involved in illegal marijuana grows aren't U.S. citizens.

"Regardless of where the individuals are from, the true problem involves conflicting state and federal laws. We also have little to no oversight, allowing for criminal activity to occur at a high degree," Morton said.

Morton declined to elaborate on those comments, instead referring the Maine Wire to the U.S. Attorney of Maine.

A spokesperson for the U.S. Attorney of Maine declined to comment for this story.

A spokesperson for U.S. Customs and Border Patrol, the agency that published the original leaked memo, declined to comment on the memo.

“The US Border Patrol coordinates closely with our interagency partners when conducting investigations and when taking enforcement actions,” the spokesperson said. “It would not be appropriate for the USBP to comment on behalf of other agencies.”

“Furthermore, Border Patrol does not publicly disclose sources of information, investigative methods, or other information that may jeopardize the safety of witnesses or otherwise compromise any investigation,” said the spokesperson.

The Maine Wire offered to provide the U.S. Attorney of Maine and the Maine State Police with a list of illicit foreign-owned marijuana grows in Maine prior to the publication of this story, but both declined.

The Federal Bureau of Investigation, which has been investigating illegal Chinese marijuana grows in Maine for at least two years, declined to comment for this story.

## **Finding Maine’s Illegal Grow Sites — and Their Owners**

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A review of real estate records, physical site inspections, and interviews with hundreds of Mainers has identified more than 100 Chinese-owned properties in Maine — all purchased by single men and women from out-of-state, primarily Brooklyn and Staten Island, over the past three years.

The buyers often pay cash, but dozens of the properties carry mortgages from just a few finance companies.

The sites are almost all in rural Maine and show evidence of active or recently active marijuana grow operations, including grow supplies and the obvious smell of marijuana even at a considerable distance.

Almost all of the sites have had extensive modifications to houses, garages, and outbuildings to support marijuana growing, including the installation of 300- or 400-amp commercial grade electricity service, consumer-owned utility poles, and multiple heat pumps.

Neighbors confirm that the houses frequently smell of marijuana and several times a year, a white van with New York or Massachusetts plates will arrive and depart. Neighbors also reported, in some cases, seeing tractor-trailer trucks delivering grow supplies.

The properties the Maine Wire has identified account for thousands of acres of land in rural Maine and tens of millions of dollars worth of real estate. Marijuana industry experts said a standard 2,500 square foot house in Maine could, if properly renovated into a marijuana grow, generate \$1 million to \$3 million in marijuana per year.

Although most of the properties are owned under the names of Chinese men and women from New York or Massachusetts, some of them are owned through LLCs.

The Maine Wire was not able to independently confirm the immigration or citizenship status of the owners of these properties; however, nothing in U.S. or Maine law would prevent a Chinese national from purchasing a property in Maine, even if they were in the country illegally.

The Maine Wire has also discovered records tying multiple sites together, including car registrations, municipal waste permits, real estate records, and other public records, which, taken together, support the determination that the grow sites are connected and centrally controlled under an umbrella organization.

At a grow site in Fairfield, for example, there was a Toyota Corolla registered to the owner of a separate site in Garland. That same vehicle was later observed at the site in Garland.

At a different Fairfield site, there was a truck with Mass. plates that had a dump permit sticker for Dexter (40 miles East) and a dump sticker for Wilton (40 miles West).

Law enforcement sources confirmed that they are aware of the existence of multiple sites in both Dexter and Wilton.

Several of the properties that show obvious signs of active or recently active marijuana growing operations have been purchased by Chinese individuals from New York or Massachusetts only to be resold shortly after to other Chinese individuals from New York or Brooklyn.

### **Indoor Marijuana Cultivation 101**

Before we get to the sites the Maine Wire identified, it will be helpful to go over some basics of growing marijuana indoors.

The chief necessity is abundant electricity. That electricity is used to power the grow lights, which consume substantially more energy than your average LED lighting.

But because those lights also generate a tremendous amount of heat, the grow rooms require cooling and ventilation equipment.

The ideal temperature for growing marijuana is 75-80 degrees Fahrenheit. Without significant air conditioning, the lighting would make a grow room too hot.

The primary way the sites in Maine cool their grow rooms and control humidity is through heat pumps.

The combined electricity consumption of the lighting and the heat pumps requires robust upgrades to electrical infrastructure at a typical residential property.



Most of the sites identified by the Maine Wire show evidence of recent electrical upgrades and the addition of multiple heat pumps.

Linesmen from Central Maine Power and local electricians both shared, on the condition of anonymity, stories about being asked to upgrade residential buildings with the power capacity typically only needed by energy-intensive businesses.

“Usually it’s like a 10 KVA transformer that they overload out of a, like a regular house. You won’t even be able to tell,” said a CMP Linesman. “And so we gotta go upgrade and usually one person will come out and stare at us the whole time. They usually don’t know any English”

One electrician in central Maine was asked to install commercial grade service to a mobile home — a job he refused because he found the customers, who did not speak English, too sketchy.

“I met with them one time a couple years back but didn’t like what I was seeing,” the electrician said.

