STATE OF MICHIGAN
DEPARTMENT OF HEALTH AND HUMAN SERVICES
LANSING

GRETCHEN WHITMER
GOVERNOR

AMY EPKEY
ACTING DIRECTOR

September 15, 2026

Rebekah Condon, MPH
Health Officer, Barry-Eaton County Health Department
330 W Woodlawn Ave,
Hastings, MI 49058

Dear Rebekah Condon,

At your request, the Michigan Department of Health and Human Services (MDHHS) conducted a public health evaluation of environmental sampling data collected at Tyden Lofts in Hastings after an incident involving ricin. Environmental data were collected to confirm that conditions in most areas of the apartment building are no longer an imminent danger to building occupants. This Letter Health Consultation documents the clearance sampling for **first floor apartments from unit 101 to unit 113 and the common hallway from unit 113 to the south stairwell.**

At the time of this health consultation, law enforcement and public health agencies continue to coordinate regarding this matter. Questions regarding the nature or status of any Federal Bureau of Investigation (FBI) activity should be directed to the FBI Detroit Field Office.

After evaluating the available data, MDHHS concludes that occupancy in the first floor areas referenced above no longer pose an imminent danger to life and health from ricin and can be safely reoccupied.

- This conclusion is supported by:
  - Sampling conducted by the U.S. Environmental Protection Agency (EPA) and analysis performed by the MDHHS Bureau of Laboratories. All results for these locations were non-detect (<0.2 ng/cm^2), which is two orders of magnitude less than the clearance value of 190 ng/cm^2 (**Appendix A**).
  - Each apartment unit has separate HVAC systems.
  - The first floor hallway has an HVAC system that will **NOT** be turned on as it connects to the uncleared area remaining on the first floor. There are signs and official orders in place to prevent turning on this HVAC unit. The HVAC control unit is not publicly accessible, and is located on the roof of the building.
  - Cleared areas on the first floor listed above are physically separated from uncleared areas. This separation should prevent unauthorized access and migration of any potential hazards from uncleared areas.

MDHHS concludes that a possible imminent danger remains on the remaining section of the first floor until further decontamination and testing occurs. This remaining area is sealed off to access with physical barriers. An ongoing local public health order restricts access to trained professionals in this area who are still in the process of decontamination and/or using these areas as part of the designated corridor for decontamination activities.

The remainder of this letter provides support and details for this public health conclusion.

Background:

On Thursday, Sept. 10, the Barry-Eaton District Health Department (BEDHD) and MDHHS received information about a potential ricin exposure at Tyden Lofts located in Hastings, Mich. Emergency responders notified and evacuated residents. Testing indicated the presence of ricin[1]. While first responders were in the building, they observed what appeared to be castor beans in one apartment. All ricin containing materials were removed from the building as part of the criminal investigation.

Ricin is a protein that is naturally found in castor beans. Exposure to the active ricin protein can be deadly depending on the amount of ricin exposed to and how a person is exposed to it (**Table 1**). BEDHD provided a fact sheet for distribution to the affected residents and other concerned individuals about ricin, see **Appendix B**.

Table 1: Exposure Pathways Table

Contaminant	Source	Exposure Point	Exposure Route of Concern	Exposed Population	Time Frame	Exposure*
Ricin	Crushed Castor Beans	Surfaces on first floor east hallway and location(s) with known ricin contamination.	Ingestion, Inhalation	Children, Adults	Past	Potential
		Surfaces in common hallway of the **first floor** from unit 101 to 113. Floor 2 and 3.	Ingestion, Inhalation	Children, Adults	Present, Future	Eliminated

*The exposure pathway is considered complete if there is evidence, or a high probability, that these elements are, have been, or will be present at a site (this indicates some level of exposure was likely).

A separate letter health consultation was written for clearance of floors 2 and 3 of the building.

Environmental Results:

Wipe and Micro vacuum sampling results:
The sampling plan for this response was developed by BEDHD, EPA and MDHHS to identify any areas with possible ricin contamination based on the assumption that ricin was not distributed via air throughout the building, as each apartment has its own HVAC system, and that the highest potential for contamination would have been from foot traffic or contact with surfaces. This rationale guided sampling location selection (see **Appendix C** for the full sampling plan and sample locations.)

On Monday, Sept. 14, environmental sampling of the apartment building took place in order to identify any potential ricin contamination in specific areas of the first floor with a focus on high touch surfaces and high traffic areas.

