

Educating International Students about Rabies through the Kansas State University Rabies
Laboratory: A Field Experience Report

by

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A FIELD EXPERIENCE REPORT

submitted in partial fulfillment of the requirements for the degree

MASTER OF PUBLIC HEALTH

Master of Public Health Program
College of Veterinary Medicine

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Approved by:

Major Professor
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Abstract

This report presents a detailed field experience undertaken for 180 hours with the Kansas State University Rabies Laboratory. The agency is the primary diagnostic lab for the state of Kansas (and until recently, Nebraska). In addition, the lab provides support for the teaching and research responsibilities of the Department of Diagnostic Medicine/Pathobiology, the College of Veterinary Medicine and Kansas State University.

Rabies is a deadly zoonosis endemic in the United States, including in Kansas. Animal control programs emphasize in vaccination of dogs and cats, and removal of stray animals have been essential in reducing the risk of rabies exposures to humans. Bats are also a potential reservoir of rabies for humans. The Kansas State University Rabies Laboratory have received reports that bats sometimes enter the campus buildings, which in this case show that there are some possibilities that students can be exposed to the potential rabid wild animals.

While most of human bite cases worldwide are due to dogs, more than 90% of animal cases in the U.S. occur in wildlife. This field experience focused on educating the international students about the risk of rabies transmission from wild animals because, as non-permanent residents in the U.S., they might never come across information about rabies in the United States. Developing a health campaign based on the target audience's preference has strengthened my skill to strategically and effectively educate the public.

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Chapter 1 - Introduction

Rabies is a zoonotic disease that is almost always fatal if left untreated. Globally, the virus causes an estimated 59,000 human deaths annually, mostly among underserved populations in Africa and Asia (Hampson et al., 2015). The majority of these deaths are due to the virus that circulates among domesticated dogs (World Health Organization, 2013).

Domesticated dogs are no longer considered as rabies reservoirs in the United States. However, there are at least 20 virus variants maintained by bats and 8 virus variants are maintained by terrestrial mesocarnivores, such as raccoons, skunks, foxes, and mongooses. Distribution of rabies virus variants associated with terrestrial mesocarnivores occurs in geographically definable regions. Raccoon variant is distributed along the East Coast of the United States; skunk variants exist in the south central, north central, and California; gray fox variants are present in Texas and Arizona; arctic fox variant is present in the Arctic region; and dog-mongoose variant is present in Puerto Rico (Birhane et al., 2017; Kuzmina et al., 2013; Streicker et al., 2010).

Based on animal rabies surveillance in the U.S. in 2015, more than 90% cases occurred in wild animals. Rabies is most frequently isolated from bats, representing 30.9% (n=1,704) of all animal rabies detected, followed by raccoons (29.4% [n=1,619]), skunks (24% [n=1,365]), foxes (5.9% [n=325]), other wild animals (0.7% [n=41]), and rodents and lagomorphs (0.6% [n=34]). In Kansas, where skunk rabies virus variants are considered enzootic, rabies virus was detected from 67 skunks, 6 bats, and 3 foxes (Birhane et al., 2017). It is interesting that despite the presence of other terrestrial mesocarnivore species (i.e. raccoons and foxes) in Kansas, skunks were the predominant rabid animals identified during 2015.

Human cases in the U.S. are rare; only 1 to 3 cases are reported every year. Twenty-three human mortalities were reported from 2008 to 2017. Most human deaths were due to exposure

from rabid wild animals in the country and the remainders were due to overseas dog exposure. The only connection between the cases was none of them received Post-Exposure Prophylaxis (PEP) treatment. In most cases, patients were aware of the exposure but did not know that timely PEP is crucial. On the other hand, some patients had contact with rabid bats while sleeping, but they were unaware of the risk for rabies in the absence of a visible bite wound; they did not seek medical evaluation or receive PEP after the incident (CDC, 2017).

Public understanding of rabies exposure risk from domesticated animals in canine-rabies countries as well as from wild animal contact in the United States needs to be improved. The CDC case report on 2015 highlights the need for increasing public awareness of rabies transmission risk from wild animals. The report also highlights the need for educating public agencies outside of the public health domain, such as animal control or police departments, to ensure they can provide accurate information and proper referrals (Harrist et al., 2016).

A study focused on knowledge and perceptions about bat and rabies was performed among residents of Fort Collins, Colorado. The researchers found most residents knew about risk of rabies transmission from bats and knew how to deal with it. Almost all of residents (99%) knew that bat bites should be treated by immediately cleaning the wound and consulting a physician; 89% of the residents also know that when the bat is trapped indoors, they need to capture the bat for rabies testing, and receive rabies PEP if the bat tests positive for rabies (Sexton & Stewart, 2007). In Manhattan, Kansas, most of the parents visited the Riley County Fair in 2013 were aware of rabies and knew how to teach their children to be aware of the risk of animal bites (Bradford, 2014). However, a study to assess rabies knowledge, attitudes, and perception of international students in the U.S. has never been done before.

