

# 2021 **RESEARCH** FORUM



## Measuring and Minimizing Sound to Improve Cat Welfare

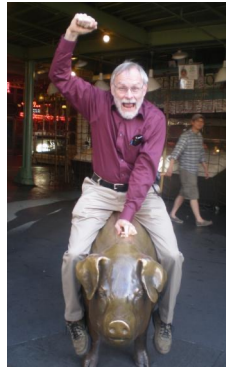
*Bailey Eagan, University of British Columbia, Animal Welfare Program*





# 2021 RESEARCH FORUM

## Thanks to...



**Dr. David Fraser**



**Dr. Emilia Gordon**



**Dr. Alexandra Protopopova**



**UBC Applied Animal Biology students and BC SPCA Staff and Volunteers**

“Unnecessary noise is the most cruel abuse of care which can be inflicted on either the sick or the well.”



*Florence Nightingale, 1860*



# What Sparked Our Research?





# SHELTER HOUSING IS CRITICAL TO CAT WELFARE

- Environmental change when entering a shelter:
  - Can cause fear and stress
  - Can lead to illness and behavioural changes
  - Can ↓ adoption and ↑ euthanasia
- “the quality of housing can literally be a matter of life or death for a cat entering a shelter”  
(pg. 635)

Wagner D, Hurley K and Stavisky J 2018a 1. Shelter housing for cats: Principles of design for health, welfare and rehoming. *Journal of Feline Medicine and Surgery* 20: 635–642.

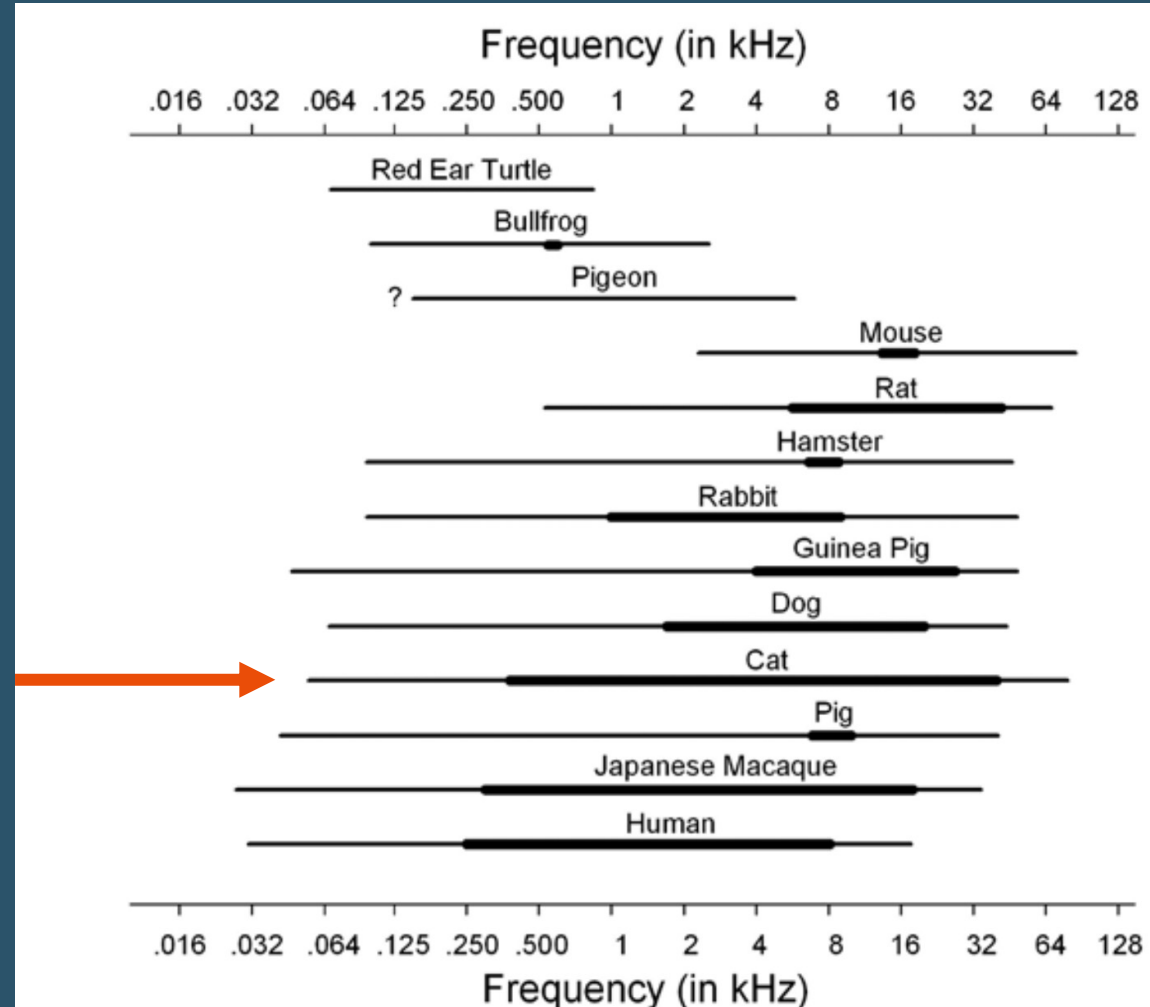








# Hearing Ranges of Common Laboratory Animals



Heffner HE and Heffner RS 2007 Hearing ranges of laboratory animals. Journal of the American Association for Laboratory Animal Science.

