

Fires in Animal Housing Facilities

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Abstract

Fires in animal housing facilities result in significant loss of life and property. There is a lack of a single database or reference of fire events in animal housing facilities. The objective of this project is to gather and analyze information on the causes of fires, fire losses, and fire protection features of animal housing facilities.

Methods

This research involved the following tasks:

- Literature review of published journals, technical reports.
- Information collection and data analysis through an online questionnaire survey.
- Review of U.S. news media articles from 2020-21, that collected over 157 animal housing fire incidents.

Literature Review

Fires in or at animal occupancies

(Ref: *NFPA, 2018 & 2021*)

- NFIRS data reported 1,310 total fires in or at livestock or poultry storage properties during 2014-18 in the U.S.
- Total of \$37 million in property damage during this period.
- Heating equipment was estimated as the leading cause of these structure fires in livestock or poultry storage properties.
- Organic materials were amongst the leading items that were first ignited in these structure fires.

Barn fires in the U.S.

(Ref: *NFPA, 2012 & AWI Report, 2018*)

- Between 2006-10, there were an estimated 830 structure fires in barns in the U.S., resulting in \$28 million in property damage annually.
- Total of 326 barn fires were reported during 2013-17 in the U.S. At least 2,763,924 farm animals died as a result of barn fires during this period.
- Chickens had the greatest number of deaths in barn fires, a total of 2.6 million chickens were killed in the years 2013-17.
- The main causes of barn fires were found to be heating devices, followed by malfunctioning of electrical systems.

Barn fires in Canada

(Ref: *HIS, 2020*)

- Total of 327 barn fires were reported in Canada through media reports between 2015-19.
- 76% of cause of fires were either electrical heating device failures or mechanical failures.
- Winter months accounted for 47.4% of total number of barn fires for the years 2015-19.

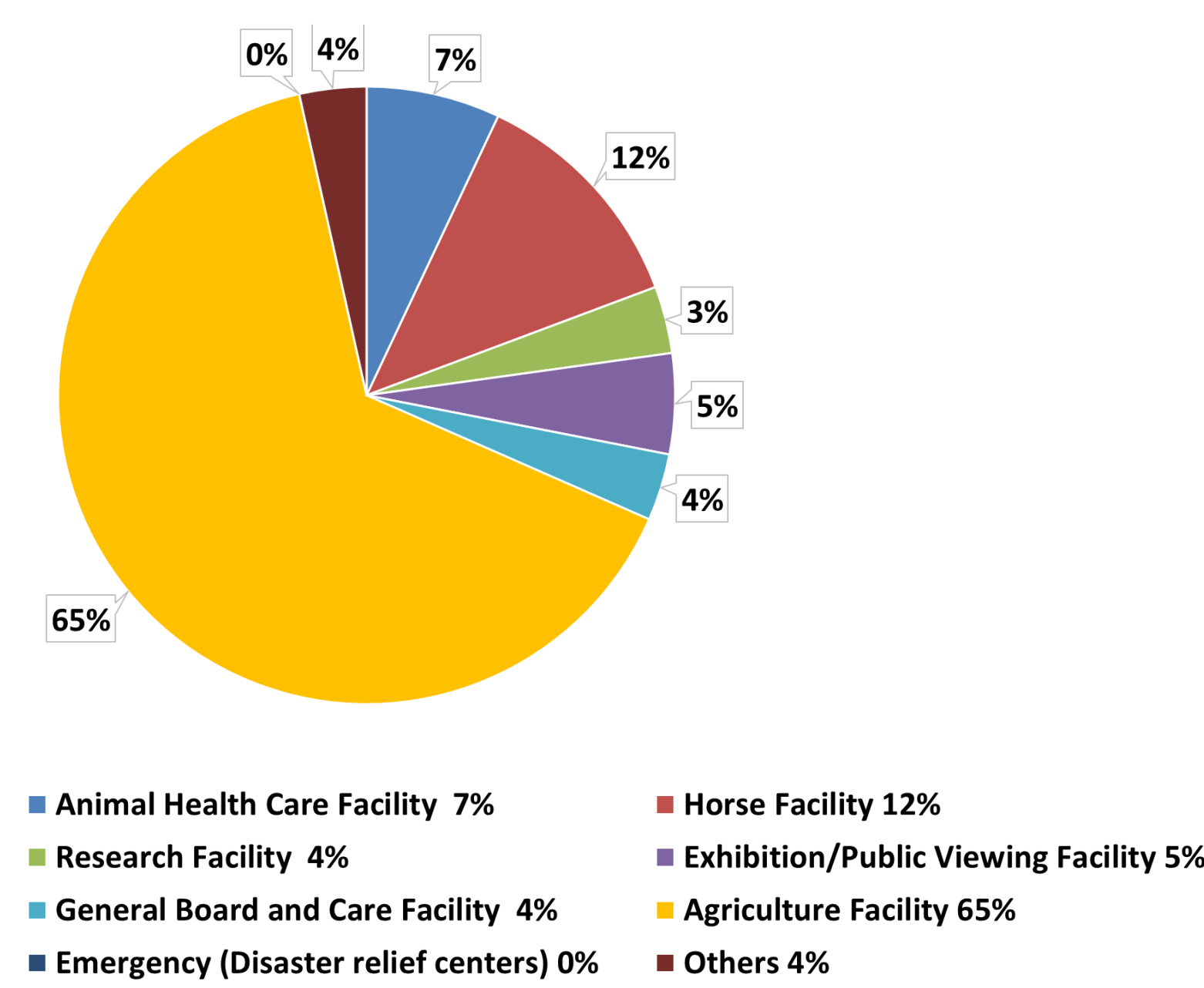
Survey Questionnaire Data Summary

Key Data Collected about Animal Housing Facility Fire:

