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# Evaluating the effects of temporary fostering on shelter dog welfare

# Key Terms

Shelter Dog Welfare

Fostering

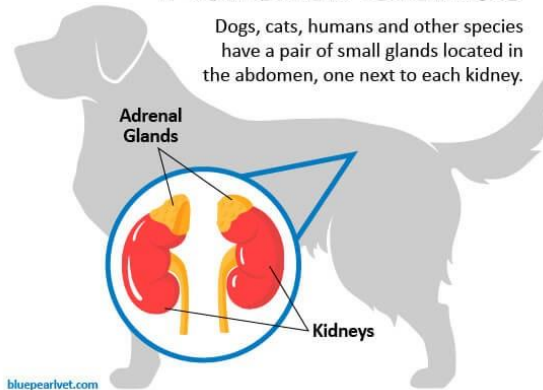
Endocrine System:  
Adrenal Glands

Cortisol & Measuring Stress Levels

Sympathetic/ Parasympathetic  
Nervous System

## Adrenal Glands

Dogs, cats, humans and other species have a pair of small glands located in the abdomen, one next to each kidney.



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# **Does Temporary Fostering Decrease Levels of Stress in Shelter Dogs?**

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# Experiment One: Defining Stress In Shelter Dogs Using Cortisol

## Cortisol

Most widely used physiological markers of the stress response in dogs.

**Urinary Cortisol levels/testing:** The amount of cortisol in the urine reflects the average cortisol concentration in the blood at the time that the urine sample was formed.

**Human interactions reduce cortisol in shelter dogs.**  
Just 30 minutes of walking and interaction decreases cortisol levels of shelter dogs.

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# Experiment One Research Summary: Methods

Experimental Research study assessed the impact of one and two-night fostering programs.

- 207 dogs from five animal shelters across the United States
- Dog's urine was collected in the morning before foster pick up, during foster and after foster stay for cortisol: creatinine analysis

Shelter	Admission type and state	Prior year canine intake	Subject dogs	Complete sequences <sup>a</sup>	Samples collected	Samples removed <sup>b</sup>
BFAS	Limited, UT	743	39	38	131	3
AHS	Open, AZ	6,607	43	32	243	9
HSWM	Limited, MT	847	40	33	235	4
DCAS	Open, GA	5,686	43	41	254	8
SPCATX	Limited, TX	4,818	42	40	254	17

## Table

Shows participating shelters and locations, Shelters canine intake, the number of canine participants per shelter, the completed number of experimental sequences per shelter, the samples collected and samples removed due to errors such as contamination or inability to collect urine.

# Experiment One Research Summary: Findings

## Cortisol Findings

- Cortisol: Creatinine ratios dropped significantly during their foster stay.
- Cortisol levels rebounded back to pre-sleepover values upon acclimation back to the shelter.

Mean cortisol: creatinine ratio value, standard error, *F* test statistic, and *p* value for time-points before, during, and after temporary fostering at 5 US shelters.

Shelter	Before Sleepover (Shelter)				During Sleepover (Foster)				After Sleepover (Shelter)				
	1		2		3		4		5		6		
	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	
BFAS			20.66 <sup>a</sup>	0.98	18.15 <sup>a,b</sup>	0.89				21.38 <sup>b</sup>	1.25		
AHS	43.53 <sup>a</sup>	2.92	44.51 <sup>b,c</sup>	2.34	37.23 <sup>b</sup>	2.03	32.80 <sup>a,c,d</sup>	2.36	40.19 <sup>d</sup>	2.30	38.96	1.93	
HSWM	29.84	1.56	31.50 <sup>a</sup>	1.78	26.42 <sup>b</sup>	1.74	25.89 <sup>a,c,d</sup>	1.69	30.85 <sup>c</sup>	1.52	32.59 <sup>b,d</sup>	1.70	
DCAS	29.06 <sup>a,b</sup>	1.62	28.48 <sup>c,d</sup>	1.41	24.54 <sup>a,c</sup>	1.48	23.59 <sup>2,b,d</sup>	1.72	28.06	1.49	27.60	1.55	
SPCATX	24.34 <sup>a</sup>	1.52	24.67 <sup>b</sup>	1.55	22.19	1.49	20.64 <sup>a,b,c,d</sup>	1.49	24.49 <sup>c</sup>	1.55	24.16 <sup>d</sup>	1.40	
Overall			29.73 <sup>a</sup>	0.79			24.92 <sup>a,b</sup>	0.77			29.19 <sup>b</sup>	0.75	