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# Decibel Level Impacts Humans

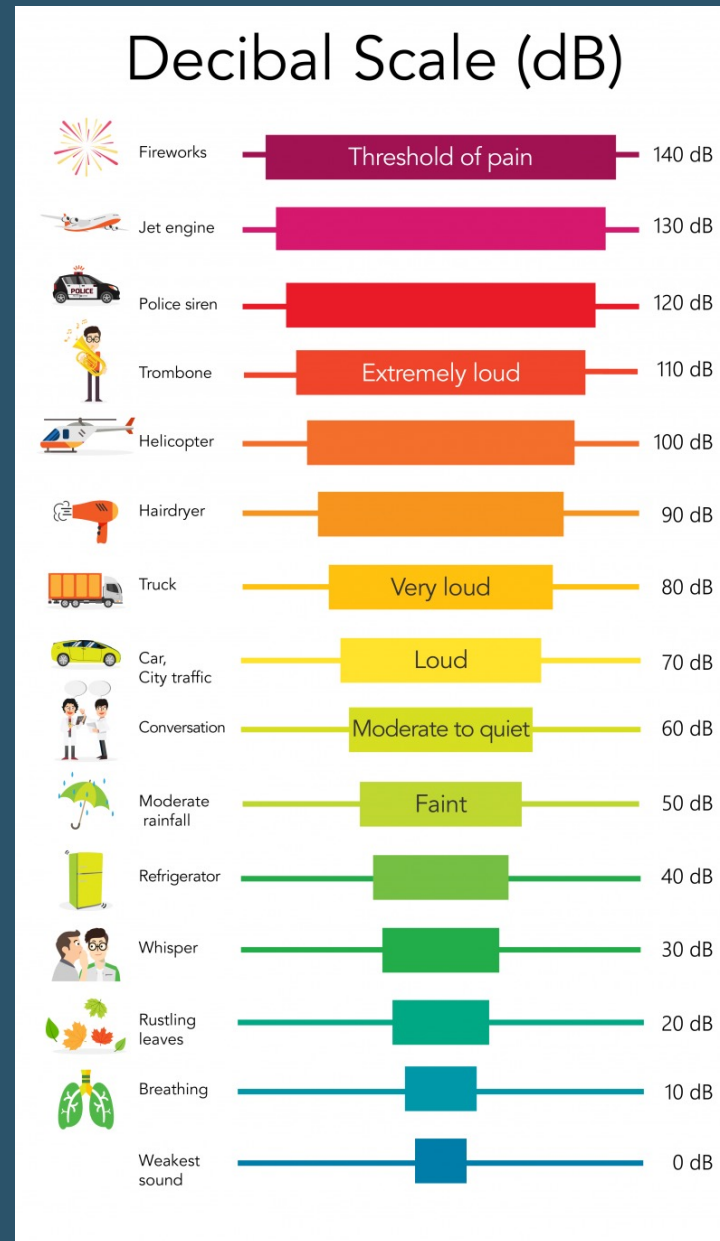
Immediate harm to human hearing



Hearing protection for humans



Hearing damage with prolonged exposure in humans





# Decibel Level Impacts Animals

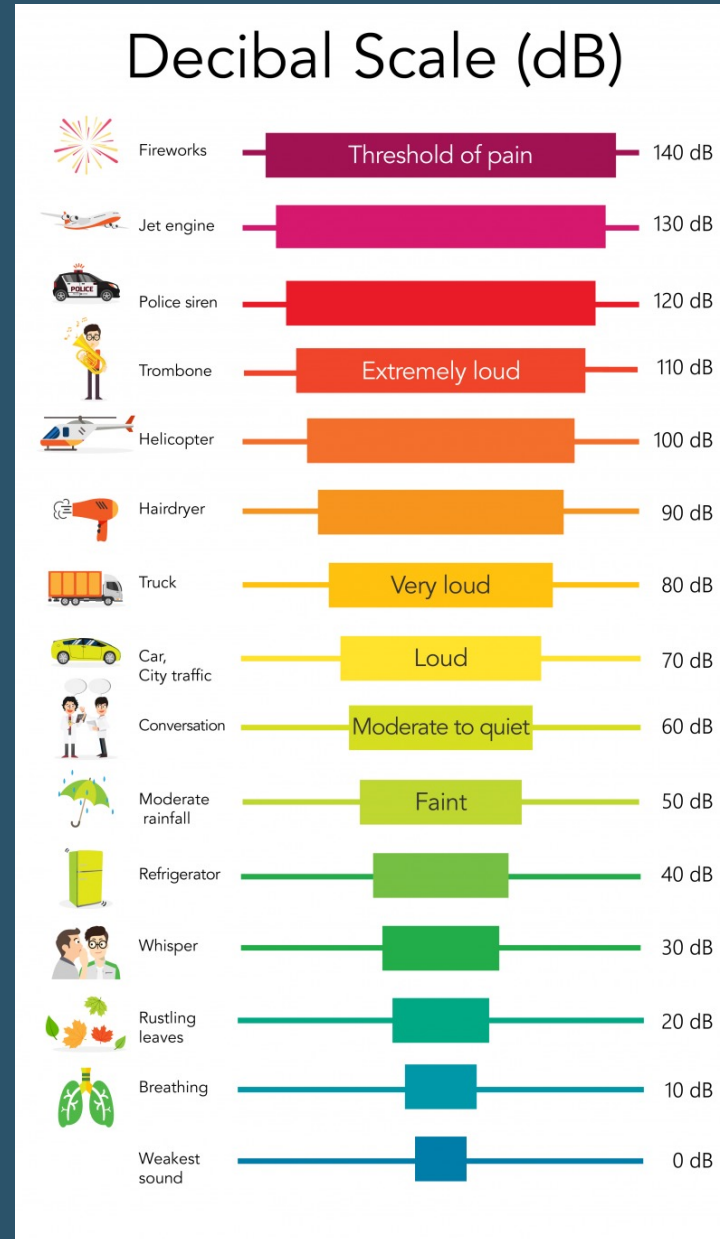
Immediate harm to human hearing →

Hearing damage in dogs at  