The two most common electrical upgrades encountered at these sites are new 300- or 400-amp breaker boxes and consumer-owned utility poles.

Without such upgrades, running a grow operation on common residential wiring risks starting a fire, as has happened at sites in Canaan, Winterport, and Vassalboro.

In addition to electricity, the indoor grow rooms need to seal out ambient light, which is why all of the windows are boarded up at these locations.

Ambient light during a dark-cycle can cause young marijuana plants to turn into hermaphrodites, which decreases the potency of the flower.

Here are some more in-depth looks at sites the Maine Wire has identified based on real estate records, photographs provided by sources, public records, and interviews with law enforcement and residents of the towns.

### **629 Norridgewock Road, Fairfield**



This 4-bed, 2-bath house was purchased by 32-year-old Juan Lin on July 30, 2021, according to Somerset Registry of Deeds records.

The windows are obscured, not with curtains or blinds, but with a type of foil foam board used to keep out ambient light.

On the back of the house, there are three active heat pumps, two on the main house and one on the semi-detached garage.

The home also boasts an electrical entrance that far exceeds the standard residential electrical equipment.







**EXHIBITS TO TESTIMONY IN OPPOSITION TO L.D. 40 - 000042**

In 2021, prior to Lin's purchase, the home did not have any heat pumps or commercial grade electricity.







A master electrician licensed to work in Maine said the electrical equipment on the side of the home appeared to be a 400-amp service with two 200-amp manual disconnects — an expensive arrangement that is rare to install on a residential property.

In layman's terms, the house is consuming far more energy than your average Maine home.

It also reeks of pot, according to neighbors.

Inside the home, photos show clear evidence of a marijuana growing operation. (Note: these were provided by a source who asked to remain anonymous.)

Legal Maine cultivators consulted by the Maine Wire assessed that this is what a standard grow operation looks like, noting the chemical containers, the newly installed benching on either side of the room, and wiring.





This picture shows the same room prior to 2021.



**EXHIBITS TO TESTIMONY IN OPPOSITION TO L.D. 40 - 000047**





At the time the more recent photos were taken, there were two vehicles on the property. A charcoal gray truck with Massachusetts license plates and a large white cargo van, also with Mass. plates.

According to public records, the only other address associated with Lin is in Quincy, Mass., where he appears to live with several family members.

Though Lin owns the property, there is no evidence that he has himself participated in the cultivation or trafficking of marijuana.

Title Order No.: 2021-78  
Escrow No.: 2021-78  
LOAN #: 2106QB038789

[Space Above This Line For Recording Data]

## MORTGAGE

### WORDS USED OFTEN IN THIS DOCUMENT

Words used in multiple sections of this document are defined below. Other words are defined in Sections 3, 5, 8, 10, 11, 13, 18, 20 and 21. Certain rules about the usage of words used in this document are also provided in Section 16.

(A) "Security Instrument" means this document, which is dated **July 30, 2021**.

The term

"Security Instrument" includes any Riders recorded with the Security Instrument.

(B) "Borrower" means **JUAN LIN**,

who sometimes will be called "Borrower" and sometimes simply "I" or "me." "Borrower" is granting a mortgage under this Security Instrument. "Borrower" is not necessarily the same as the Person or Persons who signed the Note. The obligations of Borrowers who did not sign the Note are explained further in Section 13.

(C) "Lender" means **Quontic Bank**.

Lender is a corporation

or association which exists under the laws of **The United States of America**.

Lender's address is **One Rockefeller Plaza , 9th Floor, New York, NY 10020**.

Except as provided in Sections 13 and 20, the term "Lender" may include any Person who takes ownership of the Note and this Security Instrument.

(D) "Note" means the note signed by **Juan Lin**



DOC 12040 Bk 5764 Pg 194

**Exhibit A - Property Description****Borrower(s): Juan Lin****Property Address: 629 Norridgewock Rd., Fairfield, ME 04937**

A certain lot or parcel of land with the buildings thereon situated in the Town of Fairfield, in the County of Somerset and State of Maine said premises being located on the westerly side of Route 139 and being the northeasterly corner of land as conveyed by Frank Tozier et ux to Howard L. Knox and Florence W. Knox by Deed dated October 13, 1977 and recorded in the Somerset County Registry of Deeds in Book 884, Page 373 and being more particularly bounded and described as follows to wit:

Commencing at a point in the northerly line of land as above conveyed which said point of beginning is marked by a steel rod driven in the ground in a stone wall and is located two hundred sixty-seven feet (267') more or less westerly of said Route 139 as measured along said stone wall which is the northerly line of the premises hereby conveyed; thence south sixty degrees east (S 60° E), or as the course may be along said stone wall which is the northerly line of the within described premises two hundred sixty-seven feet (267'), more or less to a point on the westerly sideline of said Route 139 at or near a steel rod driven in the ground; thence south three degrees east (S 3° E) or as the course may be along the westerly sideline of said Route 139 One Hundred Fifty feet (150') more or less to a point at or near another steel rod set in the ground; thence north eighty-five degrees west (N 85° W) two hundred feet (200') more or less to a point marked by another steel rod set in the ground and which said point is located two hundred sixty-seven feet (267') southeasterly of the point of beginning; thence northwesterly or as the course may be in a straight line two hundred sixty-seven feet (267') to the point of beginning.