As non-permanent residents in the U.S., international students need to be informed about the risk of rabies transmission from wild animals. While living in the U.S, they may have contact with wild animals and may not be aware of the rabies risk. For instance, the Kansas State University Rabies Laboratory have received reports that bats sometimes enter the campus buildings, which in this case show that there are still some possibilities that students can be exposed to potential rabid wild animals. Unfortunately, information about endemic infectious diseases in the U.S., especially rabies is not provided during student orientation. Therefore, they might be unaware of the risk and unable to respond appropriately if they are exposed to rabid animals. Providing information about rabies to international students is crucial because rabies is a nearly universal fatal disease but preventable if exposed person receives PEP as soon as possible.

Access to information about rabies is available in the public health official websites and hotlines, such as the CDC and state health departments. The Kansas State Veterinary Diagnostic Laboratory (KSVDL) Rabies Laboratory at Kansas State University posts information about rabies cases in Kansas, to provide more information for Kansas residents. Lafene student health center at KSU also provides digital information about rabies in their waiting rooms. However, this information is only passively offered to students. Those who are not actively seeking the information might still unaware about rabies. Thus, providing an active campaign of rabies to international students is critical.

Taking this into account, a preliminary survey study which targeted international students as the respondents is necessary to assess their level of rabies knowledge, level of familiarity with potential rabid animals, perceived risks, vulnerability, and their responses to a potential rabid animal exposure. Moreover, measuring the likelihood to seek medical information and treatment when the students have contact with potential rabid animals is essential because timely medical

treatment is the key to prevent human cases in exposed individuals. This type of survey study is commonly known as a knowledge, attitude, practice (KAP) survey.

Information gathered from the survey is then used to design the appropriate anti-rabies campaign for international students to raise students' awareness. Effective anti-rabies campaigns use messaging that takes into account the knowledge, attitude, and practices is required to reach the targeted group. The survey findings are the valuable evidence to design an effective health education campaign as well as choice of media channels.

Chapter 2 - Project Overview

The overall focus of this project was to provide education about rabies for international students at Kansas State University. There were two phases of this project. The first phase assessed the level of rabies knowledge, attitude, and perceptions among the target audience using an online survey. The second phase was designed and conducted an anti-rabies campaign based on the information gathered from the survey.

KAP survey findings

Research-based strategies should be involved in designing health communication efforts to shape materials and products for delivery, to choose the best way to approach the target audiences, and most importantly to understand the base knowledge among the targeted population. Using the World Health Organization guidelines (World Health Organization, 2008), this KAP survey focused on assessing the level of knowledge, attitude, and practices regarding human and animal rabies. In addition, the survey examined the most appropriate media and communication channels to determine the best approach to communicate with the target audience.

Response rate

The invitation to participate in the online survey was distributed once a week during three consecutive weeks to the international student listserv. There were 1,751 email addresses subscribed in the listserv. The survey was taken by 167 respondents, however, only 145 responses were used in this analysis because we only wanted to include responses from international students who completed the survey. The response rate of this survey was 8.5%.

The level of familiarity with potential rabid animals

Most participants were aware of the presence of the potential rabid animals in their neighborhood, residence areas, and campus buildings. The potential rabid animals mentioned in this survey were raccoon, skunk, and bat. As much as 75 (51.7%) of the participants have seen these animals in Kansas. Some of them have seen the animals in their neighborhood, residence, and inside K-State facilities. Interestingly, of the 145 participants, 4 (2.8%) reported that they have bitten or scratched by species that can potentially be rabid. This is the first report of potential rabid animal exposure to international students in the United States (Figure 1).