prolonged exposure →

Hearing protection for humans →

Stress response in rats →

Hearing damage in rodents and  
rabbits →



CDC 2019; CCOHS 2020; CCAC 1993; Scheifele et al. 2012; CDC 2019; Baldwin et al 2019

# Animal Facilities Can Get Noisy

Immediate harm to human hearing

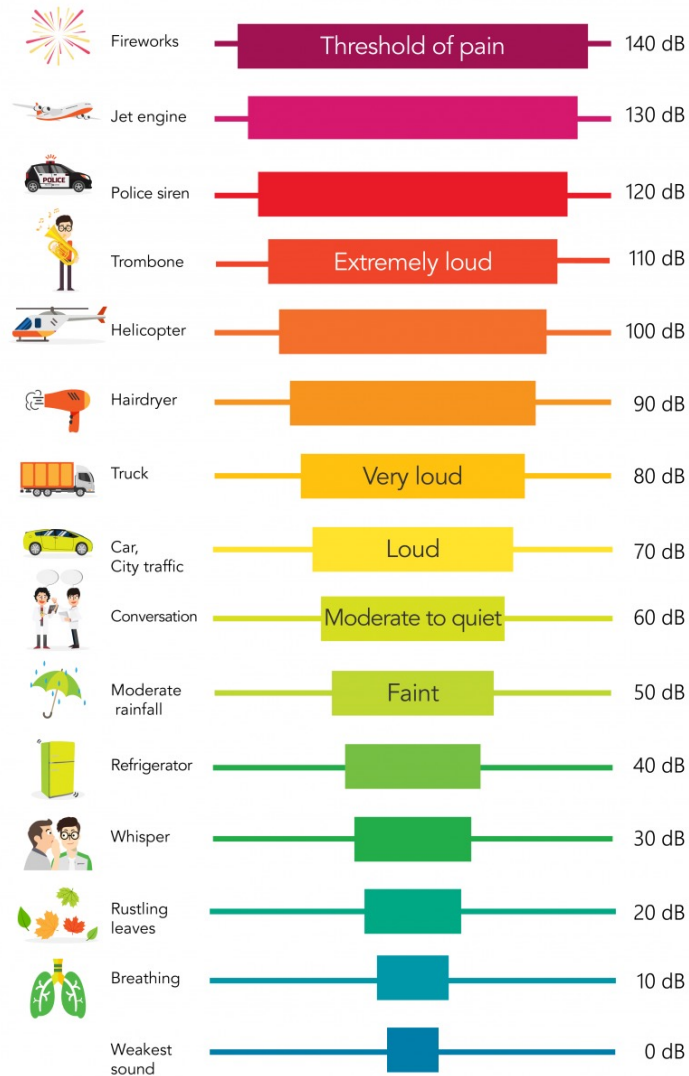
Hearing damage in dogs at prolonged exposure