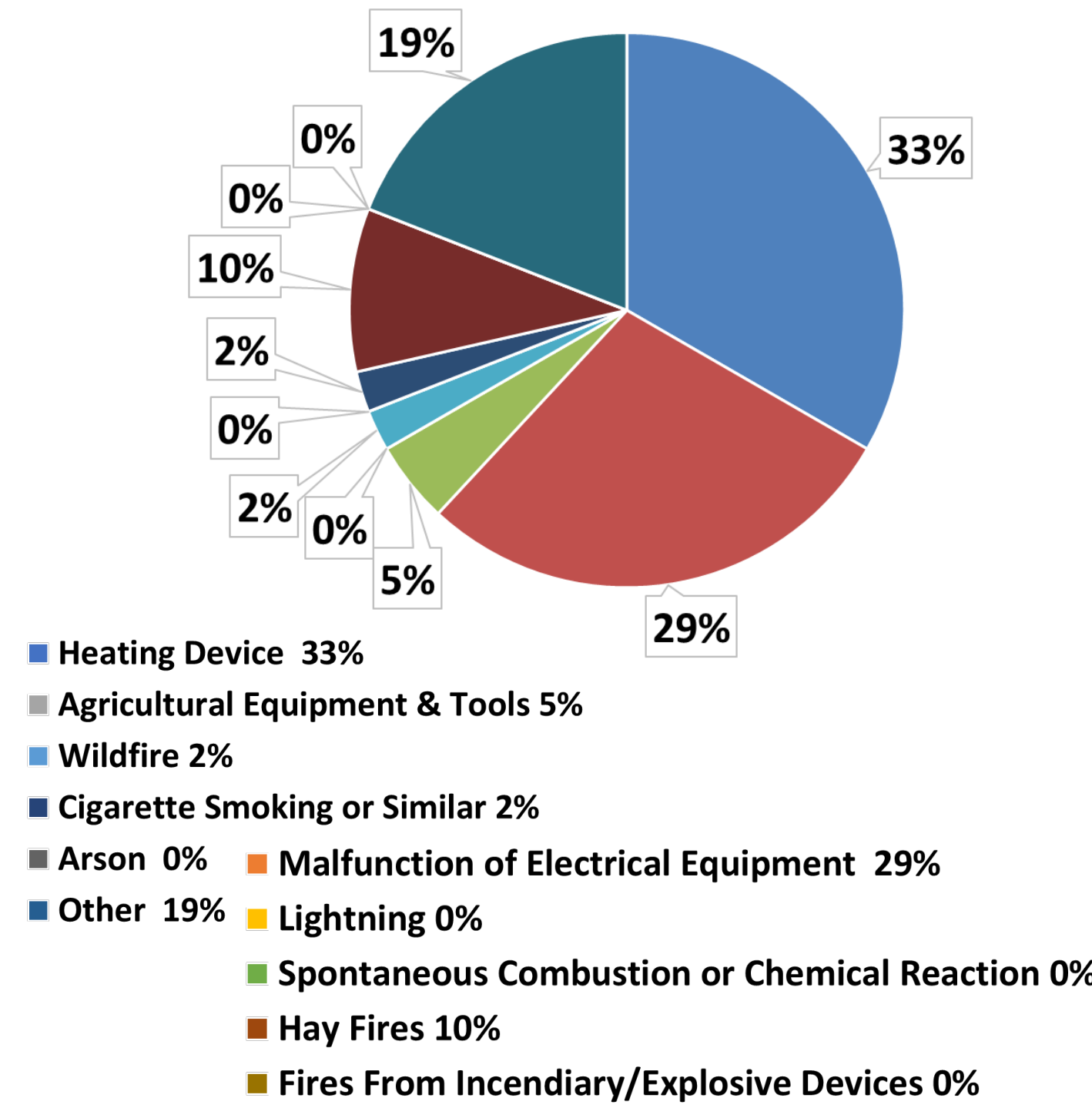
- General information about facility type
- Cause of fire
- Electrical and general policies
- Loss summary
- Fire protection features and preparedness
- Additional information

Has there been a fire incident in the animal housing facility in the last 10 years?	Responses N = 135
No	70
Yes	65