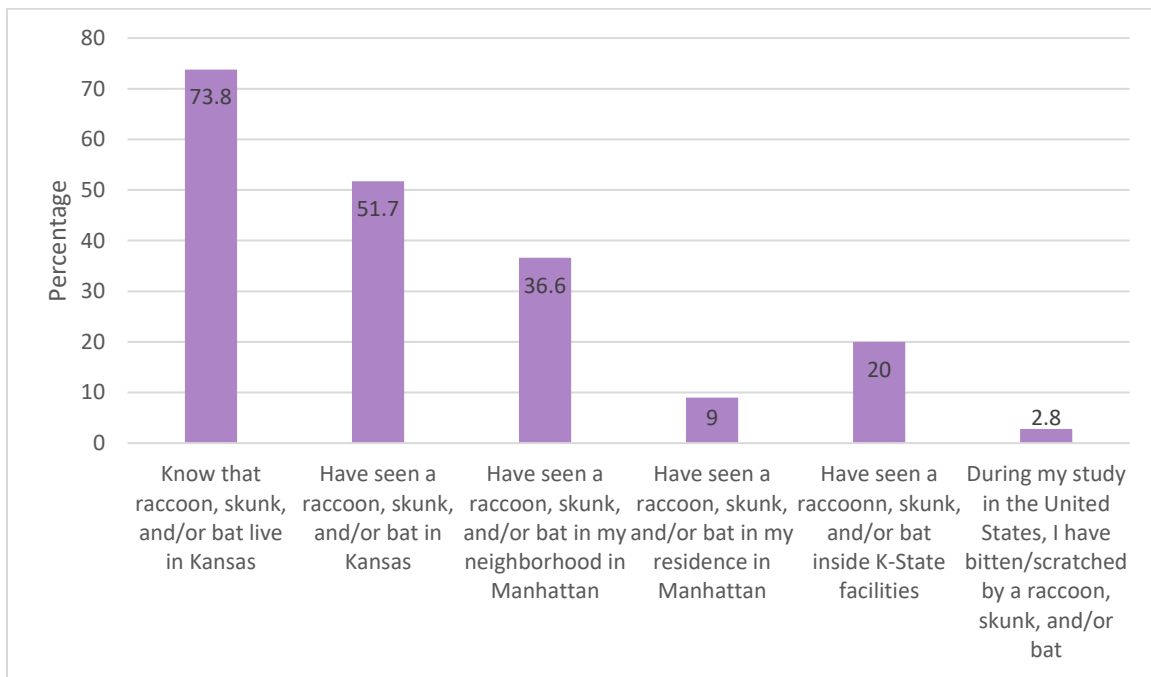


Figure 1. The participants' level of familiarity towards the potential rabid animals during their study in the United States (n=145)

Level of rabies knowledge

We assessed knowledge by using close-ended questions with “True”, “False”, and “Don’t know” as the possible answers. Five questions were used to measure participants’ knowledge about

rabies virus biology, pathogenicity, and mode of transmission; ten questions were used to measure participants' knowledge about animals that may transmit rabies to humans (Table 1).

Table 1. Type of questions to assess participants' knowledge and record of participants' response

Type of question	Number of correctly answered questions	n (%)
Biology, pathogenicity, and mode of transmission (n=5)	$0 \leq x \leq 2$	46 (31.7%)
	$3 \leq x \leq 4$	89 (61.3%)
	5	10 (6.9%)
Animal species that may transmit (n=10)	$0 \leq x \leq 4$	42 (29.0%)
	$5 \leq x \leq 7$	65 (44.8%)
	$8 \leq x \leq 10$	38 (26.3%)

Level of knowledge was categorized into 3 groups, low, intermediate, and high. Those who answered at least 12 questions correctly were classified as having a higher level of rabies knowledge; those who answered 7-15 questions correctly were classified as having an intermediate level of knowledge, and those answered 6 questions correctly or less were classified as having a lower level of knowledge. Level of knowledge about rabies was generally low; only 14.5% of the participants were categorized as a high level of knowledge (Table 2).

Table 2. Number and percentage of participants presented low, intermediate, and high level of rabies knowledge

Level of knowledge	Number of correctly answered questions	n (%)
Low	$0 \leq x \leq 6$	38 (26.2%)
Intermediate	$7 \leq x \leq 11$	86 (59.3%)
High	$12 \leq x \leq 15$	21 (14.5%)

Perception of risk

Perception of risk was defined as the participants' judgment about the likelihood of rabies exposure. We used two questions to measure participants' judgment in certain situations. Possible answers for each question were 'very unlikely', 'unlikely', 'likely', and 'very likely'. In this study,

we used Cronbach alpha (α) value to determine internal consistency reliability of the questions. According to Nunnally (1967), the acceptable value of Cronbach alpha should not be less than 0.70. The scale reliability of the two questions by using Cronbach alpha was acceptable ($\alpha=.737$).

The first question in the survey asked about how likely they will catch rabies if they woke up with a bat in the same room, 56.6% answered very unlikely and unlikely (Table 3). We categorized these participants as perceiving minimal risk of catching rabies.

Table 3. Record of participants' responses about the likelihood of catching rabies if the participant woke up with a bat in the same room

Response	Number of participants	%	Cumulative Percentage
Very unlikely	21	14.5	14.5
Unlikely	61	42.1	56.6
Likely	55	37.9	94.5
Very likely	8	5.5	100.0
Total	145	100.0	

The second question asked about how likely an unattended child, a disabled or intoxicated person would be exposed to rabies if there was a bat in the room; 32.4% perceived there is minimal risk of catching rabies. Table 4 is the record of the responses.

Table 4. Record of participants' responses about the likelihood of catching rabies if a bat were found in the same room with an unattended child, a disabled or intoxicated person

Response	Number of participants	%	Cumulative Percentage
Very unlikely	13	9.0	9.0
Unlikely	34	23.4	32.4
Likely	76	52.4	84.8
Very likely	22	15.2	100.0
Total	145	100.0	

The percentage of participants who had higher perception of the likelihood of rabies exposure was the cumulative percentage of respondents who answered 'likely' and 'very likely'. Participants'

perception of rabies risk was relatively low, only 44.1% participants who perceived they or someone else were likely to get rabies exposure in certain situations (Table 5).