Hearing protection for humans

Stress response in rats

Hearing damage in rodents and rabbits

## Decibal Scale (dB)



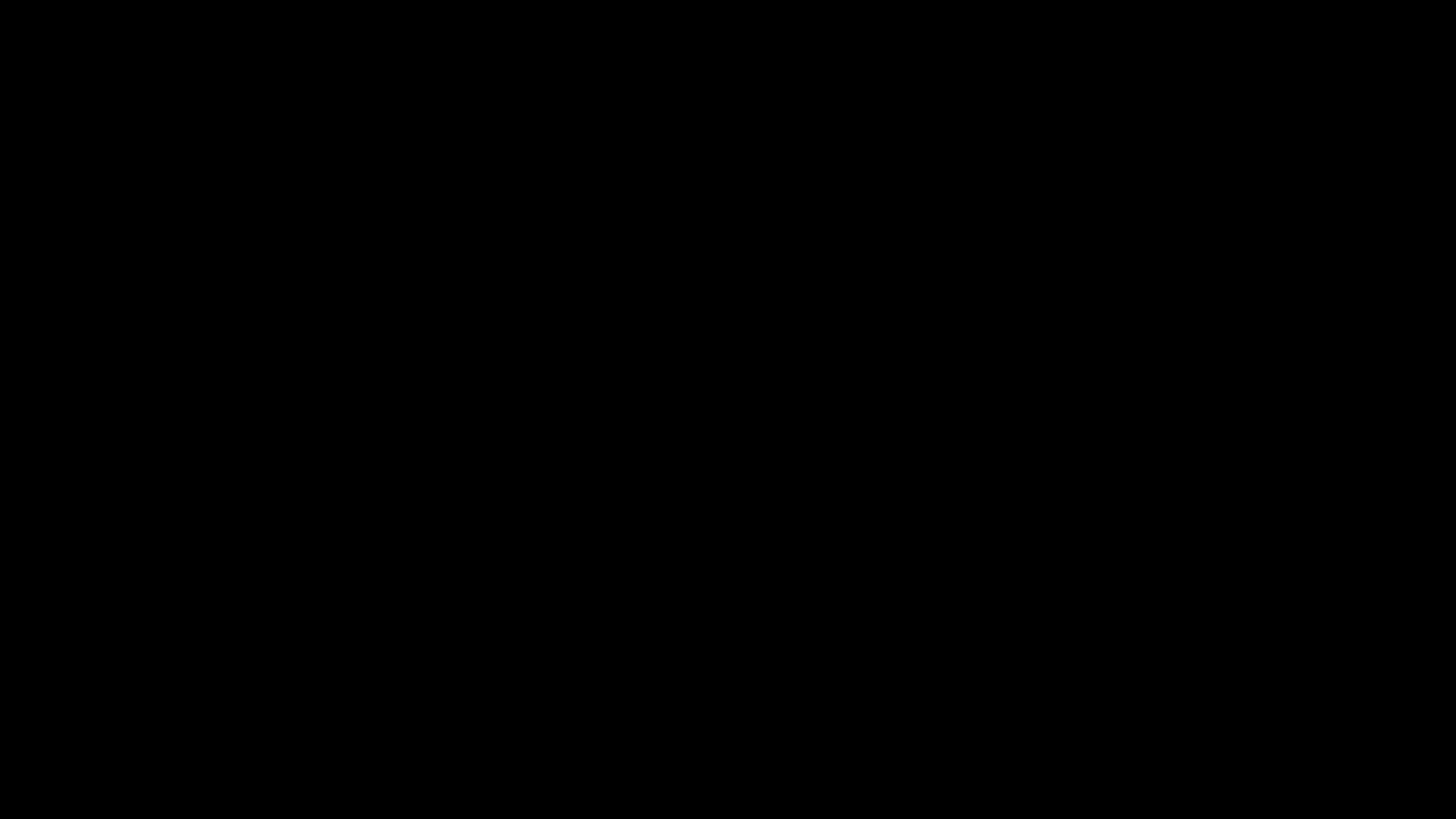
Animal Shelters and Grooming

Dog Kennels

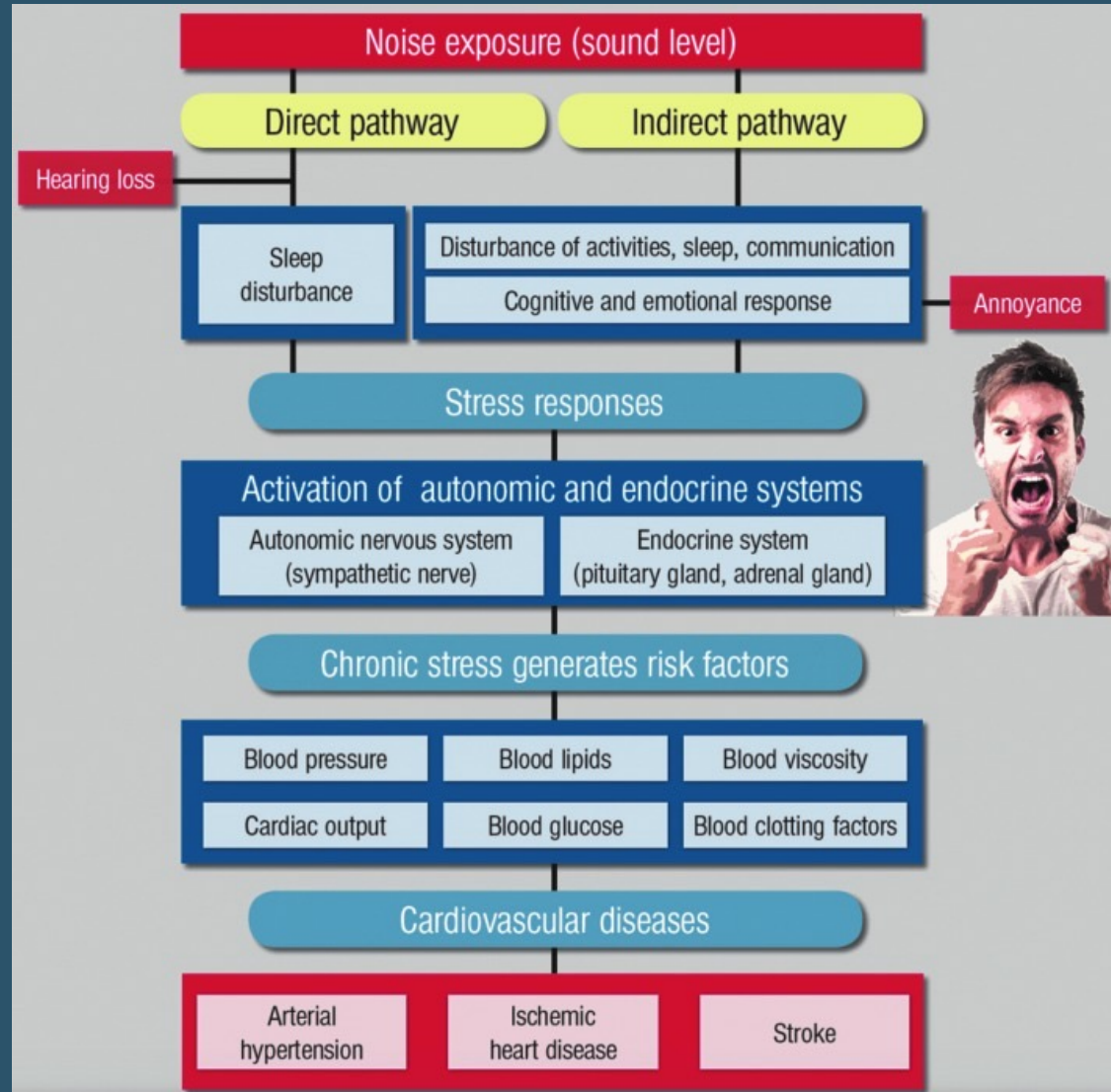
Veterinary ICUs

CDC 2019; CCOHS 2020; CCAC 1993; Scheifele et al. 2012; CDC 2019; Baldwin et al 2019; Fullager et al 2015; Sales et al 1997; Coppola et al 2010





# Noise has adverse effects on humans





# Noise appears to adversely impact cats

- Exposure to dogs was biggest factor affecting cat stress
- The “macroenvironment” likely at least as relevant as the “microenvironment”

McCobb EC, Patronek GJ, Marder A, Dinnage JD and Stone MS 2005 Assessment of stress levels among cats in four animal shelters. *Journal of the American Veterinary Medical Association* 226: 548–555.

Stella J, Croney C and Buffington T 2014 Environmental factors that affect the behavior and welfare of domestic cats (*Felis silvestris catus*) housed in cages. *Applied Animal Behaviour Science* 160: 94–105.



# What We Did

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## ***The effect of animal shelter sound on cat behaviour and welfare***

