

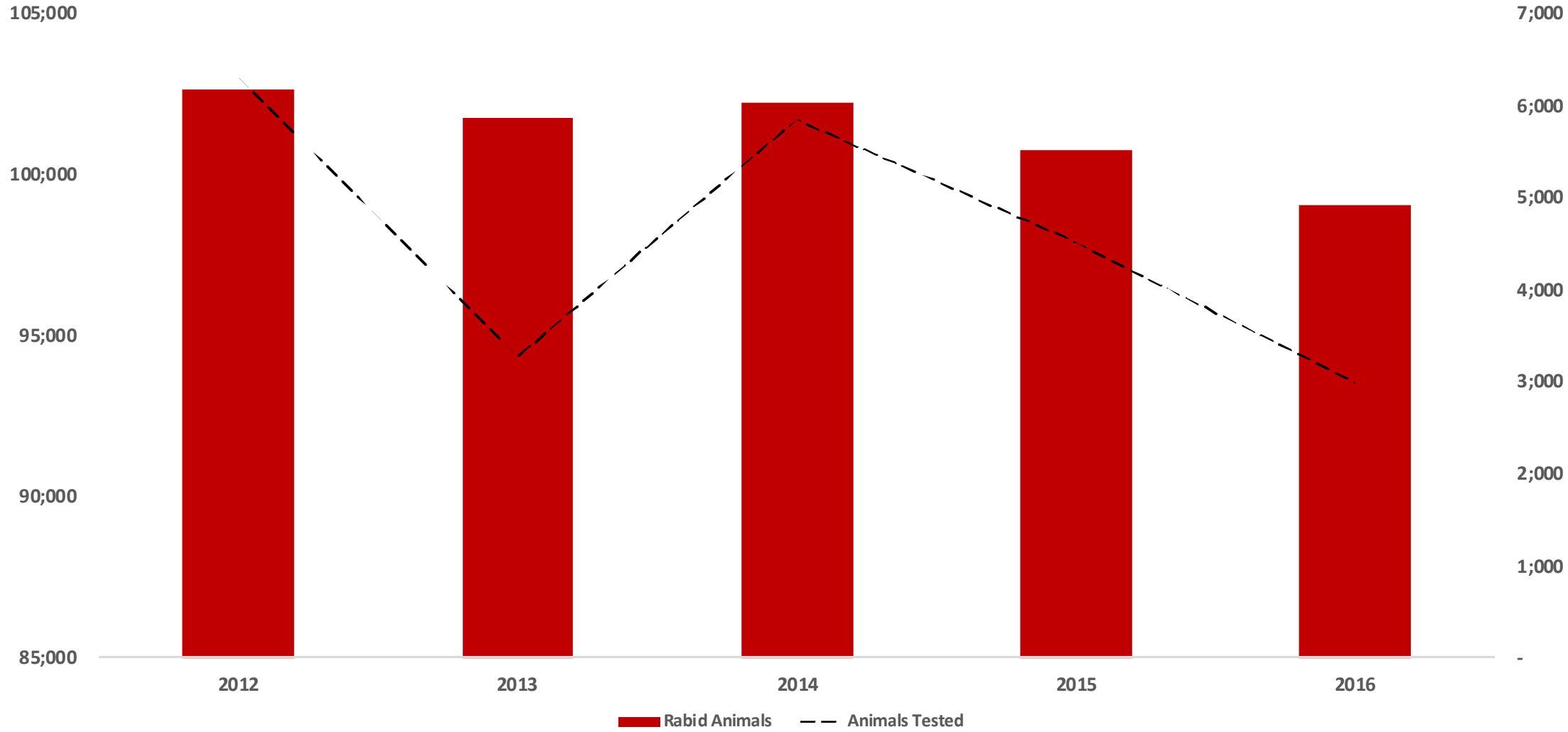
A close-up photograph of a brown bat with its wings spread wide, lying on a textured, brownish ground. The bat's face is visible, showing its ears and nose. The wings are dark and thin, extending outwards. The ground is composed of small, irregular particles, possibly soil or rock. A semi-transparent grey banner is overlaid on the top half of the image, containing the title text.