Table 5. Number and percentage of participants presented low and high level of perception of rabies risk

Perception of risk			
Low		High	
Number of participants	%	Number of participants	%
81	55.9	64	44.1

Attitudes to exposure to suspected rabid animals

Participants' attitude was defined as their beliefs and behavioral tendencies towards exposure to suspected rabid animals. We used three statements to measure it (Table 6). Possible responses for each question were 'strongly agree', 'somewhat agree', 'neither agree nor disagree', 'somewhat disagree', and 'disagree'. Those who answered 'strongly agree' or 'somewhat agree' were considered as having favorable attitude. Those who answered 'neither agree nor disagree' were considered as having neutral attitude. Those who answered 'somewhat disagree' or 'disagree' were considered as having unfavorable attitude. Cronbach alpha was acceptable ($\alpha = .713$).

Table 6. Participants attitude scores on exposure to suspected rabid animals

Attitude	Frequency (%)		
	Favorable	Neutral	Unfavorable
"If I get bitten by a skunk, I will clean up the wounds and consult a doctor/nurse as soon as possible"	131 (90.3%)	9 (6.2%)	5 (3.5%)
"If I get bitten by a raccoon, I will call the police or animal control department to capture the raccoon and send it to the laboratory for testing"	99 (68.3%)	26 (17.9%)	20 (13.8%)
"It's important to get assistance from animal control department if I see a bat inside my residence"	110 (75.9%)	24 (16.6%)	11 (7.6%)
TOTAL	128 (88.3%)	14 (9.7%)	3 (2.0%)

Although the level of knowledge and the perception of risk about rabies were generally low among the participants, most participants (88.3%) had favorable attitudes toward exposure to suspected rabid animals.

Participants' media usage and preferences for anti-rabies campaign

The result of this survey suggests that an anti-rabies campaign is crucial for international students as they may encounter potentially rabid animals during their time of study in the U.S. Providing international students with information regarding basic knowledge about rabies (e.g., mode of transmission, identification of potentially rabid animals, and prevention actions) and improving perception about the likelihood of exposure is important.

This survey asked about how often the participants use various sources (i.e., online sources, printed sources, and interpersonal) when they have questions related to their health condition. A Likert scale from 1 to 6 was used, where 1='never'; 2='very rarely'; 3='rarely'; 4='sometimes'; 5='often'; and 6='very often'. The first preferred media was printed media, such as newspaper, leaflet, and brochures (mean =4.14; maximum=6). The second preference was for social media such as Facebook, Twitter, and YouTube (mean=3.90). While all those sources of information could provide reliable information, these sources are not considered to be highly reliable. Immediately seeking medical professionals' assistance is very important when someone is exposed to suspected rabid animals. Based on this survey, medical professionals were less likely to be accessed when they have health-related concerns (mean=2.85) (Table 7).

Table 7. Health information seeking behavior of participants based on their frequency and usage of mass media and interpersonal sources (Possible range was 1 to 6, with 6 being the most often used source)

Sources	Variables	Mean (SD)
Mass Media	Website of official institutions (e.g. Rile County Health Department, World Health Organization, Centers for Disease Control and Prevention)	3.62 (1.69)
	Other websites (e.g. general websites, personal blogs)	3.23 (1.45)
	Social media (e.g. Facebook, Twitter, YouTube)	3.90 (1.57)
	Newspaper, leaflet, brochures	4.14 (1.43)
Interpersonal	Medical doctor, veterinarian, nurse, or pharmacist	2.85 (1.46)
	Friends and family	2.72 (1.33)

To design an effective anti-rabies campaign, this survey asked about the most effective media to provide international students with information about rabies. Most participants chose social media (64.8%) and a brief talk before regular class started (37%). Furthermore, based on the data from the participants' health seeking behavior, printed media such as brochures can also be utilized to reach the students. Utilizing these choices to design an anti-rabies campaign for international students could be a good option.

This study, however, has several limitations. Participation rates in this study was very low, and therefore, the data from this study might not be able to reflect the true effect among international students at KSU. Due to the time constrain of this project, I was not able to improve participation rates; instead, I designed an anti-rabies campaign by using data from this study.

Anti-rabies campaign at Kansas State University

The title of this campaign was “Rabies in the United States” to emphasize that rabies is present in the U.S., and thus may improve awareness to the targeted audience. Based on the survey findings, I created a digital image and included information that the participants were not aware of prior to the study (Figure 2). The image mentioned potential rabid animals, mode of transmissions, management of animal bites, and risk of rabid bat exposure on certain individuals.

The campaign was disseminated by e-mail. I embedded the image into the body of e-mail to make sure that, once they open the message, they will be exposed to the key information. I sent the information to the international student list serv. There are 1700 email addresses listed in listserv. I sent a similar message through the Chinese Student Association listserv, to increase the number of students I reached on the campaign.

Rabies in the United States

What is Rabies?

Rabies is a virus that infects the brain and spinal cord.
Rabies almost always leads to death if the infected person receives no medical treatment.
Rabies can be prevented if treatment is given before symptoms appear.