Being all and the same premise deed from Karen Pullen Herceg to Juan Lin date this date and recorded in the Somerset County Registry of Deeds.

Doc 12040 Bk 5764 Pg 190

LOAN #: 2106QB038789

BY SIGNING BELOW, I accept and agree to the promises and agreements contained in this Security Instrument and in the Rider signed by me and recorded with it.

Juan Lin 7/30/2021 (Seal)  
JUAN LIN DATE

State of MAINE County of SOMERSET

The foregoing instrument was acknowledged before me this 7/30/2021 (date) by JUAN LIN (name of person acknowledged).

Karen J. Strout  
(Signature of Person Taking Acknowledgement)

(Title or Rank)

(Serial Number, if any)

Lender: Quontic Bank  
NMLS ID: 403503  
Loan Originator: Yingchan Weng  
NMLS ID: 1566202

KAREN J. STROUT  
NOTARY PUBLIC  
State of Maine  
My Commission Expires May 17, 2027

The Maine Wire has identified more than 100 similar sites in Maine that all fit many elements of the same pattern: 1) purchased in the past three years by a single Chinese men or women from New York or Massachusetts; 2) strong odor of marijuana even from a distance of 100s of feet; 3) rubbish from commercial grow products; 4) massive upgrades to the electrical capacity of the property; 5) property has large garage, outbuilding, or barn; 6) all windows are completely blacked out; 7) multiple security cameras; and 8) multiple heat pumps running constantly.

#### 4 Smith Road & 43 Cape Cod Hill Road, New Sharon

In New Sharon (population: 1,500), the Maine Wire identified two obvious marijuana grows purchased within the last three years.

A property at 4 Smith Road was purchased in July 2021 by Wen Bin Zhao, 34, of Brooklyn.











The house bears the tell-tale signs: all the windows boarded up, electrical upgrades, and, most tellingly, an overpowering odor of marijuana that could be easily detected from hundreds of feet away.

Similarly, this massive property at 43 Cape Cod Hill Road was purchased in June 2021 by Muhua Chen, 38, of Staten Island, N.Y.

During a visit in October, windows visible from the public road and the neighbors driveway appeared completely boarded up and the odor of marijuana was powerful (though that could have been because the site is about 200 yards from 5 Smith Road).

Although Chen and Zhao's names appear on the deeds of these properties, there is no evidence that they have themselves cultivated or trafficked illicit marijuana.





Photo from Zillow prior to Chen's purchase.

Here's the house now:









### **Madison: Golf Course Road and Lakewood Road**

Madison is host to at least three active indoor marijuana growing operations. The operations are at 383 Lakewood Road, 288 Golf Course Road, and 21 Golf Course Road.

When the Maine Wire visited these three properties attempting to interview the occupants, we observed the tell-tale signs of marijuana grows — blacked out windows, electrical upgrades, multiple heatpumps, and the obvious odor of marijuana.

The 21 Golf Course Road is owned by Changju Wu and was previously owned by Joe Hao Liang, who also owns 383 Lakewood Road.

The house at 288 Golf Course Road was owned by Yanyi Wu, 30.

Wu, who previously lived in Brooklyn, purchased the property in Oct. 2020 and sold it this September to Jamie Yajing Chen, also previously from Brooklyn.

Wu is also the owner of a house in Embden. Although Wu obtained financing for the Embden location, the two Madison properties were purchased in cash.



Like the Fairfield location, the property at 383 Lakewood Rd. has undergone significant renovations since it was purchased.

Photos available on Zillow from before Wu acquired the property show it had no heat pumps installed on the front of the building.



While attempting to contact Wu at the house for an interview, the Maine Wire observed three heat pumps on the front of the building and one on the back. Comparing the before and after pictures also shows that the garage has had new power service installed within the past three years.

When the Maine Wire visited, every window was blacked out with sheet rock and blankets, and the smell of marijuana was apparent.





A roughly five minute drive from the Lakewood Road properties brings you to Golf Course Road.

At 288 Golf Course Road, the house smelled strongly marijuana when the Maine Wire attempted to contact the owner.

A vent on the side of the garage was pumping hot air that smelled strongly of marijuana.





**EXHIBITS TO TESTIMONY IN OPPOSITION TO L.D. 40 - 000060**

Although a woman came out of the house to talk, conducting an interview was impossible because she only spoke Mandarin.

The occupant, a middle-aged Chinese woman, called an unidentified person who attempted to translate and conveyed that they were uninterested in talking.

The windows on the house and the garage were all boarded up with either foam insulation or sheetrock, and the home had commercial grade electrical service. The home also had multiple security cameras.



Like with other properties, before and after pictures show significant changes to the electrical equipment on the house following its purchase.





On the same road is another site that a neighbor described as a Chinese-owned marijuana growing operation.