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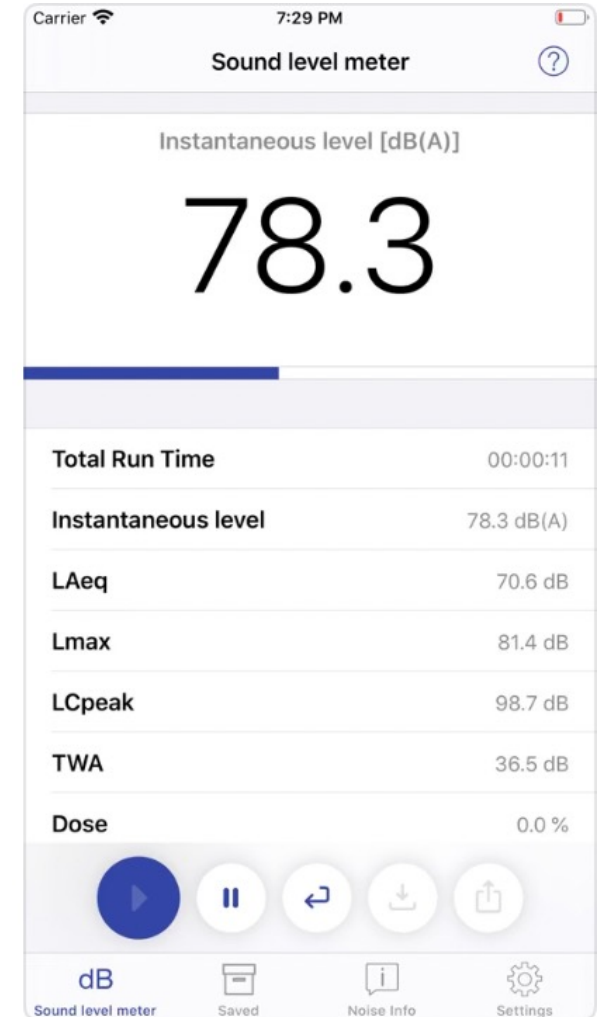
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## STUDY AIMS

1. Understand common sources and patterns of sound in the shelter
2. Understand how shelter cats behave during quiet and loud periods
3. Understand behavioural responses to sound transitions

# METHODS FOR MEASURING SOUND

- Singly housed shelter cats (n = 98) observed in Vancouver BC SPCA
- 30-minutes twice daily
- SPLnFFT Sound Level Meter app
  - Present if audible in closed room (>15 dB ↑)
  - Classified by type





# RECORDING FEAR-RELATED BEHAVIOURS

- Hide
- Crouch
- Ears back or flat
- Alert
- Startle



Stanton LA, Sullivan MS and Fazio JM 2015 A standardized ethogram for the felidae: A tool for behavioral researchers. Applied Animal Behaviour Science 173: 3–16.

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# WHERE CATS HIDE

- Hidebox
- Behind Hidebox
- Under and behind bed



# RECORDING MAINTENANCE-RELATED BEHAVIOURS

- Groom
- Play
- Stretch
- Eat
- Drink
- Yawn
- Knead
- Defecate
- Urinate
- Scratch



Stanton LA, Sullivan MS and Fazio JM 2015 A standardized ethogram for the felidae: A tool for behavioral researchers. Applied Animal Behaviour Science 173: 3–16.