How Does It Spread?

Rabies spreads when an infected animal bites or scratches a human or another animal. You can also get it from contact with the saliva of an infected animal.

The known sources of rabies in the U.S. are:

- Dogs
- Cats
- Ferrets
- Raccoons
- Skunks
- Foxes
- Coyotes
- Bats

If you see the animal with these unusual behaviors, they are more likely to have rabies:



However, an infected animal may transfer the virus before they show the symptoms.

What To Do If You Are Exposed to Rabies?

Anyone who had contact with an infected animal or its saliva is at risk of getting rabies. This includes bites, scratches, or any other bare skin contact with the animal or its saliva.



1. Wash the bite, scratch, or contact area immediately with soap and water for at least 10 minutes.
2. Seek medical attention immediately. Contact your health care provider or Public Health service for guidance about the treatment.
3. If you think your pet was exposed to rabies, call your veterinarian.

Public Health Services:

The Lafene Health Center
• **785-532-6544**

The Riley County Health
• Department
785-776-4779

Kansas Department of Health
• and Environment
785-296-1059
during normal business hours or
Epidemiology hotline
1-877-427-7317
for immediate assistance.

You Can't Always Tell If You've Been Bitten

Unlike other animals, bats have very small teeth. So, it's possible to be bitten and not know it, and a bite may not leave a clear mark. Treatment to prevent rabies may be needed if a bat is found in the room with anyone who is:



Sleeping



An unattended child



Mentally or physically challenged



Intoxicated

Figure 2. A digital image created for anti-rabies campaign at Kansas State University

In the email, I shared a link to a single-page website I created as well as a link to a video from the Global Alliance for Rabies Control (GARC). The web-page I created provides more information about the purpose of capturing suspected rabid animals, the importance of involving animal control as capture the animals, and suggestion to avoid contact with potential rabid animals. The link for the web-page is: <https://andrekhristna.wixsite.com/rabies-in-the-us>. I also listed several phone numbers of public services (e.g, Lafene Health Center, KSU Rabies Lab, Riley County Health Department) that is helpful for the readers if they have questions about handling suspected animals, or suspected human exposure (Figure 3). The video from the GARC provides

audio and visual information about bats and rabies. This video provides a clear image to the audience that bats have small teeth and—due to this reason—an unattended child, sleeping, intoxicating, and mentally/physically challenged individuals may not be aware of a bat bite. The video is available in the GARC YouTube channel. The title of the video is GARC Bats and Rabies. The link to the video is: https://www.youtube.com/watch?v=Zjg_FHqIFnU&feature=youtu.be.

Because most participants prefer social media, I also posted the link to the Web-page through Facebook groups at KSU. As of April 1, 2018, we have had 41 visitors to this Web-page. I also conducted a campaign on a listening class at the English Language Program (ELP) Department. There were 12 international students in the class. I delivered the message for about 15 minutes through a brief talk, a video-based material, as well as a question and answer session.

Project Evaluation

Evaluation the effectiveness of the online-based campaign was challenging because I did not require my audience to give me feedbacks. Nonetheless, I tried to get feedbacks from my friends who received the message by asking them open-ended questions about the campaign. They told me that they learned something new about rabies through the campaign. Regarding the image and website I created for the campaign, they informed me that they can understand the message very well. The language was easy to understand, and the combination of written text and pictures helped them to understand the message better.