The neighbor, who asked not to be named, said it was common knowledge on the road that the house was being used to grow marijuana. The aroma left little reason to doubt his opinion.

Comparing older pictures of the property to how it appears now shows significant modifications to the five car garage, including window covers to exclude ambient light.







**169 Baker Road, Winterport**



Fires are not uncommon at these sites.

This house in Winterport was purchased in August 2021 by Wanzhen Huang, 50, of Brooklyn, N.Y. The purchase price was \$182,000, and Zillow currently estimates it at \$348,900, but Zillow might not know about the unrepaired fire damage. This is how the home looks now.







A neighbor took this picture shortly after the Winterport house caught fire.

When the Maine Wire visited the home seeking an interview with the occupants, it appeared abandoned.















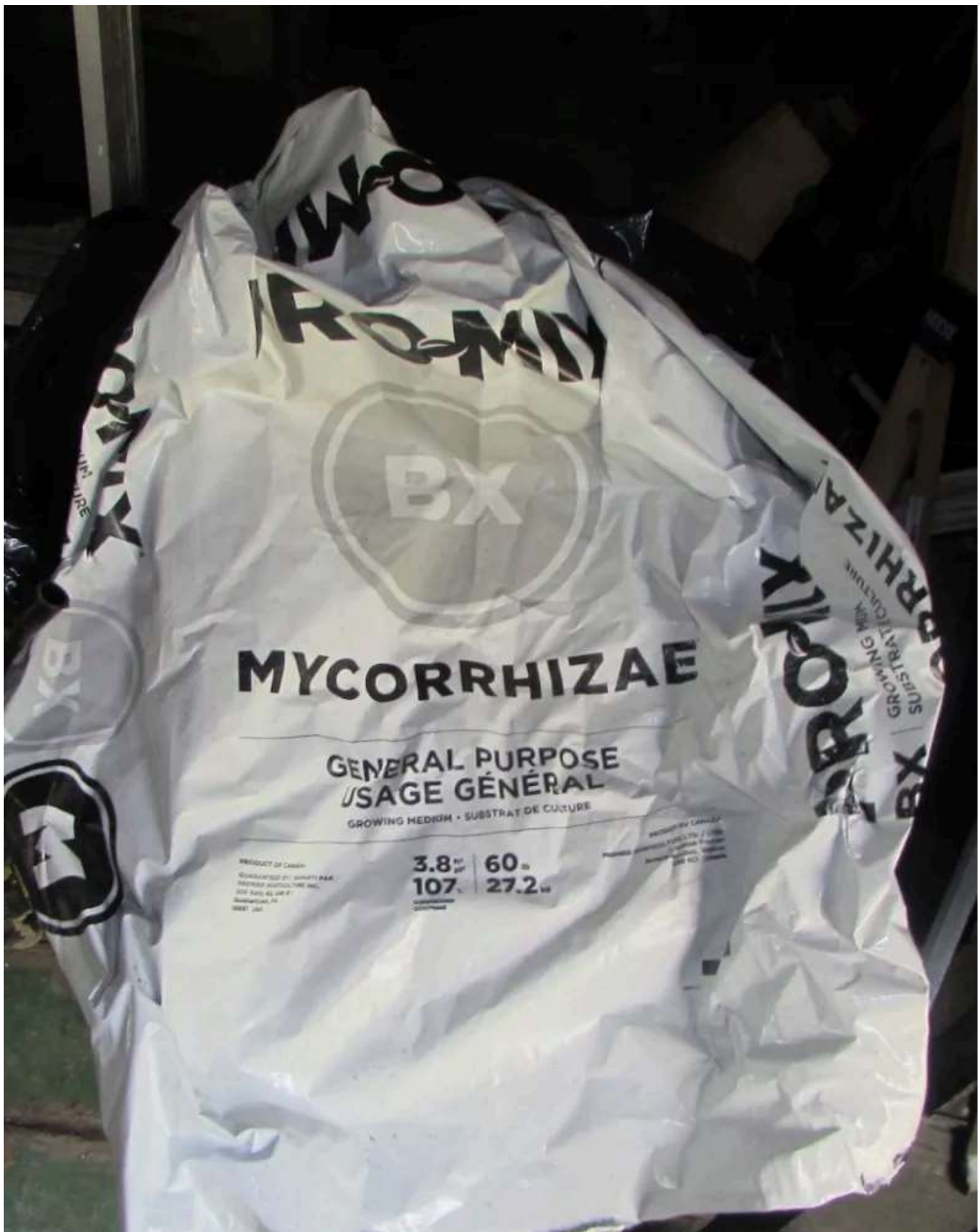


346 Ohio Hill Road Rt 23, Fairfield



This dilapidated Ohio Hill Road house was purchased by Yifeng Yu, 38, of El Monte, Calif., in February of 2020. Images provided to the Maine Wire by a source who asked to remain anonymous show marijuana growing equipment littering the property, including plant pots, fertilizer containers, and soil supplements.











**195 West Road, Chesterville**

In Chesterville, the Maine Wire observed the strong odor of marijuana at this property.



