

Prohibition on Certain Life Sciences Laboratories in Boxborough

Introduction

- This prohibition would **protect** Boxborough from those hazards inherent to life science laboratories that use animals
- It is **consistent** with existing zoning bylaws regarding hazardous materials and is specific to these laboratories
- **Other** life science facilities not using animals would be **allowed**
- These laboratories pose **more problems** and **expenses** than other kinds of businesses
- Boxborough may not have the necessary **infrastructure** to handle emergencies at these laboratories

2

Thanks for allowing me to talk to proposing a change to the zoning bylaw.

This proposal would prohibit life science laboratories that use animals in any way, including testing, research, development, and training.

It is important to determine whether or not a facility locating in Boxborough meets even minimal requirements of current taxpayers; including protection of our air and water. We need to ask whether the town's infrastructure will be burdened.

There are no businesses using animals in research and development presently.

Add to Definitions:

Life sciences. Advanced and applied sciences that expand the understanding of human physiology and have the potential to lead to medical advances or therapeutic applications including, but not limited to, agricultural biotechnology, biogenetics, bioinformatics, biomedical engineering, biopharmaceuticals, biotechnology, chemical synthesis, chemistry technology, diagnostics, genomics, image analysis, marine biology, marine technology, medical devices, nanotechnology, natural product pharmaceuticals, proteomics, regenerative medicine, RNA interference, stem cell research and veterinary science. (M.G.L, Chapter 130 of the Acts of 2008). Facilities that utilize animal testing of products are not included in this definition.

Under Article IV USE REGULATIONS – 4003(4) BUSINESS/INDUSTRIAL USES, change footnote 3 on page 18 to read as follows:

3. Provided that hazardous materials are not a primary part of the business ***and provided that use of animals in research, development, testing, or for any other purpose is not any part of the business.***

3

This is what will appear in the warrant.

The word business I intend to change to facility at the meeting to clarify that the prohibition applies only locally.

Changes:

- ***Add to Definitions***

Life sciences. *Wording as set forth in the warrant article.*

4

This is the exact wording taken from the zoning bylaws of Leominster and Westminster as approved by the Attorney Generals office.

The last sentence is to exclude animal use.

Note that other life science facilities are permitted.

Changes:

- Under Article IV Use Regulations –
table: 4003(4) Business/Industrial Uses –
line: Research & Development
Districts OP& IC
Change footnote 3
page 18
to read *as set forth in the warrant article.*
- Footnote 3 applies only to one line as described
above

5

The term “Life Science” does not automatically conjure up concerns regarding hazardous materials.

But it is impossible to separate use of hazardous materials from animal-based research and development; **there are hazardous *biological, chemical, and radioactive materials*** used in these facilities.

The use of hazardous materials is partly addressed already in the zoning bylaw – however the zoning bylaw does not address all areas of concern.

Animal Biosafety Levels (ABSL)

- 1: Microorganisms not known to cause **disease**
- 2: Microorganisms associated with **human disease**
- 3: Microorganisms causing **serious or lethal disease** with **high individual risk – low community risk**
- 4: Microorganisms causing **infections that are frequently fatal, with no vaccines or treatments – high individual risk – high community risk**

6

This table ranks the risk levels of infectious microorganisms used in these laboratories and is derived from the World Health Organization and the National Institutes of Health.

There are four risk levels in ascending order – 1-not a risk to individuals or community – to – 4-high individual and community risk – such as the Ebola virus

Nearby there are two operating ABSL level-3 laboratories, one in Grafton and one in Worcester.

Twelve miles south in Southborough up until 2015 there was an ABSL level-4 laboratory in operation.