Five locations were sampled for this part of the clearance sampling with one duplicate. All results are orders of magnitude lower than the clearance value for ricin of 190 ng/cm^2 (**Table 2**) which is protective for a young child being in frequent contact with the surface (**Appendix A**).

[1] https://barryeatonhealth.org/ricin-2026/

Table 2: Screening analysis for ricin

Analyte Name	Maximum Sample Result	Clearance Value *	Evaluate Further?
Ricin	ND (<0.2 ng/cm^2)	190 ng/cm^2	No

* See Appendix C
# Per Laboratory Response Network (LRN) protocol the limit of detection is 1-10 ng/mL of ricin toxin and 2 ml to resuspend the swabs. For a 100 cm^2 area sampled that is between (0.02 to 0.2 ng/cm^2)

Individual Urine Testing Results:
In support of the environmental investigation, urine monitoring for ricinine, an alkaloid that can be found in castor beans and castor oil, was completed for 21 individuals from the apartment building who volunteered for this monitoring. Ricinine was not detected in any of these individuals. This indicates that these individuals were unlikely exposed to ricin or castor oil, supporting the findings from the environmental samples at the apartment building. Additional details about this urine monitoring will be described in a separate report.

Conclusion:

After evaluating the available data, MDHHS concludes that occupancy in the first floor areas above no longer pose an imminent danger to life and health from ricin and can be safely reoccupied.

- This conclusion is supported by:
  - Sampling conducted by the U.S. Environmental Protection Agency (EPA) and analysis performed by the MDHHS Bureau of Laboratories. All results for these locations were non-detect (<0.2 ng/cm^2), which is two orders of magnitude less than the clearance value of 190 ng/cm^2 (**Appendix A**).
  - Each apartment unit has separate HVAC systems.
  - The first floor hallway has an HVAC system that will **NOT** be turned on as it connects to the uncleared area remaining on the first floor. There are signs and official orders in place to prevent turning on this HVAC unit. The HVAC control unit is not publicly accessible, and is located on the roof of the building.
  - Cleared areas on the first floor (listed above) are physically separated from uncleared areas. This separation should prevent unauthorized access and migration of any potential hazards from uncleared areas.

MDHHS concludes that a possible imminent danger remains on the remaining section of the first floor until further decontamination and testing occurs. This remaining area is sealed off to access with physical barriers. An ongoing local public health order restricts access to trained professionals in this area who are still in the process of decontamination and/or using these areas as part of the designated corridor for decontamination activities.

Recommendation:

MDHHS recommends the imminent danger order be lifted for apartment units 101 through 113 and the hallway connecting those apartment from the south stairwell to the elevator lobby; those parts of the building are considered safe for re-occupancy.

Public Health Action Plan:

Additional decontamination and clearance testing is required for the remaining parts of the first floor. This action should be completed as soon as possible in coordination with EPA, BEDHD, MDHHS and all other relevant entities. This area should remain accessible only to authorized personnel with the proper personal protective equipment.

These conclusions and recommendations may be updated as additional information becomes available. If you have any questions or concerns, please contact the MDHHS Toxicology and Assessment Section at 800-648-6942.

Sincerely,

T. Joost van ‘t Erve, Ph.D., Toxicologist
Toxicology and Assessment Section
Division of Toxicology and Response

c: Dr. Sarah Lyon-Callo, Ph.D.
State Epidemiologist and Senior Deputy Director,
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Appendix A: Clearance estimate for ricin

MDHHS received a copy of the memo authored by Robert Thiboldeaux, PhD, Senior Toxicologist, Wisconsin Bureau of Environmental and Occupational Health titled "*Clearance estimate for active ricin toxin on hard indoor surfaces*" drafted on Dec. 23, 2014; and revised on April 10, 2015 (Thiboldeaux 2015).

The basic approach described in Thiboldeaux (2015) was based on equations for estimating exposure doses children from hand-to-mouth incidental ingestion of pesticide residues (EPA 2012). This approach is also used by MDHHS for evaluating exposure to drug residue at clandestine drug labs (MDHHS 2007).

For ricin the most sensitive receptor would be a young child spending a lot of time in contact with residue containing surfaces like carpets or floors and who frequently puts their hand in their mouth leading to potential ingestion.