A source, who asked to remain anonymous, said CBP has visited this property and even used a hidden camera to photograph it over a period of months.

A CBP agent declined to comment when asked about this property.

### **Harming Legal Growers**

Legal marijuana cultivators told the Maine Wire that licensed operators have long believed that at least some weed grown illegally at sites controlled by Chinese organized crime is making into Maine's legal marijuana market.

The influx of cheap Chinese weed — which cannabis aficionados have dubbed “Triad Weed” — is, they believe, depressing prices.

“[Marijuana prices] went from \$2,800 during COVID and right before COVID,” said one medicinal grower. “Now, for a good pound of flower, it’s like \$1,250. So your profit on that after your CMP bill, your profit on that is like, you know, \$600.”

“All these little guys and all these caregivers that are doing the right thing are getting shut out and shutting down,” they said.

The plummeting price for legal cannabis in Maine coincides well with when Chinese buyers began scooping up rural Maine properties and converting them into grow operations.

### **How Much Money Are These Sites Making?**



First off: How much marijuana could each site produce?

According to industry experts the Maine Wire consulted, the amount of marijuana produced at a given spot would depend on the skill of the growers, the resources at their disposal, and how much of the home and garage has been dedicated to grow rooms.

Assuming maximum efficiency, a 2,500 square-foot house could accommodate 50 grow lights, which would produce 100 pounds of processed marijuana per harvest. Such an operation could expect four to twelve harvests per year, or 400 to 1,200 pounds of marijuana flower.

How much is that in U.S. dollars? That depends on where the flower is ultimately sold. If the flower is sold into Maine's barely regulated medicinal market, it's almost certainly being sold for less than \$800 per pound. However, if the flower is being trafficked back to NYC, the black market price is closer to \$3,000 per pound.

Although there are a considerable range of factors, multiple individuals told the Maine Wire that it was realistic to conclude that an operation of this type could fetch \$1.2M to \$3.6M, not including the considerable costs of electricity, fertilizers, pesticides, fungicides, and, in some cases, mortgage payments.

This will be the first in a series of stories from the Maine Wire concerning Chinese organized crime in Maine.

Future articles in this series will focus on the financial arrangements that have allowed Chinese buyers to purchase so much real estate in Maine, the political response to this problem from Augusta, how the Office of Cannabis Policy understands the problem, and what steps law enforcement is taking.

*Edward Tomic and Graham Pollard contributed to this report.*

## Caregiver Exodus: Market Conditions and the Impact on Maine's Medical Use of Cannabis Program

*The Office of Cannabis Policy surveyed former caregivers to gain a better understanding of why they did not renew their registration in Maine's Medical Use of Cannabis Program in 2022.<sup>1</sup>*

### Introduction

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The Maine Medical Use of Cannabis Program (MMCP) saw over 1350 caregivers exit the program from the end of 2021 to the end of January 2023. The impacts of this exodus—a net loss of over 800 caregivers—have been felt by the remaining caregivers and resulted in a number of unsubstantiated claims about *why* this trend has emerged and *why* caregivers are continuing to leave the program. Rather than relying on anecdotal evidence, in early 2023, the Office of Cannabis Policy (OCP) surveyed former caregivers to gain a better understanding of why so many registrants exited the program. The results show that business and market conditions were the central drivers of program exits rather than other narratives, such as state regulations being too arduous and costly for most caregivers to operate.

### Background & Methodology

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The decrease in the number of medical cannabis caregivers accounts for 27.5% of the program's participants from 2021 to January 2023. This decrease has been a significant shock to the program, and many inside and outside of the program have speculated as to why these changes have happened. OCP has sought to bring data and analysis to this conversation, while developing a better understanding of the policy realities within the caregiver program.

To understand this issue more rigorously, OCP designed a survey to examine why caregivers have exited the program.<sup>2</sup> The survey was emailed to every caregiver who exited the program between January 1, 2022, and January 31, 2023, and 1339 individuals were successfully reached.<sup>3</sup> Only 14 former caregivers did not have a valid email address on file. Over the course of several weeks,<sup>4</sup> OCP received responses from 117 former caregivers—a response rate of 8.7%. Survey responses were anonymous; however, respondents were given the opportunity at the end of the survey to provide their contact information if they were open to potential, future follow up from OCP.

### Survey Findings

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As Figure 1 demonstrates, OCP received responses from individuals previously engaged in authorized conduct across the six different categories listed. The vast majority of respondents—71.7%—previously either cultivated cannabis for direct sales or cultivated cannabis for wholesale. This finding makes sense for two reasons. First, most caregivers in the program participate in these two activities. Second, the price of cannabis in the MMCP has dropped precipitously in concert with increases in production. Cultivators

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<sup>1</sup> The design and implementation of this survey, including all data collection and analysis, was conducted internally by OCP.

<sup>2</sup> OCP defines a program “exit” as an individual who allowed their caregiver registration to expire, failed to renew, withdrew, or voluntarily withdrew.

<sup>3</sup> This figure is larger than the net loss of 770 mentioned above because new caregivers enter the program each year, while others exit, making what is a larger number of exiting program participants.