Hazardous chemicals used in these laboratories

- ***Solvents*** – cause damage to skin and respiratory tract; systemic damage to liver, kidneys, nervous system, etc.
- ***Oxidizers*** – cause burns
- ***Carcinogenic compounds*** – cause cancer
- ***Irritants, corrosives*** – cause damage to skin and respiratory tract

7

Sue! Just Read titles

Hazardous chemicals used in these laboratories

- ***Neurotoxins*** – cause central nervous system damage such as memory impairments, epilepsy, and dementia
- ***Asphyxiants*** – cause suffocation
- ***Reproductive and developmental toxins*** – cause infertility and birth defects
- ***Flammable, reactive, explosive chemicals***

8

Sue! Just Read titles

Radioactive Materials

- ***Radioisotopes*** – may cause acute or chronic systemic damage, cancer, infertility, and birth defects

Sue! Just Read titles

Reference 16

Hazardous Waste

- These facilities **generate** many harmful substances
 - **ignitable, corrosive, reactive, and toxic wastes**
 - **gaseous air contaminants** – waste anesthetic gases
 - **air pollutants as particulate matter**
 - **carcinogens**
- **Animal Carcasses** are the most prominent hazardous waste
 - contain a combination of **chemical, radioactive, and biological hazards**
- On-site **incineration** is one disposal method

10

These infectious and toxic wastes are difficult to dispose of. -- Some waste remains for up to a year on-site waiting for disposal.

Many facilities have their own incinerators – this would be undesirable here.

During operation they release particulates that are carcinogenic such as Dioxins and Furans, Polycyclic aromatic hydrocarbons compounds, and others.

These airborne particulates contaminate air, soil, and eventually ground water.

At Univ of Calif, Irvine up to 30 tons of this waste is generated per year.

Reference 14, 19, 24

Hazards to public, first responders, and environment

- Exposure to hazardous microorganisms and toxic chemicals and radioactive materials
 - via **contaminated air, soil, and groundwater**
 - to **first responders** during an emergency or natural disaster
 - by **accidental release** of material from facility into air or septic
 - via **transportation** of materials, waste, or animals
 - by **escape** of infected test animals
 - from **contact** with infected of lab personnel

11

In 2007 there was an outbreak of Foot & Mouth disease in England among cattle that required herds to be slaughtered - it was blamed on leaking and uninspected drainage pipes at a nearby R&D complex.

Note: Boxborough had leaking in-ground gasoline storage tank several years ago.

Laboratory engineered infectious agents are often far more virulent than those found in nature. Releasing an infected animal into the environment may cause an uncontrollable event.

Between April 2013 and September 2014, eight individual mouse escapes were reported at the University of North Carolina-Chapel Hill.

Reference 1, 7, 8, 9, 11, 12, 14, 15, 16, 17

Need for Disaster Response Planning

- ***Kinds of emergencies:***
 - ***naturally occurring*** – blizzards , fires, floods, and tornados
 - ***human-related*** – human error or incorrect operating procedures
 - ***mechanical*** – electrical, plumbing, heating ventilation and air conditioning malfunctions
 - ***hazardous materials events*** - chemical spills and radiologic and biohazard exposures.
- The facility disaster plans should be shared with Boxborough’s police, fire, and other relevant municipal and state departments

12

These labs use negative air pressure for containment of pathogens. At Texas A&M and at the CDC lab in Atlanta, power failures caused a loss of negative air pressure.

There would be a need for disaster response planning by Boxborough’s first responders.

First responders would need to be trained and equipped to be able to effectively respond to an emergency at these laboratories.

Reference 7 (p.35), 11, 16 (sect. 4.6.1.4), 17

Summary

- This prohibition would **protect** Boxborough from those hazards inherent to life science laboratories that use animals
- It is **consistent** with existing zoning bylaws regarding hazardous materials and is specific to these laboratories
- **Other** life science facilities not using animals would be **allowed**
- These laboratories pose **more problems** and **expenses** than other kinds of businesses
- Boxborough may not have the necessary **infrastructure** to handle emergencies at these laboratories

13

Summary – five points

List of references and a topic index are provided.

Are there any questions?