MDHHS evaluated the approach and parameters used in Thiboldeaux (2015) and reviewed the parameters MDHHS uses to evaluate drug (fentanyl) exposure (MDHHS 2007) to determine whether updated parameters were needed. Specific checks were done for the use of the oral exposure dose of 1 milligrams per kilogram (mg/kg) body weight and a safety or uncertainty factor of 100.

The biological action of ricin, irreversibly inactivating eukaryotic ribosome, inhibits protein synthesis and results in cell death (Audi et al. 2005). Lethal oral doses in mice are approximately 1000 times higher than lethal doses given by injection (Audi et al. 2005, ESFA 2008, Worbs et al. 2011). Estimates of lethal injection doses in humans are approximately 5 to 10 micrograms (µg)/kg (0.005 to 0.01 mg/kg) and, similar to mice, oral ricin exposure in humans is also expected to be approximately 1,000 times less toxic (Noumi et al. 2024) Estimated lethal oral doses are one to 20 mg ricin/kg from castor bean consumption (Audi et al. 2005). Estimates of ricin exposure from castor beans ingestion are considered to have greater uncertainty in the ricin dose, due to a variety of factors, as compared to laboratory animal exposure to purified ricin (Audi et al. 2005). The oral exposure dose of 1 mg ricin/kg body weight was used in this clearance estimate. This represents an estimated minimum lethal oral dose for humans from castor bean consumption (Audi et al. 2005).

No reports of human poisoning from ingestion of purified ricin were identified as published reports focus on ingestion of castor beans (Noumi et al. 2024). No other values (either no or lowest observed adverse effects levels [NOAEL or LOAEL]) were identified either by MDHHS or in other publications (ESFA 2008).

A factor of 100 was applied to the 1 mg ricin/kg body weight. Burrows and Renner (1999) used a factor of 100 to convert a human LD_{50} to an estimated NOAEL. This is similar to the practice used by the Michigan Department of Environment, Great Lakes, and Energy's Air Quality Division (AQD) for development of their values. AQD divides median lethal dose (LD_{50}) values by 500 to account for the uncertainty in estimating a lifetime NOAEL from an LD_{50} (MDNR 1989). This clearance estimate described here is not intended to account for daily exposure over a lifetime, but acute exposure during a single 8-hour period. The application of the factor of 100

results in an oral value of 0.01 mg/kg (10 µg/kg).[2] The value of 10 µg/kg is also the upper estimate of the estimated lethal dose by injection, which is anticipated to be much lower than oral lethal doses.

Additional discussion was had around the justification of an eight-hour exposure period but since this is a protective assumption for the number of hours a young child is consistently able to do hand-to-mouth behaviors on floors, there was no desire to make a change. MDHHS also considered using the exposure factors chosen for a similar scenario of post-cleanup sampling for fentanyl for locations used as clandestine drug labs (MDHHS 2007). Using those factors in place of the ones presented here would have resulted in a higher clearance value. To remain as protective as possible, the 190 ng/cm^2 clearance level was retained.

Adapted from Thiboldeaux 2015:

The EPA exposure equation is:

$E = [HR * (FM * SAH) * (ET * N_Replen) * (1- (1- SE)^{(freq_repl/N_repl)}]$

Where:
E = exposure, in this case oral dose (mg/day); **10 mg/day** for a 10 kg (22 pound) child based on an oral dose of 1 mg/kg body weight ricin to humans (described above; note that the factor of 100 is applied later in the calculation)
HR = hand residue loading (mg/cm^2);
calculate **HR = AR * FH**
where: **AR** = application rate (or in this case, residue detected) of active ingredient (toxin) to surface (mg/cm^2). *AR is the variable to be calculated.*
FH = fraction of active ingredient ai transferred to hands (unitless); *0.3* based on dry and wet hand-press data;
FM = fraction hand surface area mouthed / event (fraction/event); *0.25*
SAH = surface area of one hand (cm^2); *225 cm^2*
ET = exposure time (hr/day); *8 hour/day*
N_Replen = number of replenishment intervals per hour (intervals/hour); *4 intervals/hour*
SE = saliva extraction factor (*i.e*., mouthing removal efficiency); *0.68*
Freq_Replen = number of hand-to-mouth contacts events per hour (events/hour); *12*

Substituting into equation 1:

10 mg/d = [(AR * 0.3)*(0.25 * 225 cm2)*(8 hr/d * 4 intervals/hr)*(1-(1-0.68)$^{(12events/hr)/(4intervals/hr)}$]