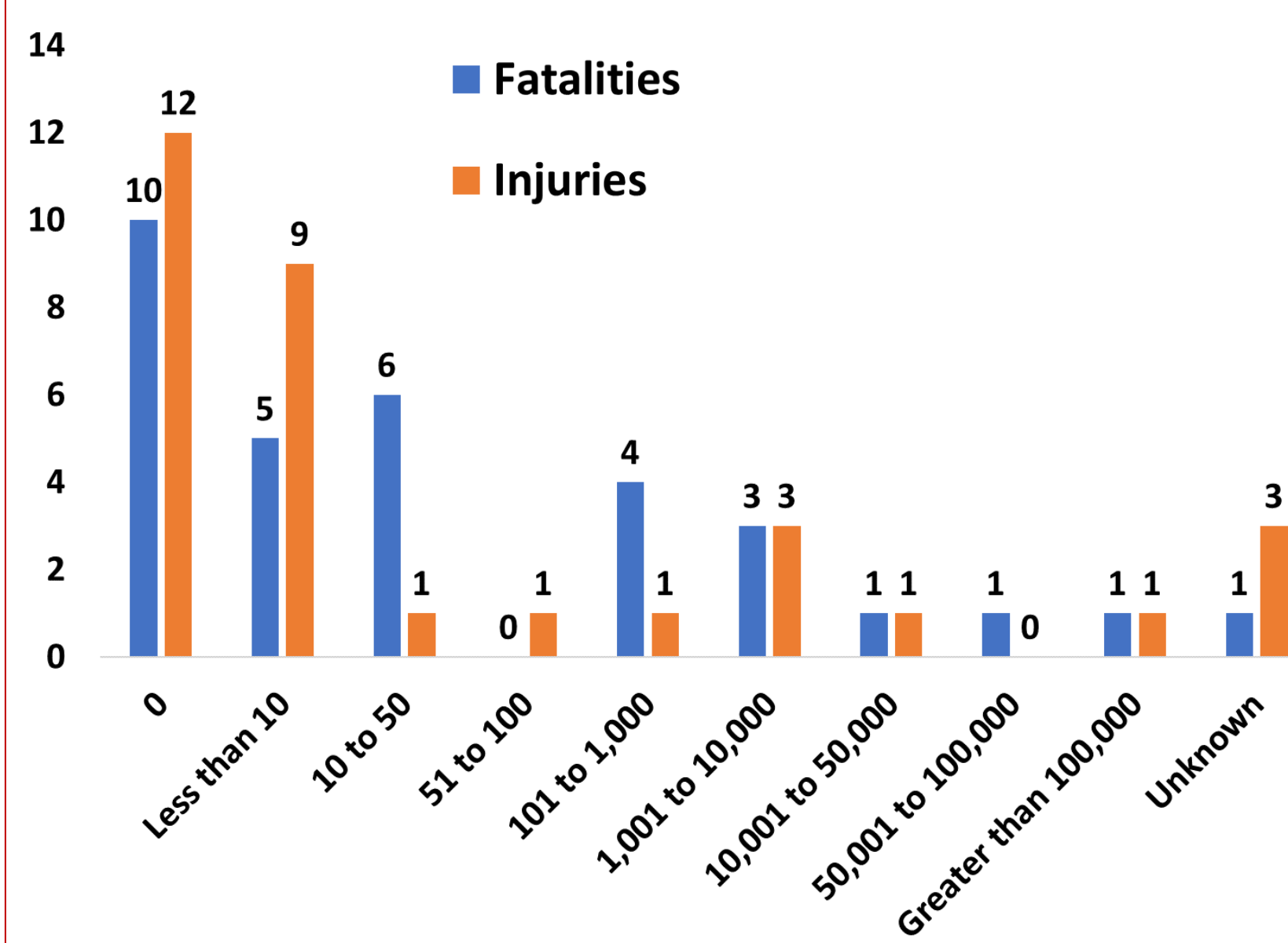
Type of Animal Housing Facility that Reported Fire, N = 57



