

## SHORT COMMUNICATION

# The Beneficial Auxiliary Role of Poison Information Centers: Stewardly Use of Rabies Post-Exposure Prophylaxis in a Time of Shortage

RACHEL M. GORODETSKY<sup>1,\*</sup>, STEPHANIE L. HON<sup>2</sup>, ROBERT J. GELLER<sup>2,3</sup>, BRENT W. MORGAN<sup>2,3</sup>

<sup>1</sup> Department of Pharmacy Practice, D'Youville College School of Pharmacy, Buffalo, USA

<sup>2</sup> Georgia Poison Center, Atlanta, USA

<sup>3</sup> Department of Emergency Medicine, Emory University, Atlanta, USA

## Abstract

**Background:** During the one-year period from May 2008 to May 2009, a nationwide shortage developed which rabies vaccine was not being produced by the manufacturers. In order to manage existing supply, a protocol was established wherein an authorization was required from the regional poison center before vaccine could be administered to a patient.

**Methods:** The Georgia Poison Center internal database was accessed for information pertaining to rabies exposure calls for the time of the restriction, as well as the years before and after. Results were examined for the total number of human rabies exposure calls received by the poison center, as well as the number of cases in which PEP was recommended.

**Results:** During the restriction period, the number of rabies-related calls increased, while the percentage of cases in which PEP was recommended, remained consistent. The year following the restriction, the number of rabies related calls remained elevated.

**Conclusion:** Our Regional Poison Center was able to make a positive impact by reducing unnecessary use of PEP in a time of shortage and thereby ensuring that all patients who needed the vaccine were able to receive it. This further shows the potential capacity of the poison information centers to optimize healthcare services.

**Keywords:** Rabies; Post-exposure prophylaxis; Medication shortage; Poison center; Public health

## INTRODUCTION

Rabies is possibly the most deadly infectious disease known, with a fatality rate of 99.9% once symptoms appear. Fortunately, it is also among the most preventable diseases if exposure is recognized early. In 2011 in the United States, there were six cases of human rabies and 6,031 cases of animal rabies reported to the Centers for Disease Control and Prevention (1). The majority of the animal cases were wild animals, with raccoons being the most numerous, although there were 493 cases in domestic animals (1). According to the World Health Organization (WHO), rabies causes 55,000 human deaths annually worldwide (2), while an estimated 327,000 deaths are prevented with the timely administration of rabies post-exposure prophylaxis (PEP) (3). PEP consists of a combination of wound care, rabies immunoglobulin, and vaccination.

Because rabies is still commonly found in animals both in the US and other parts of the world, the availability of PEP is imperative. Given the life-saving nature of the vaccine, if the supply is interrupted, it could create a tragic situation in which patients who have been exposed to rabies virus are unable to receive treatment.

Through an agreement with the state Public Health

Department in 1994, our Regional Poison Center began to host the state rabies hotline through our call center, providing the invaluable service of triage for rabies PEP. The responsibilities of this service are to take a thorough history of any potential rabies exposure, to provide recommendations regarding the risk of transmission of rabies and the need for PEP based on guidelines provided by the state. Since its inception, the service has received an average of 1,400 calls annually.

The rabies triage service of the Georgia Poison Center is a useful tool for health care providers who are unsure whether or not PEP is necessary. However, consultation with and authorization from the Poison Center for PEP administration has never been specifically required except for the period from May 2008 to May 2009 when a nationwide shortage of rabies vaccine developed due to lack of production by the manufacturers. During that time, existing vaccines were stockpiled by the state, and a protocol was put in place wherein a recommendation was required from the Poison Center before vaccine could be released for administration. On a weekly basis, the Poison Center was given a new "code word" from the state Public Health Department. If rabies PEP was deemed appropriate for a suspected exposure, the provider was given the code word,

\* Correspondence to: Rachel M. Gorodetsky, 197 York Bay Trail, West Henrietta, NY 14586, USA.

Tel: +1 917 971 5233, Fax: +1 716 829 7746, E-mail: rachel.gorodetsky@gmail.com

Received: 25 August 2012; Accepted: 22 November 2012

which allowed access to vaccine from the stockpile and administration to the patient. Health care providers only had to contact the poison center to obtain PEP and were not required to call for cases in which they felt PEP is not necessary. The goal of this program was to control a limited supply of rabies vaccine by preventing unnecessary use. In 2009, the shortage ended and the restriction on use was lifted.