Solving the variable, AR= 0.019 mg/cm^2, or 19,000 ng/cm^2

This AR is based upon a LD_{50} endpoint. A 100-fold safety factor was added, resulting in a clearance number of **190 ng/cm^2**. This is the maximum concentration of ricin residue on hard indoor surfaces that would be acceptable using these assumptions.[3] This clearance estimate is

[2] Application of the 500 as a safety factor would result in an oral dose of 2 µg/kg body weight (1000 µg/kg body weight/500).
[3] A lower range for the clearance estimate would be 38 ng/cm^2 if the safety factor of 500 was used.

two orders of magnitude higher than what is detectable by the MDHHS Bureau of Laboratory's Laboratory Response Network (LRN) protocol (non-detect <0.2 ng/cm^2).[4]

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[4] It should also be noted that per the plan, locations with any detection of ricin would be decontaminated and resampled.

Appendix B

What to Know about the Ricin Exposure Event at Tyden Lofts in Hastings

A suspected ricin (rye-sin) exposure occurred at Tyden Lofts located in Hastings on Thursday, Sept. 10. Officials are testing to confirm this exposure. To prevent any additional exposures, residents of Tyden Lofts were evacuated. **The Barry-Eaton District Health Department (BEDHD) has ordered that residents, employees, contractors, visitors or other persons shall not enter or re-enter the Tyden Lofts buildings.**

What is ricin?

- Ricin is a natural poison.
- It comes from castor beans.
- It can be made into a mist, powder, crystals or liquid.
- It can be harmful or fatal if swallowed, breathed in or injected.
- It is illegal to have ricin.

If breathed in, ricin can cause the health effects below <u>within 24 hours of exposure</u>:

- Difficulty breathing.
- Fever.
- Cough.
- Nausea.
- Tightness in the chest.
- Heavy sweating.
- Fluid buildup in the lungs.
- Blue skin.
- Low blood pressure.
- Respiratory failure.

If swallowed, ricin can cause the health effects below <u>within 10 hours of exposure</u>:

- Vomiting.
- Diarrhea.
- Severe dehydration.
- Low blood pressure.
- Seizure.
- Liver, spleen and kidney failure.

Health effects depend on how much ricin you were exposed to and how you were exposed. BEDHD suggests anyone who was in the apartment building and has any of these symptoms call 911 or go to the emergency room. Tell hospital staff that you may have been exposed to ricin.

What recommendations are there?

Currently, BEDHD recommends that you:

- Seek medical attention if you have symptoms related to ricin exposure.
- Change out of any clothes that may have been exposed to ricin and seal them in plastic bags.
- Wash your body with soap and water, if possible.
- Follow instructions given by public health officials and federal agencies investigating the possible exposure.

For General Questions:

- MDHHS: 800-648-6942

Barry-Eaton District Health Department

Be Active • Be Safe • Be Healthy

For Specific Needs/Concerns:

- BEDHD: 269-798-4111

Appendix C – Tyden Lofts Sampling Plan #1

Overall Objective:

Samples will be sent to the MDHHS laboratory to be analyzed in batches of 12 based on the priorities outlined below. Sampling locations have been determined based on high traffic, primarily foot traffic where ricin residue would settle to the floors, in tandem with the known location where first responders observed castor beans.

This sample batch will be performed in a manner to allow clearance for residents to return to part of the first floor, via the south stairwell and elevator access. No access will be allowed via the main east entrance or to the hot zone until post-decontamination of the specific location were first responders observed castor beans and clearance sampling of the Hot Zone. The north hallway of the first floor is considered the Hot Zone. Composite sampling is allowed for sampling and single vs composite samples are noted as such on site plans. Each site plan is titled based on the clearance objective.

Locations:

- Objective: Sample for clearance of First Floor south of the hallway corner.
- Intent: Allow residents to move in to complex outside first floor Hot Zone.
- 6 total samples,
    - Sample List: See “First Floor of South Hallway and East Stairwell Clearance Sampling to MDHHS”
        1. South Hallway Single Vacuum Sample close to unit 113
        2. South Hallway Single Vacuum Sample mid hallway
        3. South Hallway Single Vacuum Sample mid hallway
        4. South Hallway Single Vacuum Sample end of hallway to south
        5. South Hallway Swab
        6. Duplicate of Location 3