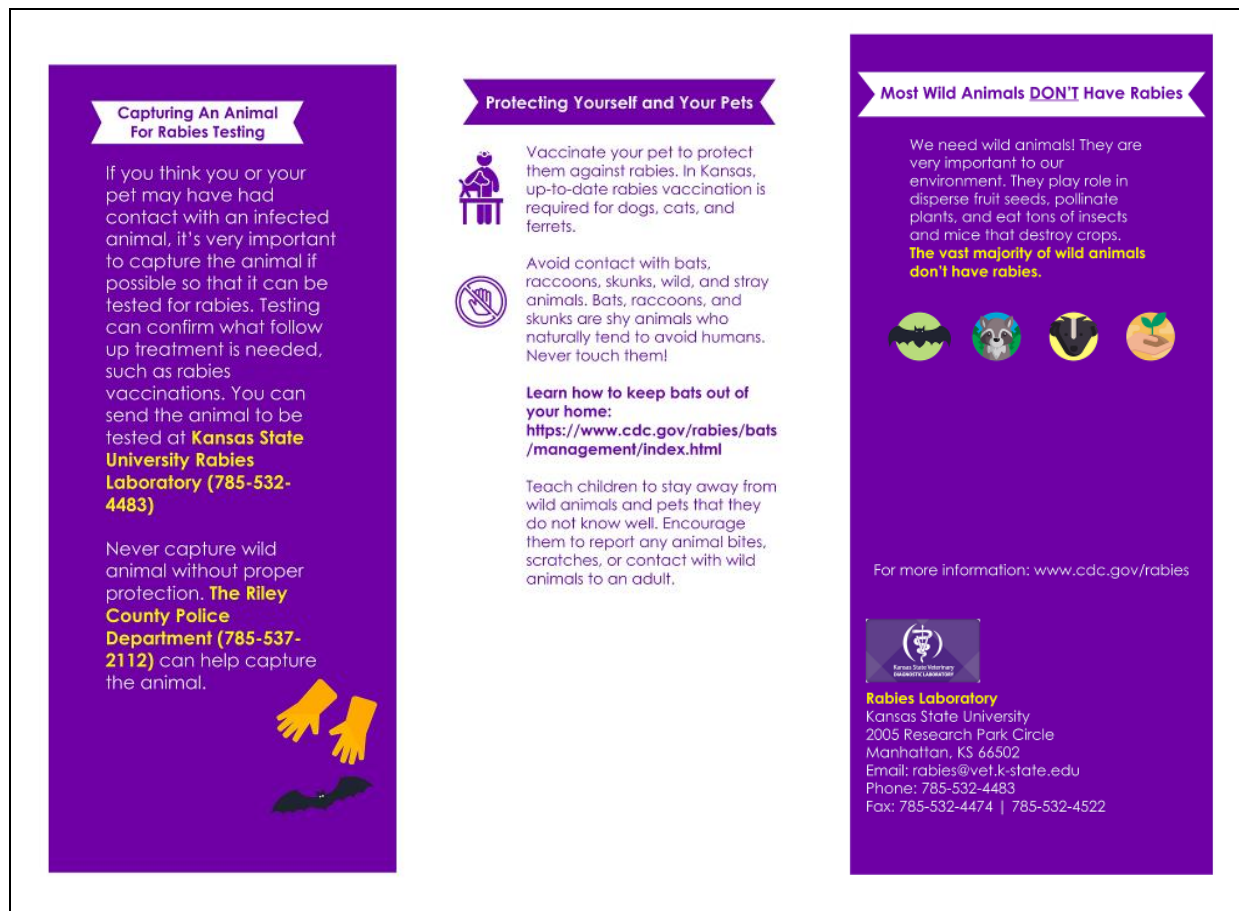


Figure 3. Rabies information in the web-page designed for the campaign

I used close-ended anonymous questionnaire to evaluate the campaign effectiveness at the ELP class. All students agreed that they learned something new about rabies in the U.S. They also agreed that the information was important for them and that sharing the information could be beneficial for their family members or friends who live in the U.S.

Chapter 3 - Discussion and Recommendations

Public understanding about rabies exposure risk from wildlife contact needs to be improved in the United States (Harrist et al, 2016). Despite the successful control of rabies in domesticated dogs, rabies exposure from wildlife continues to cause human deaths. While the number of human cases is relatively low (2-3 deaths per year), the CDC estimates 30,000-60,000 PEP are given each year due to interaction with rabies suspected animals or individuals with exposure to confirmed rabid animals (CDC, 2017).

To strategically disseminate a health message, understanding the information gaps that exist among the public is important. Targeting a specific audience that might have never been exposed to the information and is at high risk of exposure is another important factor when designing a health campaign. The survey study in this project has been helpful in understanding the information gaps that exist among my target audience, international students at KSU. The survey study also provided me information about health-seeking behavior of the target audience, and therefore enabled me to design the anti-rabies campaigns.

Based on the survey, social media were the most preferred media for anti-rabies campaign materials at KSU. The title of the campaign was 'Rabies in the U.S'. I disseminated the campaign materials through email listservs and Facebook groups. I designed an image focusing on information that, according to the survey results, was most needed by the target audience. The image covered potential rabid animals, mode of transmissions, management of animal bites, and risk of rabid bat exposure on certain individuals. In the image, I included phone numbers of public health services and referral agents. I embedded the image into an email that I sent through listservs as well as Facebook posts. I utilized a video about bat and rabies from GARC to provide audio-visual media for the audiences. I also created a single-page website to provide more specific

information about Rabies in the U.S. In the email and Facebook posts, I referred the link to the web-page and the video.

This project could be expanded in several ways. In this project, I learned that disseminating health information about endemic zoonoses and infectious diseases in the U.S would be a valuable service for international students; especially if the disease or the vector animals are not commonly present in their home countries. Introducing them to the information would be helpful to prevent and control cases on this targeted group. Creating printed media and distributing them during student orientation would be a way to reach the students. Creating something for the children to take home, such as coloring pages, may be another option to encourage students who live with their children to talk to their children about basic preventative measures as well as to encourage themselves to know more about the disease. During the orientation, a public health booth that provides the printed media could be utilized to engage more students.

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Appendix A - IRB Approval Letter



University Research Compliance Office

TO: Dr. Robert Larson
Diagnostic Medicine/Pathobiology
Q-217 Mosier Hall

Proposal Number: 9016

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: 11/07/2017

RE: Proposal Entitled, "Assessing Rabies Awareness and Perceptions among International Students"


The Committee on Research Involving Human Subjects / Institutional Review Board (IRB) for Kansas State University has reviewed the proposal identified above and has determined that it is EXEMPT from further IRB review. This exemption applies only to the proposal - as written - and currently on file with the IRB. Any change potentially affecting human subjects must be approved by the IRB prior to implementation and may disqualify the proposal from exemption.