## STUDYING 10 CATS WITH HIGHEST FEAR BEHAVIOUR

<b>Fear Total (%)</b>	100	100	100	100	100	100	100	100	90	77.5
<b>Maintenance Total (%)</b>	0	0	0	0	0	0	0	0	0	0

## STUDYING 10 CATS WITH HIGHEST MAINTENANCE BEHAVIOUR

<b>Fear Total (%)</b>	5.1	2.1	1.6	0	3.3	4.7	0	0	0	0
<b>Maintenance Total (%)</b>	8.3	5.7	7.5	25.0	6.7	15.0	1.7	5.0	5.0	25.0

**Negative correlation between fear and maintenance behaviour**  
 $(r_s(70) = -0.353, p < 0.05)$

# HIDING HABITS

- 28.7% of observation intervals in Hidebox
- 77% observed in other studies
- Cage size  $> 0.74\text{m}^2$  = lower URI rates



**Kry K and Casey R** 2007 The effect of hiding enrichment on stress levels and behaviour of domestic cats (*Felis sylvestris catus*) in a shelter setting and the Implications for adoption potential. *Animal Welfare* 16: 375–383.

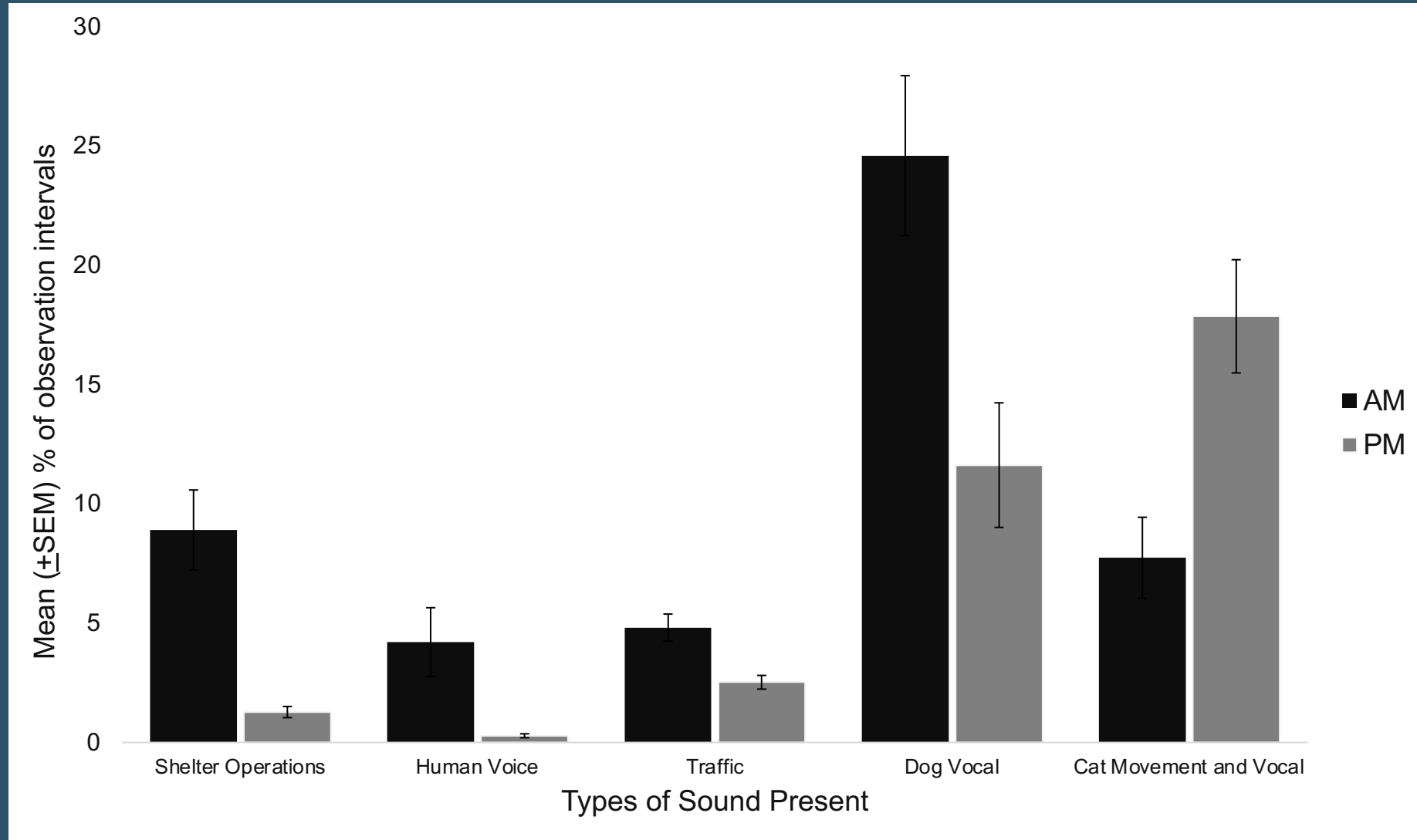
**Wagner DC, Kass PH and Hurley KF** 2018c Cage size, movement in and out of housing during daily care, and other environmental and population health risk factors for feline upper respiratory disease in nine North American animal shelters: *PLOS one* 13:1–15.