SURVEILLANCE FOR RABIES IN BATS UNITED STATES

RABIES SURVEILLANCE

- **Human and Animal Rabies**
 - Reportable in all states
 - Nationally notifiable
- **Laboratory based surveillance**
 - 128 laboratory network (public health, university, and Ag labs)
 - Published national standard DFA protocol
 - Routine proficiency testing

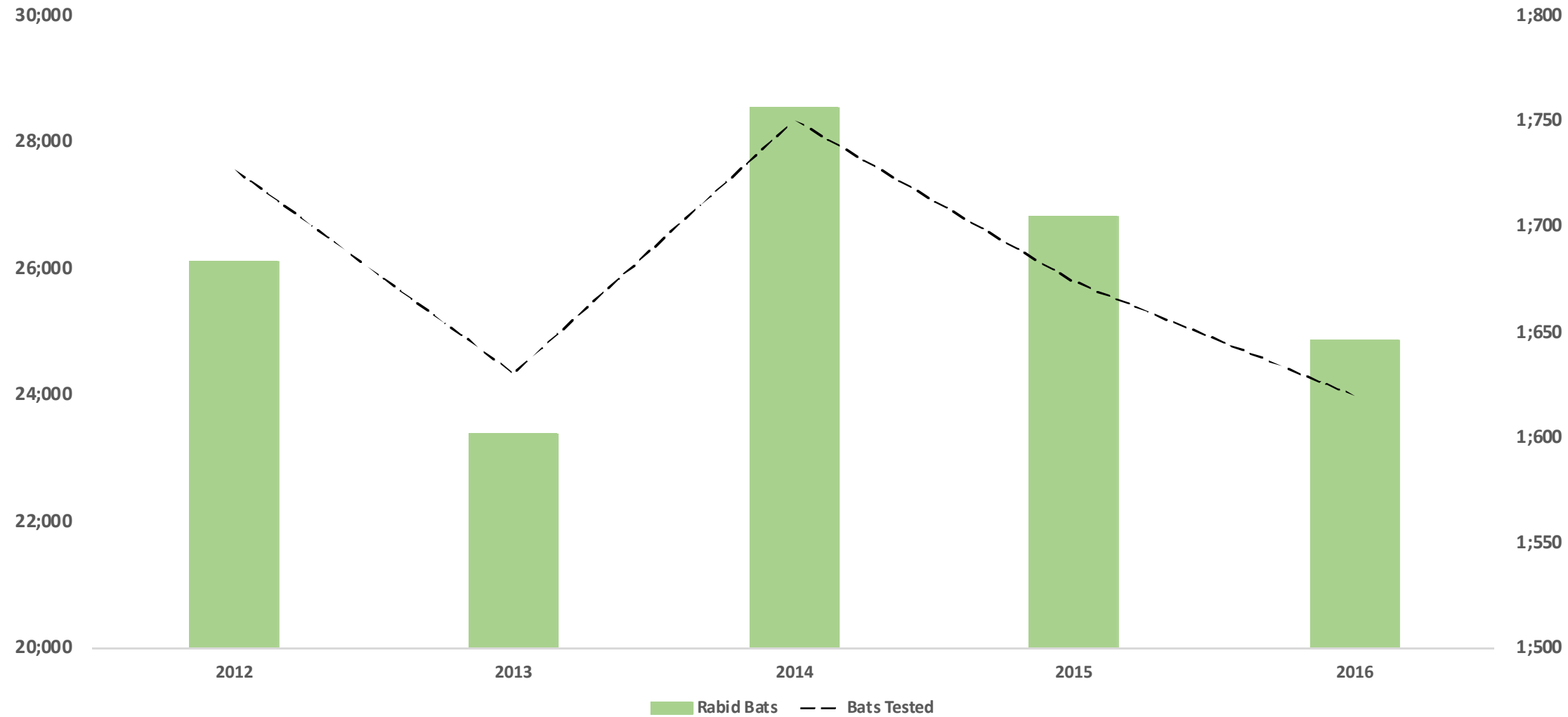