References

1. [10 incidents discovered at the nation's biolabs](https://www.usatoday.com/story/news/2015/05/29/some-recent-us-lab-incidents/25258237/) <https://www.usatoday.com/story/news/2015/05/29/some-recent-us-lab-incidents/25258237/>
2. [7 USC Ch. 54: TRANSPORTATION, SALE, AND HANDLING OF CERTAIN ANIMALS](https://uscode.house.gov/view.xhtml?path=/prelim@title7/chapter54&edition=prelim) <https://uscode.house.gov/view.xhtml?path=/prelim@title7/chapter54&edition=prelim>
3. [Biological hazard](https://en.wikipedia.org/wiki/Biological_hazard) <https://en.wikipedia.org/wiki/Biological_hazard>
4. [Biosafety in Microbiological and Biomedical Laboratories 5th Edition, U.S. Department of Health and Human Services Public Health Service Centers for Disease Control and Prevention](https://www.cdc.gov/labs/pdf/CDC-BiosafetyMicrobiologicalBiomedicalLaboratories-2009-P.PDF) < https://www.cdc.gov/labs/pdf/CDC-BiosafetyMicrobiologicalBiomedicalLaboratories-2009-P.PDF>
5. [Chemical Safety in Animal Care, Use, and Research](https://academic.oup.com/ilarjournal/article/44/1/13/650525) <https://academic.oup.com/ilarjournal/article/44/1/13/650525>
6. [DaVinci lab called 'good tenants' despite criticism from PETA](https://lancaster.wickedlocal.com/x679796972/DaVinci-lab-called-good-tenants-despite-criticism-from-PETA) <https://lancaster.wickedlocal.com/x679796972/DaVinci-lab-called-good-tenants-despite-criticism-from-PETA>
7. [GUIDE FOR THE CARE AND USE OF LABORATORY ANIMALS Eighth Edition, Committee for the Update of the Guide for the Care and Use of Laboratory Animals, Institute for Laboratory Animal Research, Division on Earth and Life Studies, National Research Council](https://grants.nih.gov/grants/olaw/guide-for-the-care-and-use-of-laboratory-animals.pdf) <https://grants.nih.gov/grants/olaw/guide-for-the-care-and-use-of-laboratory-animals.pdf>
8. [Inside America's secretive biolabs](https://www.usatoday.com/story/news/2015/05/28/biolabs-pathogens-location-incidents/26587505/) <https://www.usatoday.com/story/news/2015/05/28/biolabs-pathogens-location-incidents/26587505/>
9. [Lab Safety Guide, Western University of Health Sciences \(WesternU\)](https://www.westernu.edu/research/research-welcome/lab-safety-guide) <https://www.westernu.edu/research/research-welcome/lab-safety-guide>
10. [Laboratory Animals Ordinances Cambridge Public Health Department](http://www.cambridgepublichealth.org/services/regulatory-activities/lab-animals/lab-animal-ordinance.php) <http://www.cambridgepublichealth.org/services/regulatory-activities/lab-animals/lab-animal-ordinance.php>