Based upon information provided to the IRB, this activity is exempt under the criteria set forth in the Federal Policy for the Protection of Human Subjects, **45 CFR §46.101, paragraph b, category: 2, subsection: ii.**




Certain research is exempt from the requirements of HHS/OHRP regulations. A determination that research is exempt does not imply that investigators have no ethical responsibilities to subjects in such research; it means only that the regulatory requirements related to IRB review, informed consent, and assurance of compliance do not apply to the research.



Any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research Involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

Appendix B - Email Request for Survey Participation



FNU Noviyanti
Tue 1/23/2018 3:55 PM
To: [isc-I](#)

 Reply all | 

 9016 Approval.pdf
54 KB

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Hello K-State student,

This survey is being conducted by a graduate student in Master of Public Health program at Kansas State University as her part of Field Experience, supervised by Dr. Robert Larson and Dr. Susan Moore. The purpose of this study is to gather information about your knowledge, attitude, and perception of rabies. The information you provide will be used to make recommendation on how international students can be served better by academic institutions, specifically here at Kansas State University. The goal will be to design anti-rabies campaign at K-State and to present this paper or publish it in future to make it accessible to everyone interested.

Your responses for this study is anonymous and will be completely confidential. It has been approved by K-State's Institutional Review Board (IRB #9016) and attached is the IRB approval file. The estimated time to complete the survey is about 10-15 minutes. Please respond to all the questions as honestly as possible.

The survey is available at this anonymous link: https://kstate.qualtrics.com/jfe/form/SV_d6VWEBx4WtLY4aF

Thank you so much for participating in this academic research. We value your time and opinion. If you have any questions, please do not hesitate to contact me (noviyanti@ksu.edu) or my supervisor (rlarson@vet.k-state.edu).

Best regards,

Noviyanti
Graduate Student | Master of Public Health | Infectious Disease and Zoonoses
Department of Diagnostic Medicine/Pathobiology | College of Veterinary Medicine
Kansas State University

Appendix C - Survey Questionnaire

Consent for Participation in Study

Thank you very much for supporting our research. We appreciate your time and participation. The purpose of the study is to understand your knowledge, attitude, and perception of rabies. This study is conducted by a Master of Public Health (MPH) student at Kansas State University. She is doing the study as part of her field experience project.

The survey will take approximately 10 minutes of your time or less. The information you provide will be useful for a better health communication for students in future. Please answer all questions truthfully. Your participation is voluntary and information you provide will be kept confidential. You may withdraw at any point with no repercussions. All the data collected from the survey will be kept confidential and only used for the purpose of this project.

This study has been approved by the Institutional Review Board at Kansas State University, IRB #9016. You must 18 years or older to participate.

TERMS OF PARTICIPATION: I understand this project is research, and that my participation is completely voluntary. I also understand that if I decide to participate in this study, I may withdraw my consent at any time, and stop participating at any time without explanation, penalty, or loss of benefits, or academic standing to which I may otherwise be entitled.

I verify that by clicking "I Accept" below indicates that I am voluntarily taking this survey and I am willingly agreeing to participate in this study under the terms described.

- I Accept
- I Decline

Condition: "I Decline" is selected, skip to: End of Survey

Questionnaire Instructions

Please tell us about yourself!

1. How old are you:
 - a. Less than 18 (condition: less than 18 is selected, skip to: End of Survey)
 - b. 18-23
 - c. 24-29
 - d. 30-34
 - e. 35 and above
2. Level of Education (or current status)
 - a. Undergraduate
 - b. Masters
 - c. PhD
 - d. Other_____

3. In this section, we will ask you a few questions about Rabies

	True	False	Don't know
Rabies is a bacterium that is transferred by animals to humans			
If it is not treated, rabies almost always causes death to humans			
Humans can get rabies through the bite of an infected animal			
If a rabies-infected animal licks or scratches a person, he/she can also be infected.			
Feces and blood of an infected animal also carry rabies virus			

4. Which of these animals that can transfer rabies to human?

	True	False	Don't know
Dog			
Cat			
Mosquito			
House fly			
Squirrel			
Rabbit			
Raccoon			
Skunk			
Bat			
Bird			

5. Please tell us how familiar you are with these animals

	Yes	No
I know that raccoon, skunk, and/or bat live in Kansas		
I have seen a raccoon, skunk, and/or bat in Kansas		
I have seen a raccoon, skunk, and/or bat in my neighborhood in Manhattan		
I have seen a raccoon, skunk, and/or bat inside my residence (dorm, apt, or house) in Manhattan		
I have seen a raccoon, skunk, and/or bat inside K-State facilities (e.g., Rec-center, library, campus/laboratory buildings)		
During my study in the United States, I have been bitten/scratched by a raccoon, skunk, and/or bat		

6. If I get bitten by a skunk, I will clean up the wounds and consult a doctor/nurse as soon as possible.

- Strongly agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Strongly disagree

7. If I get bitten by a raccoon, I will call the police or animal control department to capture the raccoon and send it to the laboratory for testing.