# HIDING HABITS

- Level of concealment
- Manipulable objects in the environment are likely important
- More concealment did not appear to impact adoption



# SOURCES OF SOUND IN AM AND PM





# Key Takeaways



- More sound in AM than PM
- More fear behaviour in the AM, more maintenance behaviour in the PM
- More fear behaviour in loud AM than quiet AM
- Sound transitions elicit fear behaviour
- Results suggest that sound affects the behaviour and likely the welfare of many cats and should be controlled as much as possible

# STANDARDS FOR DECREASING DECIBELS



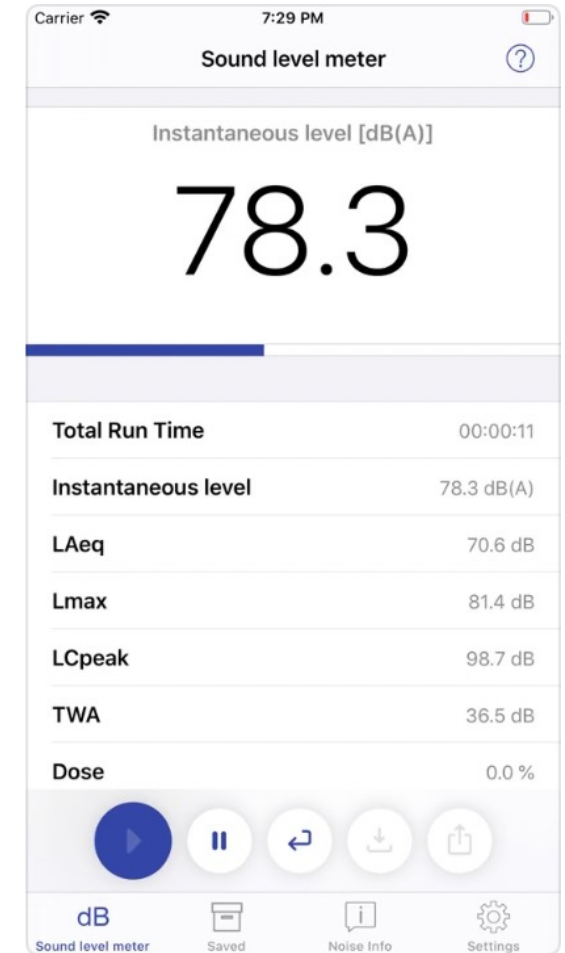
- Stella & Croney (2016) state that “it is likely that reducing noise levels and maintaining sound intensity around 60 dB (quiet conversational level) may be beneficial to cats”
- The Standards of Care in Animal Shelters (supporting ASV guidelines) state that “an appropriate acoustic environment is essential for good animal health and welfare”

Stella JL and Croney CC 2016 Environmental aspects of domestic cat care and management: implications for cat welfare. The Scientific World Journal 2016: 1–7.

Attard E, Duncan K, Firmage T, Flemming S, Mullaly K, Pryor P, Smrdelj M, Cartwright B and Rastogi T 2013 Canadian Standards of Care in Animal Shelters: Supporting ASV Guidelines. Association of Shelter Veterinarians, Apex, NC.

# MEASURE SOUND USING YOUR PHONE

- Multiple validated apps available
- iOS - NIOSH Sound Level Meter (EA Labs)
- Android – Sound Meter Pro (Smart Tools)





# INTERPRETING SOUND REDUCTIONS

Reduction in noise, dB(A)	Perceived change
- 3 dB	An audible, but small change.
- 10 dB	Large change. Sounds like a halving of the sound.

Adapted from Munzel et al (2018)

# DECREASING ENCLOSURE DECIBELS

Item	~ dB	~ Cost
Installation	~10 dB reduction	FREE
Close quietly	~10 dB reduction	FREE



# DECREASING ENCLOSURE DECIBELS

Item	~ Cost
Quiet-Closing Latch (ShorLine)	\$75 USD/ enclosure



ShorLine



# DECREASING ENCLOSURE DECIBELS

Item	~ dB	~ Cost
Shrink wrap + foam tape	~20 dB reduction	\$1/enclosure







# SOFTENING DOOR + CUPBOARD NOISE

Item		~dB	~ Cost
Silicone or felt pads		~ 5dB	\$5
Weatherstripping tape		~5 dB	\$5
Commercial Door Closer		~20 dB	\$100

# DECREASING DISH DECIBELS

Item		~dB reduction	~ Cost
Rubber coated dish		~5 dB	\$15
Towel under food dish		~8 dB	\$0-5



# DECREASING GARBAGE NOISE

Item		~dB reduction	~ Cost
Foam Pads		~10 dB	\$2
Dolly		~15 dB	\$30

# REDUCING REVERBERATION

Item			~ Cost
Wedge Foam			\$2/square foot
Automotive Sound Deadener			\$3/square foot

# IMPACT OF MUSIC ON CAT STRESS



- Listening to music prior to, and during, physical examination was associated with lower Cat Stress Score and lower handling score; no effect on the physiological stress responses
- Avoid use of radios playing very loud music
- “Reducing noise levels and maintaining sound intensity around 60 dB”

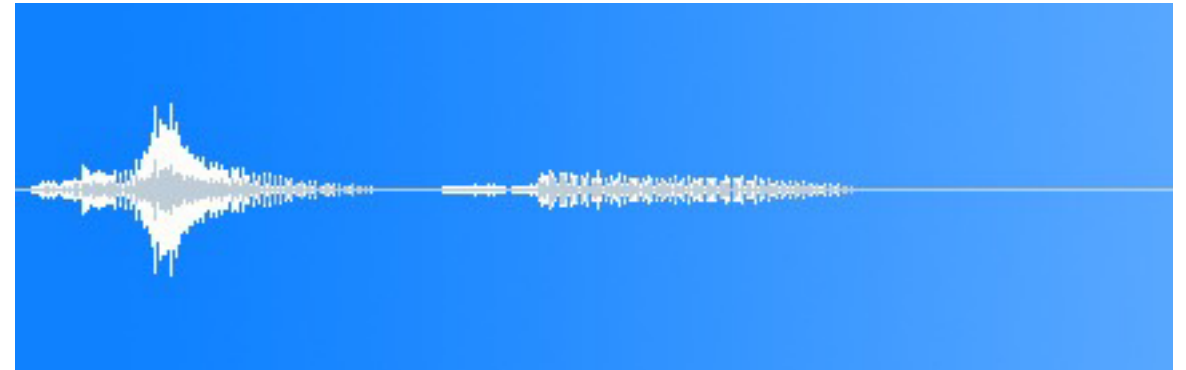
Hampton A, Ford A, Cox RE, Liu C, Koh R. Effects of music on behavior and physiological stress response of domestic cats in a veterinary clinic. *Journal of Feline Medicine and Surgery*. 2020;22(2):122-128. doi:[10.1177/1098612X1982813110](https://doi.org/10.1177/1098612X1982813110)