Animal Rabies Diagnosis 2012 - 2016

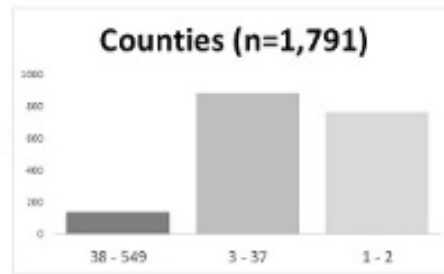
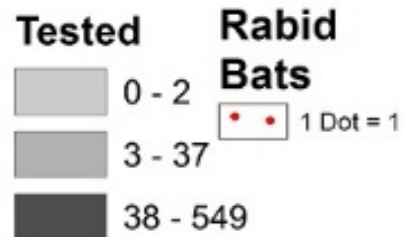
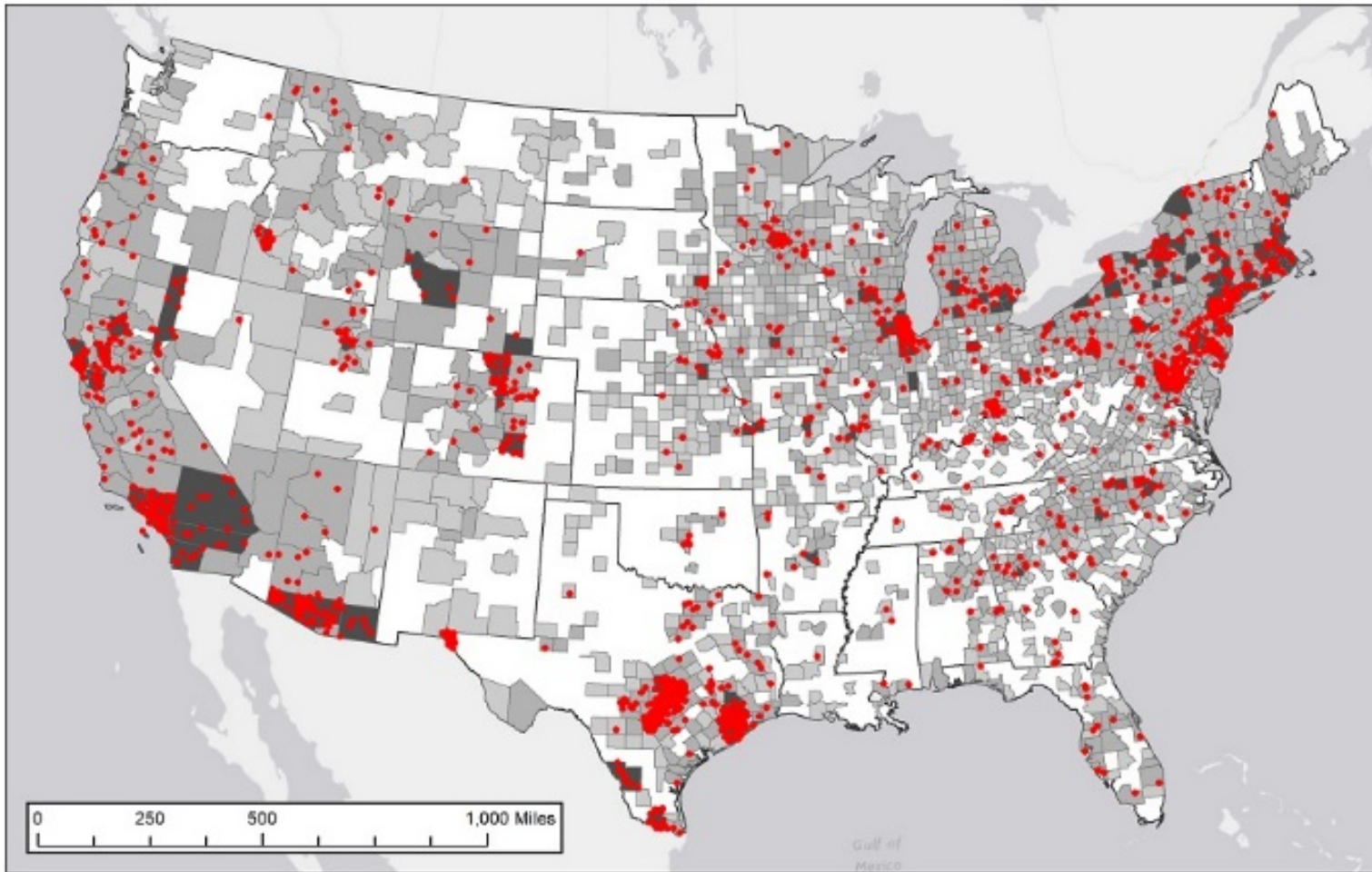


"I have a 14 year old who was playing on his cell phone and felt a bat on his leg. The father picked up the bat by his fingertip, the bat bit his finger, he killed it, and had it tested. It was positive for rabies."