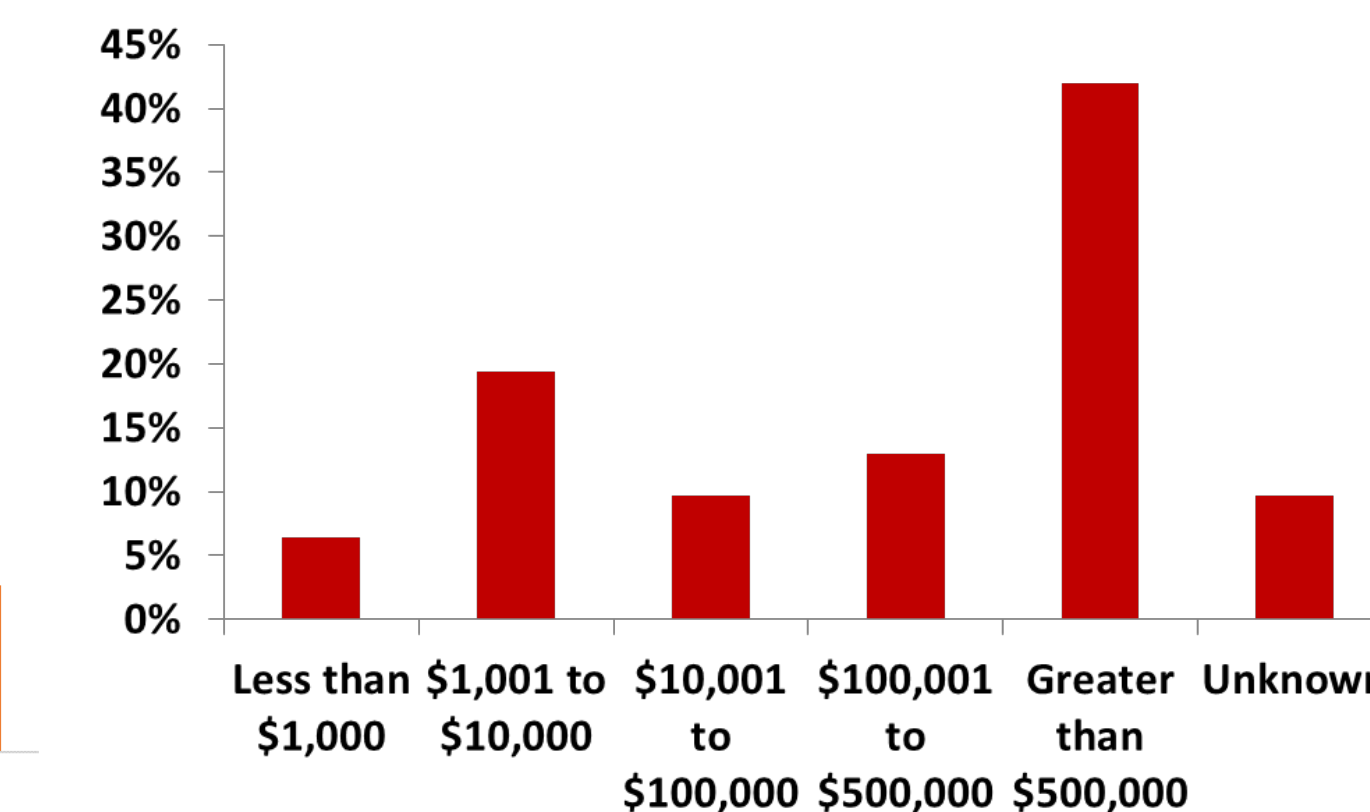
Cause of Fire, N = 42



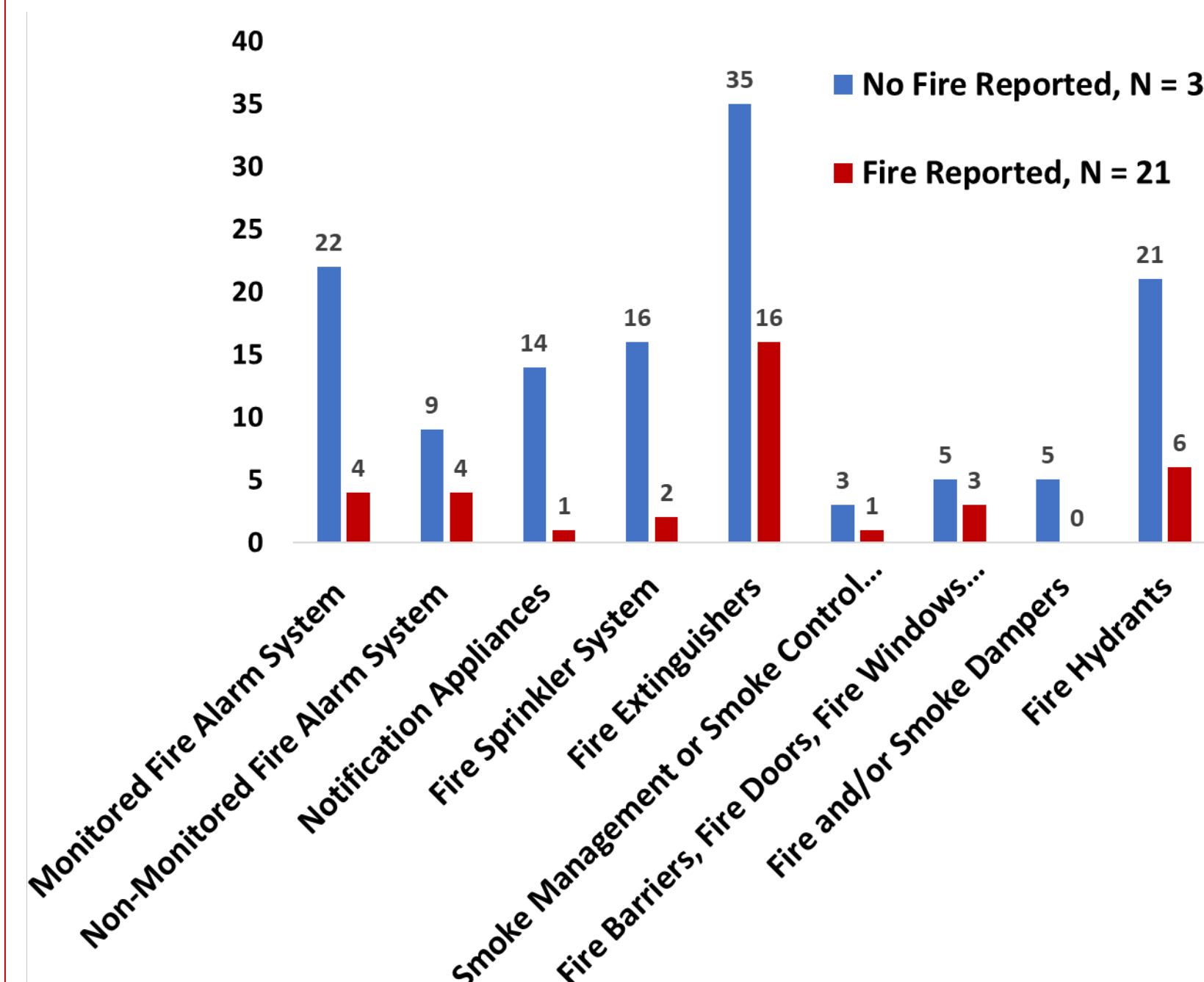
Animal Injuries & Fatalities, N = 32



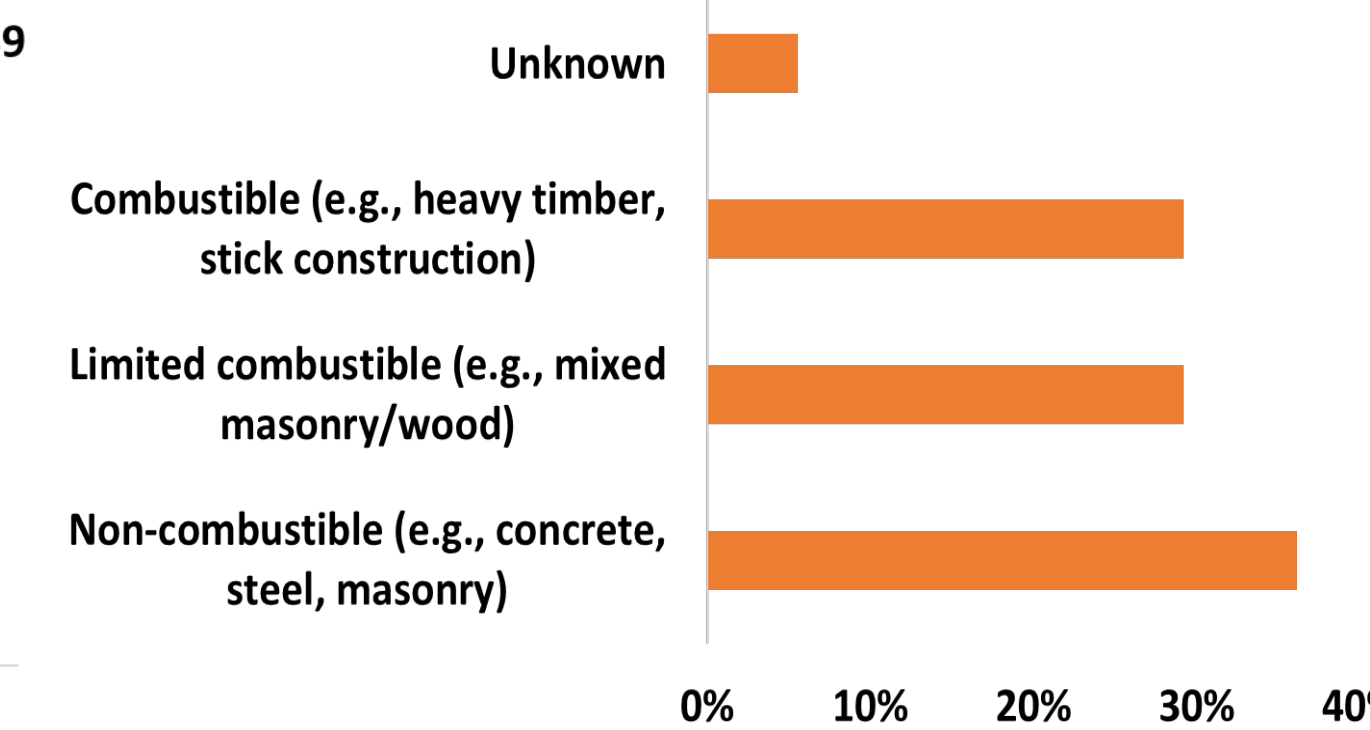