<sup>4</sup> Responses were collected from February 17, 2023, to March 17, 2023.



are most likely to feel those market effects more than participants in other jobs, and thus participants from those groups are more likely to exist in the MMCP.

**Figure 1:** Respondents' Authorized Activity

Category	Total	Total (%)
Cultivated cannabis for direct sales to a qualifying patient	41	35%
Cultivated cannabis for wholesale to another registered caregiver or dispensary	43	37%
Employed a registered assistant(s)	3	3%
Manufactured cannabis products and cannabis concentrate for medical use	8	7%
Provided samples to a cannabis testing facility	2	2%
Operated a caregiver retail store	4	3%
No answer	16	14%

The seven survey questions OCP asked to former caregivers are as follows:

1. Please tell us in your own words why you did not renew your caregiver registration.
2. Which of the following reason(s) most closely represents why you did not renew your caregiver registration? (Select your top 5 reasons.)
3. Do you believe changes in regulations would have better protected your caregiver business? (For example: A regulation requiring tracking that would protect against illicit cannabis entering the medical market and impacting price and profit.)
4. If you answered "more regulation" or "less regulation" in the previous question, please explain in your own words how that would have affected your business?
5. Is there anything you would like to share with the Office of Cannabis Policy regarding your decision to not register as a caregiver?
6. What caregiver authorized activities did you engage in?
7. If you are interested in speaking with OCP, please provide your name and email address below.

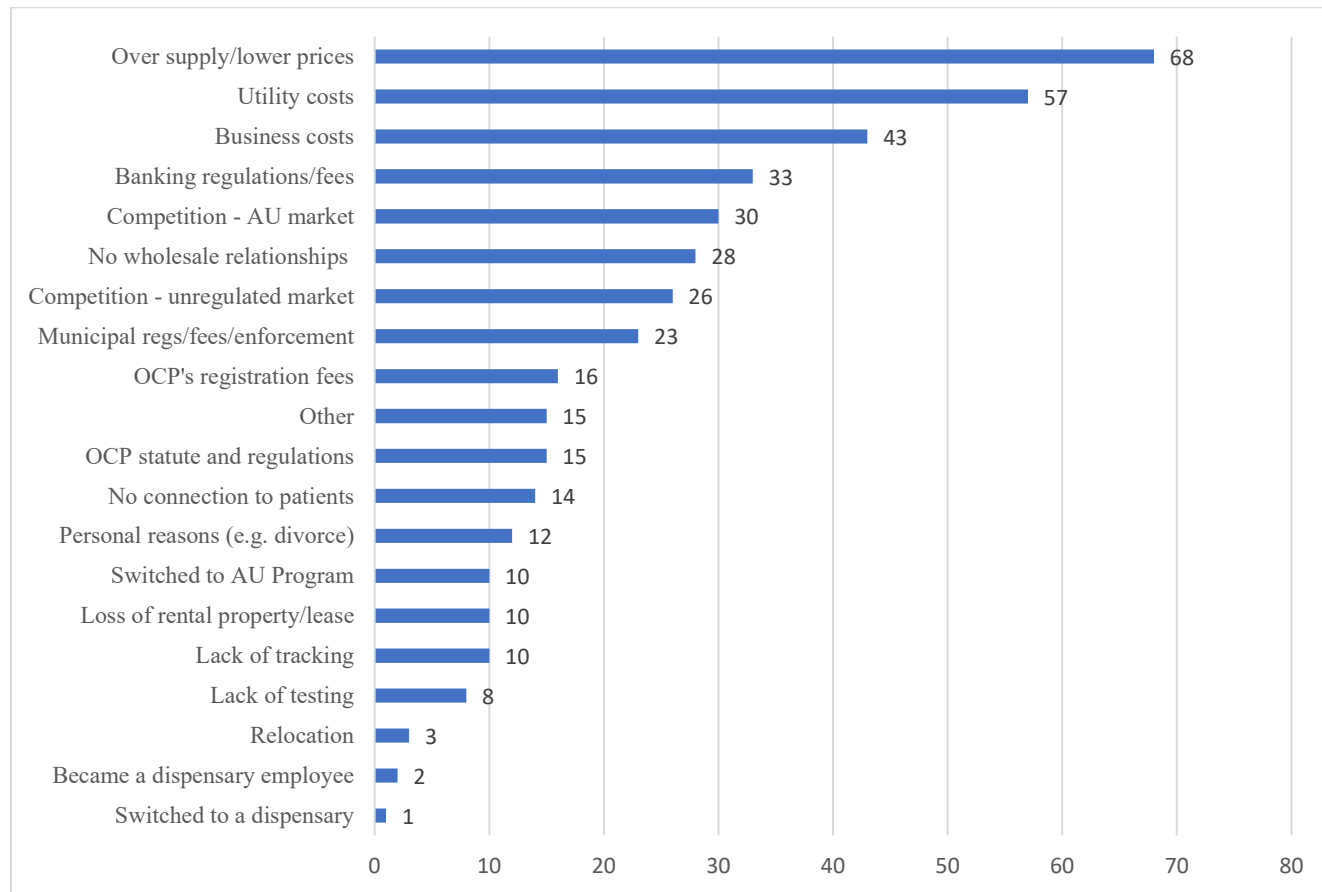
OCP's preference was to keep the survey short and straightforward in order to increase survey completion rates. The only questions respondents were required to answer were Questions 1 and 2, with the most critical question in the survey being Question 2. Here, former caregivers were able to select the top five reasons that contributed to their decision to exit the MMCP. The order of the 20 available options was randomly displayed for each respondent, and Figure 2 shows the list of those 20 options. This set of options spans a variety of topics from business issues to market conditions to policy reasons. The Office also wanted to hear former caregivers' issues or problems with OCP and other government institutions.