References

11. [Management of Animal Care and Use Programs in Research, Education, and Testing, 2nd edition](https://www.ncbi.nlm.nih.gov/books/NBK500419/)
<https://www.ncbi.nlm.nih.gov/books/NBK500419/>
12. [Prudent Practices in the Laboratory Handling and Management of Chemical Hazards Updated Version](https://www.ncbi.nlm.nih.gov/books/NBK55878/)
<https://www.ncbi.nlm.nih.gov/books/NBK55878/>
13. [Public Health Service Policy on Humane Care and Use of Laboratory Animals, U.S. Department of Health and Human Services, National Institutes of Health. Office of Laboratory Animal Welfare](https://grants.nih.gov/grants/olaw/references/phspolicylabanimals.pdf)
<https://grants.nih.gov/grants/olaw/references/phspolicylabanimals.pdf>
14. [Review of Evidence of Environmental Impacts of Animal Research and Testing by Katherine Groff, Eric Bachli, Molly Lansdowne and Theodora Capaldo](https://www.mdpi.com/2076-3298/1/1/14) *Environments* 2014, 1(1), 14-30; <https://www.mdpi.com/2076-3298/1/1/14>
15. [Safety considerations for working with animal models involving human health hazards](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6388071/)
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6388071/>
16. [UCI Long Range Development Plan Final Environmental Impact Report \(2007\)](https://cpep.uci.edu/environmental/campus-feir.php)
<https://cpep.uci.edu/environmental/campus-feir.php>
[4.6 HAZARDS AND HAZARDOUS MATERIALS](https://cpep.uci.edu/environmental/pdf/volume-I/Haz.pdf)
<https://cpep.uci.edu/environmental/pdf/volume-I/Haz.pdf>
17. [University of Florida LABORATORY SAFETY MANUAL](http://webfiles.ehs.ufl.edu/labsafe.pdf) <http://webfiles.ehs.ufl.edu/labsafe.pdf>
18. [2007 United Kingdom foot-and-mouth outbreak](https://en.wikipedia.org/wiki/2007_United_Kingdom_foot-and-mouth_outbreak) <https://en.wikipedia.org/wiki/2007_United_Kingdom_foot-and-mouth_outbreak>
19. [Institutional Animal Care and Use Committee Guidebook; National Institutes of Health:](https://grants.nih.gov/grants/olaw/guidebook.pdf) <https://grants.nih.gov/grants/olaw/guidebook.pdf >

References

20. [Lab Ventilation Systems for Your Autoclave](https://consteril.com/lab-ventilation-systems/) <https://consteril.com/lab-ventilation-systems/>
21. [Human error cause of latest Lawrence gas leak, officials say](https://www.wcvb.com/article/major-gas-leak-prompts-evacuations-in-lawrence/29260322) <https://www.wcvb.com/article/major-gas-leak-prompts-evacuations-in-lawrence/29260322>
22. [Merrimack Valley gas explosions](https://en.wikipedia.org/wiki/Merrimack_Valley_gas_explosions) https://en.wikipedia.org/wiki/Merrimack_Valley_gas_explosions
23. [Health Research Extension Act of 1985](https://olaw.nih.gov/policies-laws/hrea-1985.htm) <https://olaw.nih.gov/policies-laws/hrea-1985.htm>
24. [Laboratory Environmental Sample Disposal Information Document](https://www.epa.gov/sites/production/files/2015-06/documents/lesdid.pdf) <https://www.epa.gov/sites/production/files/2015-06/documents/lesdid.pdf>
25. [Superfund Sites in Reuse in Massachusetts](https://www.epa.gov/superfund-redevelopment-initiative/superfund-sites-reuse-massachusetts) W.R.Grace Acton <https://www.epa.gov/superfund-redevelopment-initiative/superfund-sites-reuse-massachusetts>
26. [FORT DEVENS-SUDBURY TRAINING ANNEX SUDBURY, MA Redevelopment](https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.redevelop&id=0100685) <https://cumulis.epa.gov/supercpad/SiteProfiles/index.cfm?fuseaction=second.redevelop&id=0100685>
27. [Wells G&H - Woburn, Massachusetts](https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0100749) <https://cumulis.epa.gov/supercpad/cursites/csitinfo.cfm?id=0100749>

Index to references

- Biohazard Levels (ABSL, BSL)
Reference 3, 4, 8
- Hazards and Risks
Reference 1, 5, 7, 8, 9, 11, 12, 14, 15, 16, 17, 21
- Hazards to public and first responders and environment
Reference 7, 8, 9, 11, 14, 15, 17, 21
- Hazardous waste
Reference 21, 24, 25, 26, 27
- Accidents
References 1, 7, 8, 12, 14, 16, 17
- Escape of infected animals
Reference 1, 7
- Disaster management and response
Reference 5, 7, 11, 16, 17, 21
- Pollution
Reference 14, 16
- Human Error
Reference 7, 8, 9, 21, 22
- Incinerators
Reference 14
- Overview
Reference 7, 10
- Negative Environmental Impact of Animal Research/Animal Testing
Reference 14