Estimated Total Financial Loss, N = 31



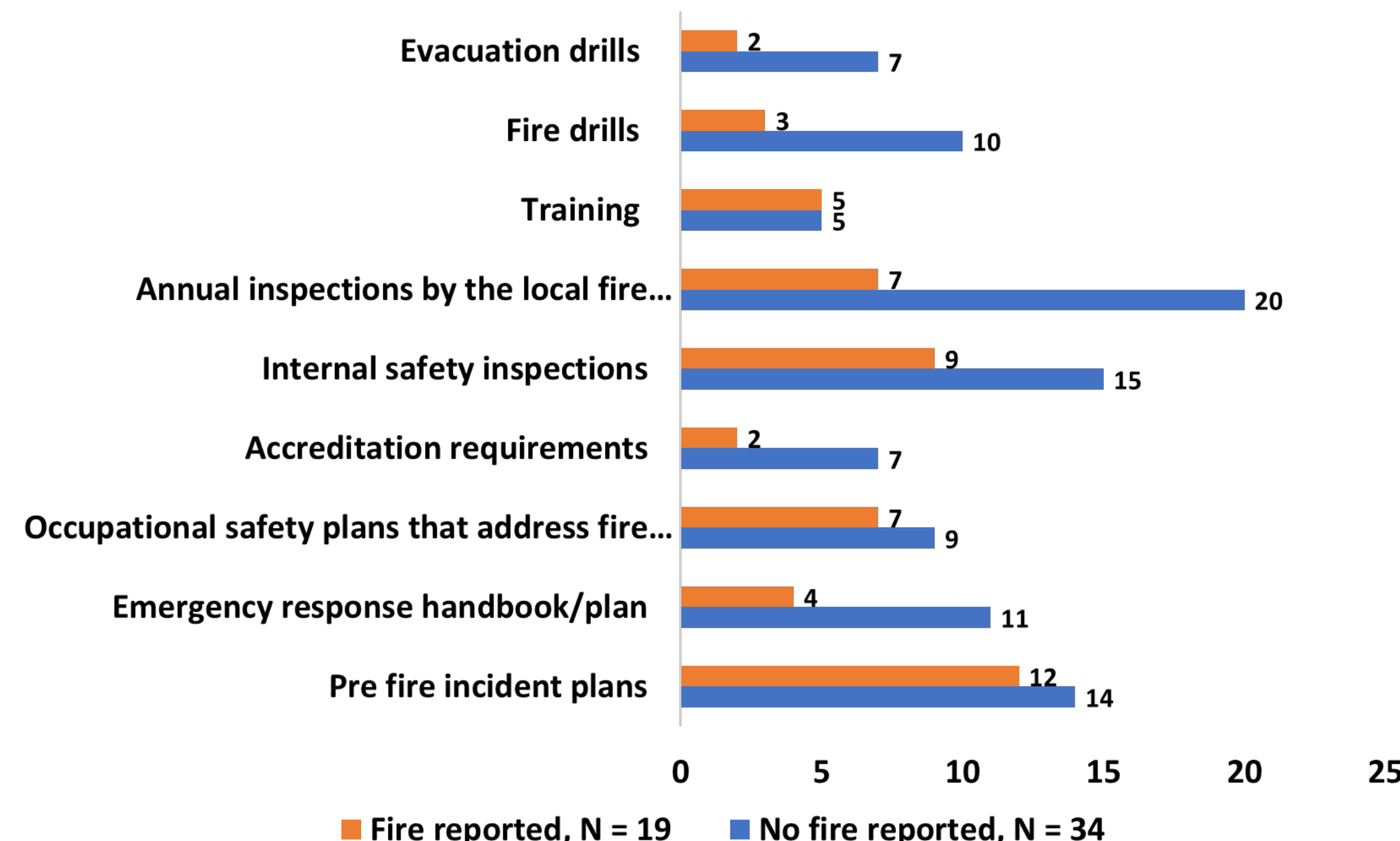
Fire Protection Features Present



Exterior Construction of Facility, N = 30