**Figure 2:** Complete List of Answer Options for Question 2

OCP's registration fees	Competition with the unregulated/illicit market
Business costs (e.g. nutrients, processing)	OCP statute and regulations
Utility costs (e.g. electricity)	Lack of testing
Banking regulations/fees	Lack of tracking
Municipal regulations/fees/enforcement actions	Switched to the Adult Use Program
Loss of rental property/lease	Switched to the dispensary model
No connection to patients	Became an employee of a dispensary
No wholesale relationships	Relocation (within state or out of state)
Over supply of product/lower prices	Personal reasons (e.g. divorce)
Competition with the Adult Use market	Other

The top five most common responses among former caregivers were 1) Over supply of product/lower prices, 2) Utility costs, 3) Business costs, 4) Banking regulations/fees, and 5) Competition with the Adult Use market. These five items collectively amounted to 54.5% of the 424 total responses.<sup>5</sup> In fact, when adding in the next two most popular responses—no wholesale relationships and competition with the unregulated/illicit market—those seven total responses make up more than two-thirds of all responses (285 out of 424). Individually, over supply of product/lower prices was selected as a top five issue by 68 of the 117 respondents (58.1%). Utility costs was selected as a top five reason by 57 of 117 respondents (48.7%). The distribution of all responses by answer is available in Figure 3.

**Figure 3:** Reasons for Not Renewing Caregiver Registration in 2022 (n=117)



These findings depart dramatically from the rumors and speculation about what has happened within the MMCP. Part of the unsubstantiated narrative centers on caregivers' unhappiness with OCP in its regulation of the program. The data suggest this take represents a distinctly minority view. Only 16 respondents noted OCP's registration fees as a top five issue for leaving the program (13.7% of all respondents). Similarly, 15 respondents noted OCP statute and regulations as a top five reason (12.8% of all respondents). Together those two answers accounted for only 7.3% of all responses.

<sup>5</sup> The total number of responses for Question 2 is greater than the total number of survey respondents as participants were allowed to select up to five answers for this question.



## **The Impact of Regulations on Caregiver Exits**

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Another aspect of the unsubstantiated narrative around the decline in the number of caregivers is that state regulations are too arduous and costly for most caregivers to operate. The survey data indicate that perspective is inaccurate, as well. Of the 109 respondents who answered Question 3, 19 stated that less regulation would have better protected their caregiver business. That amounts to 17.4% of responses. Further pushing back against the narrative of burdensome regulations, more respondents (21.1%) noted that more regulation would have better protected their caregiver business. Most strikingly, nearly half of all respondents (45.9%) said that regulation did not impact their decision to exit the MMCP.<sup>6</sup>

## **Hearing from Former Caregivers**

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One of the benefits of the survey was its inclusion of an open-ended section in which former caregivers could describe their reasons for leaving. Frequently, the legislature hears from the same voices from the medical community. Those voices are important; however, OCP frequently hears from medical patients, caregivers, and others in the medical industry who offer a much more diverse set of views and opinions on matters. Some have described a disinterest in participating in public forums. Others, unfortunately describe experiences in which they or people who they know have experienced harassment or physical and economic intimidation that makes them unwilling to speak publicly. OCP staff have frequently heard from medical (and even adult use) program participants asking that their name not be associated with their concerns and comments.

The goal of this survey was to provide a forum for former caregivers to speak their mind and remain anonymous, even to OCP. This exercise was helpful in terms of hearing unfiltered opinions. Admittedly, some were critical of OCP. One former caregiver noted quite bluntly and simply, “Get out of our business and stay out of our business!” Another was more pointed writing, “I look at the entire program as an utter failure – and look back at the time I wasted with great regret. Screw you guys.” Others focused on state tax policy as a problem. One wrote, “To (sic) much big out of state big business and recreational licensing...the state has forgotten about the small medical aspect...seems like only concerned about the large tax revenue.” Another said, “...Y’all are so concerned with taxing people and making the state money that you don’t really care about the product or the people in need.”

That feedback, although critical of the state’s legislative and executive branches and municipal governments, is important to hear.

At the same time, concerns and criticism were not solely directed at government. Significant areas of criticism centered on five key areas (which largely track with the responses to Question 2 of the survey): overproduction/lack of profit, out of state money and companies, the adult use market’s success, the presence of and bias toward big business, and illegal operations/non-compliant caregivers. It is also important to note that several people offered single responses that discussed problems across multiple categories.