The objective of our study was to determine call volume related to rabies exposure during the period of restriction. We also aimed to identify whether using this protocol had translated to a decrease in unnecessary utilization of PEP or not.

**METHODS**

A retrospective study was designed to evaluate the effect of the protocol enacted during the shortage. The poison center internal database was accessed to obtain information pertaining to rabies exposure calls for the period of the restriction, as well as the years immediately before and after for comparison. Results were examined for the total number of human rabies exposure calls that the poison center received, as well as the number of times that PEP was recommended. Results were examined using descriptive statistics. The study was conducted according to the principles of the Declaration of Helsinki. The investigation was reviewed by our institutional review board and determined to be exempt.

**RESULTS**

The target population of the Georgia Poison Center catchment area is approximately 9.7 million (4). The total number of calls received by the poison center was 88,077, 90,443, and 86,066 in 2007, 2008, and 2009 respectively. Rabies-related calls were accounted for 4837 (1.83%) of all calls during the study period. Gender breakdown of the patients is shown in Table 1. There was little difference in the number of rabies-related calls based on gender, with males accounting for only a slight majority (slightly over 50% each year). Each year, dogs were the offending animal in the majority of cases with an average of 51% of calls over three years. Following, there are cats with an average of 15.4% calls. The next most common animals in decreasing order of frequency were bats, raccoons, rats, and squirrels (7.7%, 3.4%, 2.3% and 2.3% respectively). The offending animal was undetermined in about 12% of cases each year (Table 2).

During the restriction period, the number of rabies-related

calls increased by almost 30%, from 1362 to 1758, while the percentage of cases for which PEP was recommended slightly decreased (21.4% vs. 19.4%). The code word was given out for 341 patients during the restriction period, while for 1417 cases the patient was determined not to be at risk and the code-word and thereby vaccine was not given. There were no known cases of human rabies during the shortage. The year following the restriction period, rabies-related call volume remained elevated, dropping only 3% from the previous year (Table 1).

**DISCUSSION**

During the 12 months of the shortage, rabies-related calls to the poison center increased by 30% compared to the previous year. This was expected, because health care providers were required to consult the poison center in order to gain access to the vaccine. The difference in these figures may indirectly represent the number of times which PEP might have been administered without poison center consult. During the restriction, the code word was not given out for 1417 cases. It can be assumed that at least a portion of these patients would have received PEP if there was not any restriction. Thus, we are able to show the benefits of consultation with poison information centers in managing a medication with limited supply. The increased call volume was carried over to the following year, which was 26% higher than the year before the shortage. However, our criteria for treatment did not change, and we consistently recommended PEP for approximately 20% of cases.

It can be presumed that the sudden increase in frequency of rabies related calls is showing the cases which health providers are not sure for PEP administration, but might consider it unnecessarily when there is enough supply. Thus, we believe that the combination of this increased call volume from health care providers seeking PEP with the same rates of PEP recommendation by our poison center indicates that we were able to control the sources and reduce the unnecessary use of rabies PEP during the shortage period.

Higher health authorities including Centers for Disease Control and Prevention (CDC) plays a key role in controlling stockpiles during times of shortage as they have more legislative power (5). In 2004, an influenza vaccine shortage was occurred. The Advisory Committee on Immunization Practices (ACIP) as a subdivision of CDC recommended restricting vaccine to only high-risk target groups (6). Consequently, it was found that they were successful in coverage of high risk targets and controlling

**Table 1.** Rabies-related calls to Georgia Poison Center During 2007 to 2009

Time period	May 1st 2007- Apr 30th 2008	May 1st 2008-Apr 30th 2009 <sup>a</sup>	May 1st 2009-Apr 30th 2010
Frequency of Calls received	1362	1758	1717
Frequency of PEP recommended (%)	292 (21.4%)	341 (19.4%)	445 (25.9%)
Gender (M/F)	708/ 639	906/844 <sup>b</sup>	875/ 820

<sup>a</sup> Period of rabies vaccine shortage

<sup>b</sup> Indicates more than 1 patient per call in a number of cases.