## Cortisol: Creatinine Levels

*The table shows findings of cortisol experiment. Green is cortisol levels before sleepover, blue is cortisol levels during sleepover and purple is cortisol levels after sleepover.*

# Experiment Two Defining Stress In Shelter Dogs Using Activity Levels

## Activity Levels

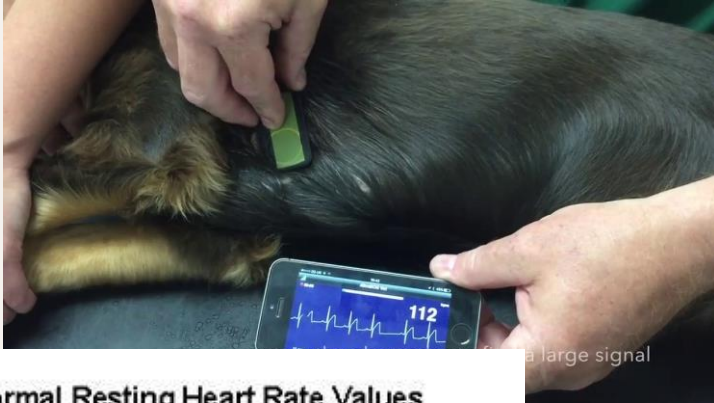
Measuring activity can be another component to shelter welfare assessment/determination of stress in dogs.

### **Signs of stress we can track:**

Increased heart rate, respiration rate, increased body temp and trouble resting are all related to signs of stress/produce elevated cortisol levels.



# Experiment Two Research Summary: Methods



## Normal Resting Heart Rate Values

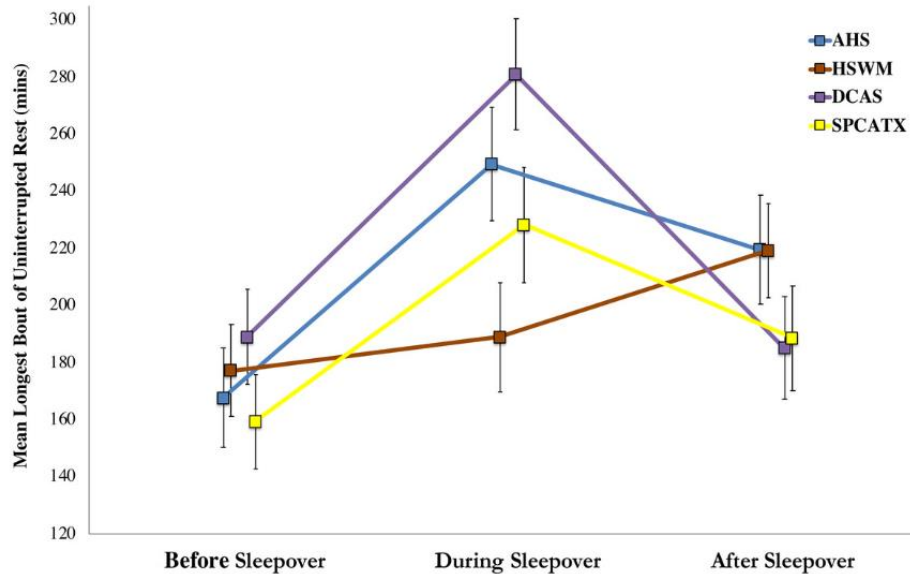
Class of Canine:	Normal Range (bpm):
Puppy	70 - 220
Toy breeds	70-180
Standard	70-160
Giant breeds	60-140

Non-invasive health monitors were worn by the 205 dogs. They collected vital rates and tracked activity levels in the shelter and foster homes.