- Strongly agree

- b. Somewhat agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
8. It's important to get assistance from animal control department if I see a bat inside my residence.
- a. Strongly agree
 - b. Somewhat agree
 - c. Neither agree nor disagree
 - d. Somewhat disagree
 - e. Strongly disagree
9. If you wake up with a bat in the same room you were sleeping in, how likely are you to be exposed to rabies?
- a. Very unlikely
 - b. Unlikely
 - c. Likely
 - d. Very likely
10. If you find a bat in a room with an unattended child, a disabled or intoxicated person, how likely is she/he to be exposed to rabies?
- a. Very unlikely
 - b. Unlikely
 - c. Likely
 - d. Very likely
11. During your study in the US, when you have questions related to your health condition, have you sought information from any of the following sources?

	Never	Very rarely	Rarely	Sometimes	Often	Very often
Websites of official institutions (Riley County Health Department, World Health Organization, Centers for Disease Control and Prevention)						
Other websites (e.g. general websites, personal blogs)						
Social media (e.g. Facebook, Twitter, YouTube)						
Newspaper, leaflet, brochures						
Medical doctor (physician), veterinarian, nurse, or pharmacist.						
Friends and family						

12. What are the sources of information that you think can most effectively reach people like you with information on Rabies? (Please choose the three most effective sources.)
- Newspapers and magazines
 - Radio
 - TV
 - Billboards
 - Brochures, posters and other printed materials
 - Social media (YouTube, Facebook, Twitter, Instagram)
 - Health workers (medical doctor, veterinarian)
 - Family, friends, neighbors and colleagues
 - Religious leaders
 - Class session (brief explanation for 5-10 minutes before class started)
 - International coffee hour at ISSS
 - Other (please explain): _____
13. Country of origin _____
14. With which gender identity do you most identify
- a. Male
 - b. Female
15. How long have you been living in the United States?
- a. Less than 1 year
 - b. 1-2 years
 - c. 2-5 years
 - d. More than 5 years

End of survey

Thank you so much for participating in this academic research. We value your time and opinion. If you have any questions, please do not hesitate to contact me (noviyanti@ksu.edu) or my supervisor (rlarson@vet.k-state.edu).

Appendix D - Example of the anti-rabies campaign

Rabies information for you!

FN You
To isc-l Mar 15

Dear all,

I want to thank you for your awesome participation to fill out the "Rabies survey" I did last month. Based on the survey, we found that providing information about "Rabies in the United States" would be a valuable service for you.

Here are some key information for you to get to know more about Rabies. Feel free to share this information to anyone who need it and I hope you enjoy it.

Rabies in the United States

What is Rabies?

Rabies is a virus that infects the brain and spinal cord. Rabies almost always leads to death if the infected person receives no medical treatment. Rabies can be prevented if treatment is given before symptoms appear.

How Does it Spread?

Rabies spreads when an infected animal bites or scratches a human or another animal. You can also get it from contact with the saliva of an infected animal.

The known sources of rabies in the U.S. are:

- Dogs
- Cats
- Ferrets
- Raccoons
- Skunks
- Foxes
- Coyotes
- Bats

If you see the animal with these unusual behaviors, they are more likely to have rabies:

- Unable to fly, flying during day time.
- Making a lot of noise or otherwise acting sick.
- Anxiety, Aggressiveness, Seizures, stumbling, and vocalizing.

However, an infected animal may transfer the virus before they show the symptoms.

What To Do If You Are Exposed to Rabies?

Anyone who had contact with an infected animal or its saliva is at risk of getting rabies. This includes bites, scratches, or any other bare skin contact with the animal or its saliva.

1. Wash the bite, scratch, or contact area immediately with soap and water for at least 10 minutes.
2. Seek medical attention immediately. Contact your health care provider or Public Health service for guidance about the treatment.
3. If you think your pet was exposed to rabies, call your veterinarian.

Public Health Services:
The Lafene Health Center
• 785-532-6544

The Riley County Health Department
• 785-776-4779

Kansas Department of Health and Environment
• 785-296-1059
during normal business hours or
Epidemiology hotline
1-877-427-7317
for immediate assistance.

You Can't Always Tell If You've Been Bitten

Unlike other animals, bats have very small teeth. So, it's possible to be bitten and not know it, and a bite may not leave a clear mark. Treatment to prevent rabies may be needed if a bat is found in the room with anyone who is:

- **Sleeping**
- **An unattended child**
- **Mentally or physically challenged**
- **Intoxicated**

Need more information? Click this link to read more about Rabies in the U.S.
: <https://goo.gl/2CoQ94>

Also, take a look at the bats commonly present in the U.S. in this 7-minutes video.