"A bat got into the house last night. When my college-age daughter woke the next day, she encountered the bat roosting in the enjoining room, the doors between the rooms had been wide open. Nuisance control took it away. Tonight, she noticed two tiny scratches on her chin. A mystery. Probably nothing. But she's worried. And it's Saturday night; no doctor or public health office is open. The bat will be sent for rabies testing Monday. "

Rabies Diagnosis in Bats 2012 - 2016





Rabies Diagnosis in Bats by Species 2012 - 2016

Species	common name	No. Tested	No. Positive	Percent Positive
Order: Chiroptera	Bat, not further specified	64,750	4,600	7.1%
<i>Eptesicus fuscus</i>	big brown bat	52,199	2,043	3.9%
<i>Tadarida brasiliensis</i>	Mexican free-tailed bat	4,063	1,099	27.0%
<i>Myotis lucifugus</i>	little brown bat	3,067	76	2.5%
<i>Lasiurus borealis</i>	red bat	1,266	151	11.9%
<i>Nycticeius humeralis</i>	evening bat	1,217	38	3.1%
<i>Lasionycteris noctivagans</i>	silver-haired bat	996	67	6.7%
<i>Myotis californicus</i>	California myotis	383	15	3.9%
<i>Myotis</i> spp.	Myotis species, not further specified	358	37	10.3%
<i>Lasiurus cinereus</i>	hoary bat	269	127	47.2%
<i>Myotis yumanensis</i>	Yuma myotis	218	4	1.8%
<i>Myotis evotis</i>	long-eared myotis	206	24	11.7%
<i>Myotis velifer</i>	cave myotis	146	8	5.5%
<i>Nyctinomops macrotis</i>	big free-tailed bat	107	10	9.3%
<i>Lasiurus intermedius</i>	northern yellow bat	104	14	13.5%
<i>Lasiurus seminolus</i>	seminole bat	92	14	15.2%
<i>Perimyotis subflavus</i>	tricolored bat	92	6	6.5%
<i>Myotis volans</i>	long-legged myotis	82	10	12.2%
<i>Myotis</i> spp.	western small-footed myotis	57	5	8.8%
<i>Myotis</i> spp.	desert pallid bat	47	10	21.3%
<i>Myotis</i> spp.	Keen myotis	45	1	2.2%
<i>Myotis</i> spp.	southern yellow bat	44	7	15.9%
<i>Myotis</i> spp.	northern long-eared bat	40	1	2.5%
<i>Myotis</i> spp.	canyon bat	29	13	44.8%
<i>Myotis</i> spp.	fringed myotis	22	2	9.1%
<i>Myotis</i> spp.	free-tailed bats, not further specified	20	4	20.0%
<i>Myotis</i> spp.	southeastern myotis	19	1	5.3%
<i>Myotis</i> spp.	lesser long-nosed bat	18	0	0%
<i>Myotis</i> spp.	southwestern myotis	15	0	0%
<i>Rousettus aegyptiacus</i> *	Egyptian fruit bat	12	0	0%
<i>Myotis sodalis</i>	Indiana myotis	9	0	0%
<i>Plecotus townsendii</i>	Townsend's big-eared bat	9	0	0%
<i>Lasiurus xanthinus</i>	western yellow bat	5	1	20.0%
<i>Desmodus rotundus</i> *	common vampire bat	4	0	0%
<i>Myotis leibii</i>	eastern small-footed myotis	4	1	25.0%
<i>Corynorhinus rafinesquii</i>	Rafinesque's big-eared bat	3	0	0%
<i>Pteropus giganteus</i> *	Indian flying fox	3	0	0%
<i>Eudema maculatum</i>	spotted bat	2	1	50.0%
<i>Myotis grisescens</i>	gray bat	2	0	0%
<i>Rousettus lanosus</i> *	long-haired Rousette	2	0	0%
<i>Eumops perotis</i>	western mastiff bat	1	0	0%
<i>Idionycteris phyllotis</i>	Allen's big-eared bat	1	0	0%
<i>Molossus ater</i>	black mastiff bat	1	0	0%
TOTAL		130,029	8,390	6.5%
<i>Total w/ Species ID</i>		<i>65,279</i>	<i>3,790</i>	<i>5.8%</i>
<i>Percentage w/ Species ID</i>		<i>50.2%</i>	<i>45.2%</i>	