Emergency Procedure and Preparedness Implemented



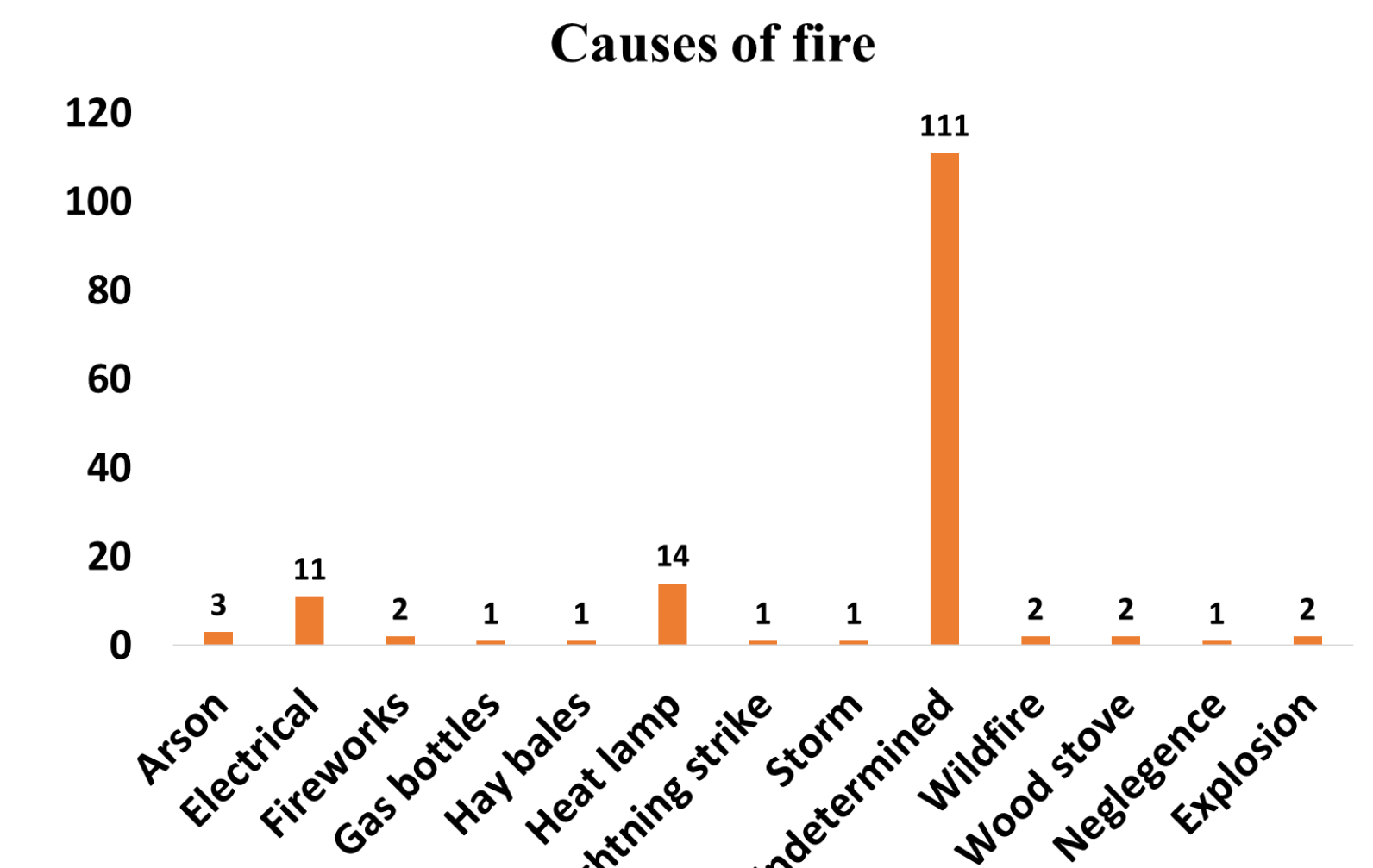
Are you familiar with NFPA 150?	Responses N = 71
Yes	28
No	43