**Table 2.** Offending animals in rabies-related calls to Georgia Poison Center During the study period

Species	2007-2008	2008-2009	2009-2010
	No. (%)	No. (%)	No. (%)
Armadillo	4 (0.29)	9 (0.51)	8 (0.47)
Bat	114 (8.37)	105 (5.97)	149 (8.68)
Beaver	0 (0)	2 (0.11)	0 (0)
Bobcat	0 (0)	6 (0.34)	4 (0.23)
Cat, Domestic	209 (15.35)	273 (15.53)	261 (15.20)
Chipmunk	11 (0.81)	21 (1.19)	17 (0.99)
Cow/Bovine	4 (0.29)	0 (0)	0 (0)
Coyote	2 (0.15)	2 (0.11)	2 (0.12)
Deer	1 (0.07)	1 (0.06)	1 (0.06)
Dog	655 (48.09)	904 (51.42)	920 (53.58)
Ferret	4 (0.29)	6 (0.34)	0 (0)
Fox	16 (1.17)	14 (0.80)	24 (1.40)
Horse	16 (1.17)	5 (0.28)	3 (0.17)
Mule	1 (0.07)	0 (0)	0 (0)
Opossum	5 (0.37)	9 (0.51)	11 (0.64)
Otter	5 (0.37)	1 (0.06)	3 (0.17)
Rabbit	5 (0.37)	6 (0.34)	4 (0.23)
Raccoon	46 (3.38)	62 (3.53)	56 (3.26)
Rat	39 (2.86)	33 (1.88)	38 (2.21)
Skunk	6 (0.44)	9 (0.51)	3 (0.17)
Squirrel	28 (2.06)	39 (2.22)	43 (2.50)
Swine/Pig	1(0.07)	1 (0.06)	2 (0.12)
Undetermined	190 (13.95)	250 (14.22)	168 (9.78)
Total	1362 (100.00)	1758 (100.00)	1717 (100.00)

the limited supply (7). Correspondingly, for the first time we showed similar beneficial role of poison information centers.

The year following the restriction period, when health care providers were again not required to contact the poison center to obtain PEP for their patients, rabies-related call volume fell only 3%. This higher frequency of calls compare to the year prior to shortage could be explained by several factors including:

1) Health care providers found the service valuable and continued to use it.

2) There was an unexplained increase in potential rabies exposure cases.

3) Health care providers continued to call the poison center habitually, though it was not mandatory anymore.

### LIMITATIONS

One limitation of our study is the use of the state Poison Center call records as a surrogate marker for use of PEP. The true number of instances that rabies vaccine is administered in our state is not collected by any government agency or pharmaceutical company. Thus, the number of vaccines administered without consulting the Poison Center (excepting the restriction period) is unknown and so, absolute comparisons could not be performed. Moreover, we could not find any similar study to ours according to

available literatures on PubMed, Medline and Google scholar and thereby, our findings could not be further discussed.

### CONCLUSION

Due to existing infrastructure and expertise, poison information centers are in a unique position to be utilized by the public health department for a number of different functions. In this way, the poison centers are able to make a positive impact by reducing unnecessary use of certain medications. Relationships between poison centers and other public health entities should be cultivated, and the availability of poison centers to aid in medication shortages should be recognized.

**Conflict of interest:** None to be declared.

**Funding and Support:** None

### REFERENCES

- Blanton JD, Dyer J, McBrayer J, Rupprecht CE. Rabies surveillance in the United States during 2011. *J Am Vet Med Assoc* 2012 Sep 15; 241(6):712-22.
- World Health Organization (WHO). WHO expert consultation on rabies: first report. Geneva: World Health Organization

## Auxiliary Role of Poison Information Centers: Rabies PEP

R.M. Gorodetsky et al.

- (WHO) press; 2004.
3. Rabies. FactSheet N°99. World Health Organization [Internet]. 2012 Sep [cited 2012 Nov 1]. Available from: <http://www.who.int/mediacentre/factsheets/fs099/en/index.html>
  4. United States department of commerce, United States Census Bureau. Georgia state and county QuickFacts [Internet]. 2012 [cited 2012 Nov 13]. Available from: <http://quickfacts.census.gov/qfd/states/13000.html>
  5. Rodewald LE, Orenstein WA, Mason DD, Cochi SL. Vaccine supply problems: a perspective of the Centers for Disease Control and Prevention. *Clin Infect Dis* 2006 Mar 1; 42 Suppl 3:S104-10.
  6. Centers for Disease Control and Prevention (CDC). Interim influenza vaccination recommendations, 2004–2005 influenza season. *MMWR Morb Mortal Wkly Rep* 2004 oct 8; 53(39):923-4.
  7. Centers for Disease Control and Prevention (CDC). Estimated influenza vaccination coverage among adults and children—United States, September 1, 2004–January 31, 2005. *MMWR Morb Mortal Wkly Rep* 2005 Apr 1; 54(12):304-7.