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Spillover of Bat Rabies Virus Variants



- 30% of rabid animals typed
- Bat rabies virus variants rare in non-volant species
 - <0.8% of typed cases
 - Foxes and skunks most frequently reported
 - Rarely in domestic animals (primarily cats and dogs)

Human Exposures

- Bats primary source of indigenously acquired human rabies
- 5 cases since 2012
 - 2012 (MA, My sp.)
 - 2012 (CA, Tb)
 - 2014 (MO, Ps)
 - 2015 (WY, Ln)
 - 2017 (FL, Tb)
- 4/5 had known contact with bat

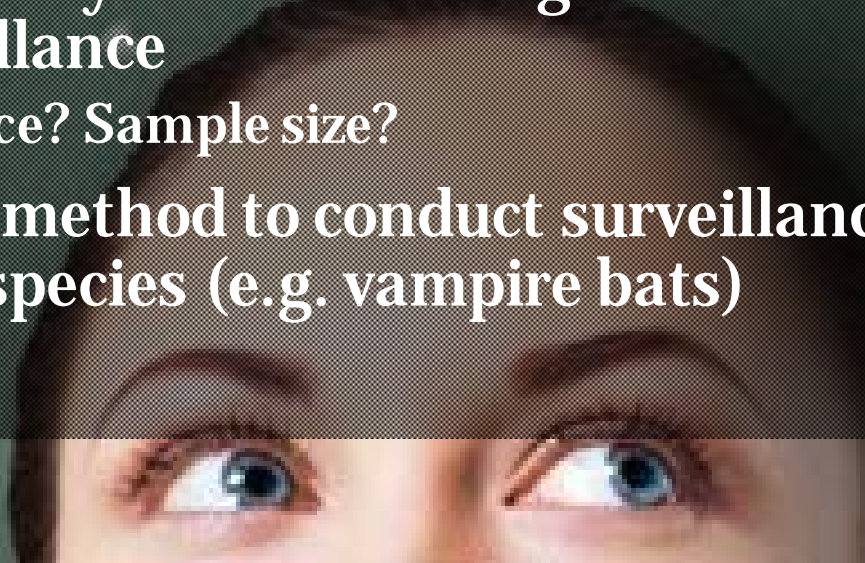


Human rabies exposures

- PEP is not a notifiable condition in US
- Estimate between 30,000 – 40,000 persons receive PEP annually
- Considerable regional variability in PEP epidemiology
 - Potential exposures to bats account for between 8-64% of PEP administered
- At 15% of estimated PEP: >\$10 million annually on bat
- \$1.5 million on laboratory surveillance
 - Saves >\$30 million in un-needed

Questions Remain...

- Gaps in Surveillance
 - Bat rabies *assumed* to exist everywhere
 - Significant holes in surveillance in rural regions, far north (e.g. AK), and Caribbean (e.g. PR)
- What is the best way to conduct targeted surveillance in areas with poor surveillance
 - Sero-Surveillance? Sample size?
- What is the best method to conduct surveillance for incursion of a new reservoir species (e.g. vampire bats)



Ongoing efforts...

- **Improve bat species identification**
 - Develop tools for laboratory staff
- **Improve guidance for variant typing**
 - Don't need to type everything, but what should we type?
- **Enhanced surveillance for vampire bats**
 - Early identification of vampire bats at US-Mexico border





Thank you!

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CDC / NCEZID / DHCPP / Poxvirus and Rabies Branch