Collection spanned one day in shelter, followed by two nights in foster, then lastly one day upon return to shelter.

**Aimed to track:** Resting pulse rates, longest bout of uninterrupted rest and proportion of time spent resting.

# Experiment Two Research Summary: Findings



## Activity Level Findings

- Dogs had their longest bouts of uninterrupted rest during sleepovers, and in the shelter after their sleepover.
- Dogs in shelter rested 45% of a 2 hour cycle; dogs in foster rested for 60% of the day.
- No effects on resting pulse rate

Table shows longest bouts of uninterrupted rests before sleepover, during sleepover and after sleepover. Reflects that longest bout of uninterrupted rest peaked during sleepover.

# Research Summary

## Strengths

- **Experiment can be replicated to determine if evidence is repeatable.**
- **Tested different outcome variables (cortisol, rest, heart rate, etc.)**
- **Cause and effect determination**

Cause: Dogs leaving shelter to go to foster for a temporary period. Effect: Signs of lower cortisol levels and monitored activity.

## Limitations

- **Results have opportunity to be subjective due to human/machine error.**

Urine has to be refrigerated for analysis- chances of it dropping to room temp due to human error. Machine has probability for invalid test results if not cleaned properly/contamination from other urine.

- **Possibility of other unknown health conditions in shelter dogs to skew test results.**

Cushing's disease causes increased cortisol levels and can go undetected in shelter dogs thus skewing test results.

# Biopsychological Connections

## **Cortisol holds strong connections to nervous system health.**

Overproduction of cortisol (Chronic Stress) is linked to the progression of neurodegenerative diseases, which gradually damage and destroy parts of your nervous system, especially areas of your brain.

## **Sympathetic Nervous System engagement in shelter dogs.**

Shelter dogs often hold high stress levels due to the shelter environment, this causes constant engagement of the sympathetic nervous system.

## **Endocrine system activity levels increased from constant stressor.**

Constant stressors in shelter environment → Engagement of Endocrine system → Cortisol produced in adrenal glands (result of stress) → Effects of cortisol on the body

# Real Life Connections

## **Shelter Welfare** How we can improve quality of life.

After seeing that human interactions result in lower cortisol levels, we can push to provide more human interactions and outside shelter time to improve quality of life.

## **Prevention** of neurological decline.

We can prevent the negative neurological effects and aim to lower cortisol levels in shelter dogs by keeping their time in a shelter environment to the minimum.

## **YOU CAN MAKE AN IMPACT!!**

## **Foster an animal at your local animal shelter.**

Fostering helps decrease stress levels and decrease chances of negative health effects developing from being in an shelter environment too long.

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# Research Conclusions

**This research set out to find if fostering decreases levels of stress in shelter dogs.**

- Fostering decreases the levels of stress in shelter dogs.
  - Shelter dogs receive better sleep when in a home environment.
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# Future Research Directions

This research can be expanded on.

This is a study of short term fostering, by see the positive results to short term fostering, we can take a step towards studying the effects of long term fostering. If a dog is in a home for a week do their cortisol rates drop even more?

Addressing the result of cortisol rebounding back to pre-sleepover levels when returned to shelter.

This seemed to be a major drawback of the experiment, making you ask the question “What's the point of taking them out of the shelter if their stress levels go back?” The research can be more developed by looking into this problem. Does a dog being fostered longer affect the rebound of cortisol? What can shelter workers do to keep cortisol levels from rebounded? Or delay rebounding?

# References

## Primary Source

Gunter, L.M., Feuerbacher, E.N., Gilchrist, R.J., Wynne, C.L. (2019). Evaluating the effects of a temporary fostering program on shelter dog welfare. *PeerJ*, 7, 1-19.  
<https://doi.org/10.7717/peerj.6620>

## Secondary Source

Arizona State University. (2019, April 1). *Sleepovers Reduce Stress in Shelter Dogs*. ScienceDaily.  
[www.sciencedaily.com/releases/2019/04/190401121814.htm](http://www.sciencedaily.com/releases/2019/04/190401121814.htm).