Are there any specific fire protection and/or life safety standard followed in the animal housing facility?	Responses N = 54
Yes	6
No	48

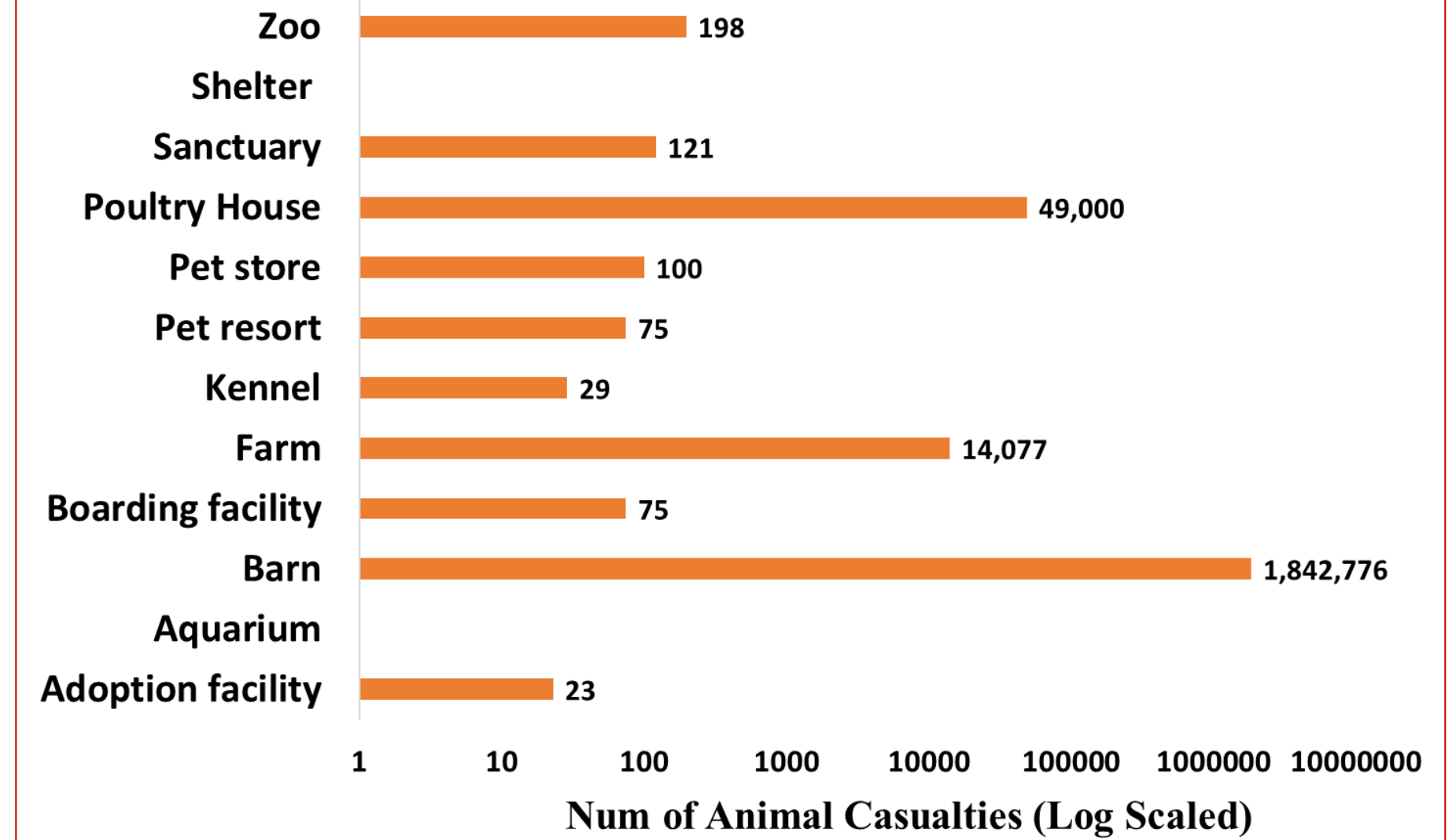
New Media Reports

U.S. News Media Data Collected 2020-21

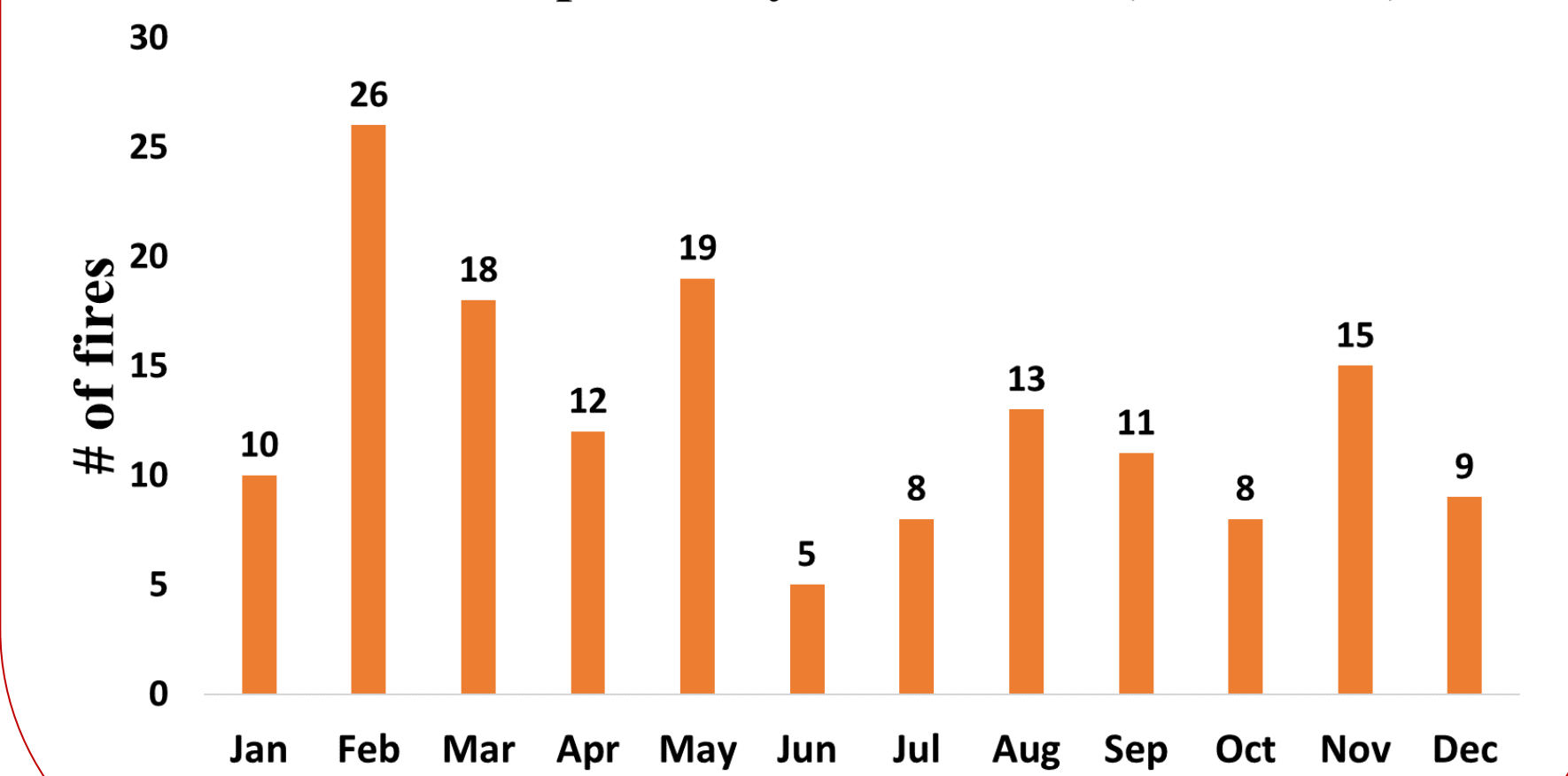
- 157 fire incidents were collected



Animal Casualties Per Animal Facility Type



Total fires reported by news media (2020-2021)



Summary Observations

- Main cause of these fires are found to be from **heating devices** followed by **malfunction of electrical equipment** according to the information collected from questionnaire & literature review.
- Literature review indicate **winter months** have the greatest reported number of fires.
- Facilities that did not report fire had more fire protection features present.
- There is a lack of awareness about fire and life safety standards applicable to animal housing facilities such as NFPA 150, *Fire and Life Safety in Animal Housing Facilities Code*.
- List of fire protection features recommended for animal housing facilities: sprinkler systems, fire extinguishers, fire doors, smoke detectors, heat detectors, carbon monoxide detectors, lightning rods, emergency exits for animals/people, permanently installed electrical system.
- Employee training, routine fire drills, annual inspections (by fire department), routine inspections of electrical systems are also recommended.
- There is a need for creating more awareness and education for fire safety standards and best practices in animal housing facilities.

Acknowledgments

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- Project technical panel