One prime example comes from a former caregiver who listed “no wholesale relationships” as one of his/her primary reasons for exiting the medical program. This respondent wrote,

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<sup>6</sup> Upon further analysis of the responses to this question, some of the respondents who indicated "regulation did not impact my decision" selected answers in Question 2 that reflected areas where greater levels of regulation could have helped. For example, 32 of the respondents that stated “regulation did not impact my decision” also indicated that over supply of product/lower prices was one of their top reasons for leaving the MMCP, and another 21 listed either competition with the Adult Use market or the unregulated/illicit market as one of their top reasons for leaving.

“More regulation of the size of recreational cannabis businesses. We have allowed big businesses to come in and open recreational cannabis grows and stores. Nobody in the public domain wants to pay \$50 for a medical card. Nobody with a small business can afford to compete with the over saturated market, at a time when prices are going up on electricity and rent (more than double) the recreational market has destroyed medical simply by growing more and dropping prices to rock bottom. Incidentally, our medical market is flooded with caregivers that are forced to sell illegally on the side just to survive in today's market.”

Here, the former caregiver was concerned with the adult use program, big business, the cost of a medical card, business and utility costs, and caregivers operating in the illicit market. This response demonstrates the complex set of problems contributing to the interwoven policy challenges impacting the MMCP as currently structured.

That response was not unique in its focus on the impact of illicit operations. One former caregiver acknowledged, “The amount of product coming from outside state lines, and the amount of business saturation.” One respondent looked at issues within the system—a complaint OCP hears somewhat regularly in other settings, “OCP needs to do more enforcement against bad caregivers, hold them accountable.”

Some shorter responses focused on similar issues with overproduction and out of state or big businesses. These included, “Maine was well on it’s (sic) way to becoming the best cannabis growers in the world. With out of state money and junky pot out of staters forced my hand.” “Market is over saturated, utilities out of control.” “Too many large (commercial) facilities.”<sup>7</sup> “No money to be made anymore.” “Profit margins have become too slim.”

One alarming finding among some responses was a few respondents’ willingness to operate illegally. One noted, “The industry is not profitable. I would rather sell weed on the street, at least I would make 7.25/hour.” Another wrote, “I would rather sell it illegal and make money then have to pay to not even be allowed to open a store” (sic).

## Conclusions

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Ultimately, the former caregiver survey provides critical information and a clearer understanding of the forces weighing on operators in the MMCP. The central drivers of caregivers’ decisions to exit the program are business and market conditions. Dramatic oversupply<sup>8</sup> and its associated plummet in commodity prices have been devastating, especially in light of increasing energy costs during the period of exodus. This information contradicts various other narratives about why caregivers have left the program, such as state regulations being too strict or registration fees being too costly for program participants to operate.

The overproduction in the MMCP has come as a result of legislative refusal to update the MMCP’s statutes in five years, even as the industry has transformed significantly. For example, with no inventory

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<sup>7</sup> Parenthetical insert included by respondent.

<sup>8</sup> Previous survey finding on oversupply in the MMCP: “...the medical cannabis market in Maine has been active for over ten years, making the 6:1 ratio an anomaly to trends observed in other states. Typically, as states progress in their timeline post market legalization for medical or adult-use, the demand-to-supply ratio decreases as efficiencies are met.” Maine Office of Cannabis Policy Cannabis Markets & Associated Outcomes - Survey Findings and Implications, Medical Supply Estimates, pp. 22-28, available at: <https://www.maine.gov/dafs/ocp/sites/maine.gov.dafs.ocp/files/inline-files/Maine%20OCP%20AHP%20Report%2006-22.pdf>, published Spring 2022.



tracking system implemented for the medical program, it is impossible for OCP to ensure that program participants are sourcing their product from the regulated market and not diverting product to the illicit market. With no updates to the MMCP registration types, medical registrants are able to participate in one, some, or all of the activities authorized under their registration type and there is no specific registration for cultivators. Registered medical dispensaries are even permitted to grow an unlimited number of cannabis plants under existing statute, creating more competition for registered caregivers. The legislative failures in these areas and others, often favored by industry members, have caused damage to many small business owners.

The oversupply in the MMCP has ultimately left businesses vulnerable to other market and business conditions. Business costs, utility costs, banking fees, competition from the illicit market, and competition from the adult use market compounded challenges for these businesses and workers. In a stable market with stable prices and supply, variable costs are easier to accommodate or endure. However, in an industry in which overproduction has led to massive drops in price, the effects of these costs have become insurmountable for many caregivers.

As a final indication of the oversupply within the medical cannabis system, even as there has been a mass exodus of caregivers in the program, supply has been uninterrupted. The findings in this report are eye opening about the problems that exist within the MMCP. At the same time, this report offers an opportunity. It provides a roadmap to enact policy changes that can simultaneously stabilize the medical cannabis market, protect Maine's 106,000+ medical patients, and ensure a continued uninterrupted supply of medical cannabis.