Wagner D, Hurley K and Stavisky J 2018b 2. Shelter housing for cats: Practical aspects of design and construction, and adaptation of existing accommodation. *Journal of Feline Medicine and Surgery* 20: 643–652.

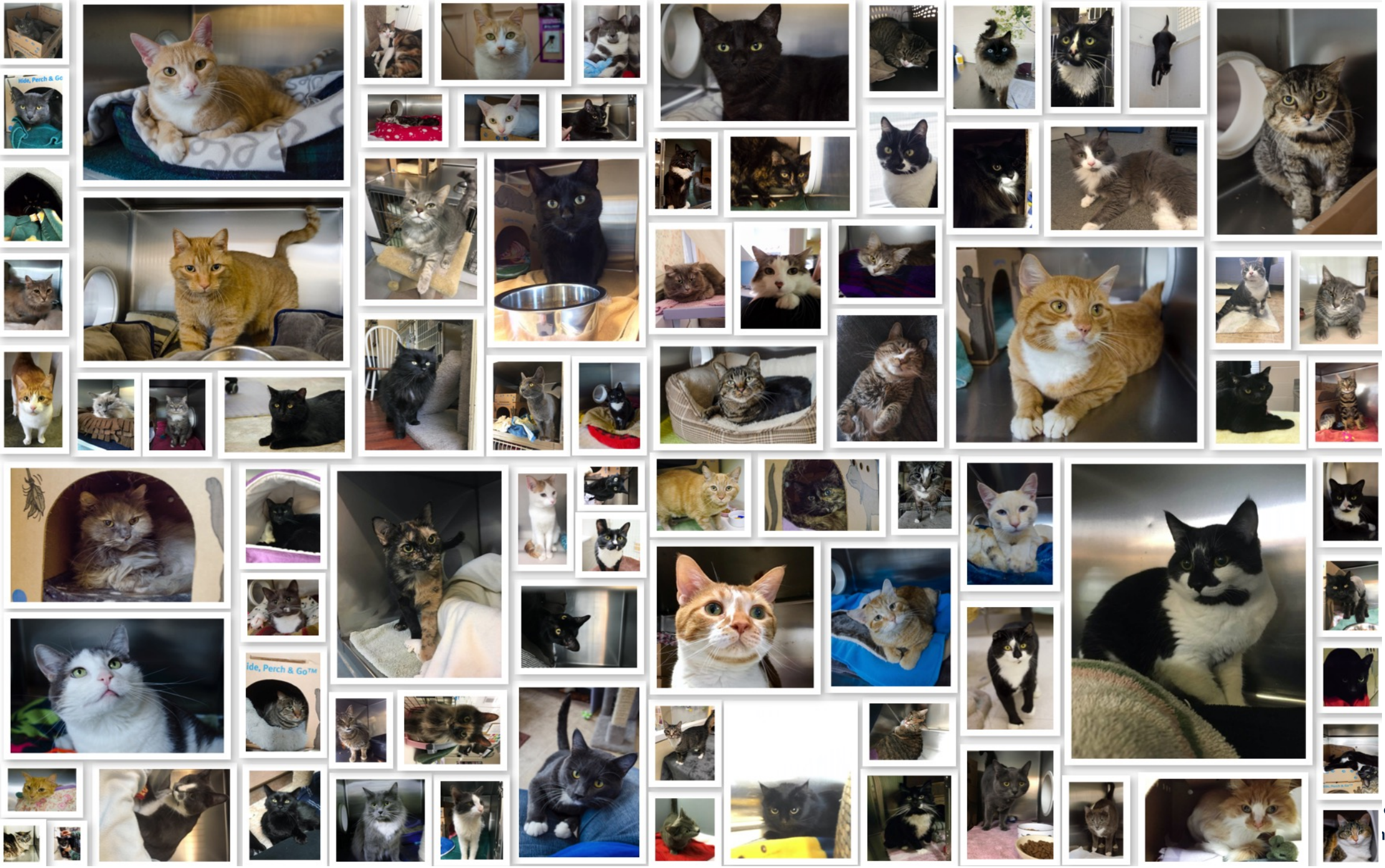
Stella JL and Croney CC 2016 Environmental aspects of domestic cat care and management: implications for cat welfare. *The Scientific World Journal* 2016: 1–7.

# SOUNDPROOFING OUR BEHAVIOUR

- Keeping doors closed
- Opening and closing slowly
- Carrying items instead of dragging
- Keeping voices low, encouraging staff, volunteers and visitors to do the same









# THANK YOU

- The BC SPCA staff and volunteers
- Zoetis Canada and Mitacs Accelerate Fellowship
- Thank you for having me!



# For More Information



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