

The Cost of Rabies Post-Exposure Prophylaxis in Minnesota, 2017–2018

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Background: Rabies in Minnesota

- **Reservoir species in Minnesota: skunks and bats**
- **No state law mandating rabies vaccinations for any animal**
- **Animal bites (to humans) and rabies post-exposure prophylaxis (PEP) are not reportable**
- **Minnesota Dept of Health does not control rabies biologics**

Minnesota's Rabies Surveillance System

- **Joint surveillance system including**
 - **University of Minnesota Veterinary Diagnostic Laboratory (VDL)**
 - **Minnesota Department of Health (MDH) Public Health Laboratory (MDH-PHL)**
 - **MDH Zoonotic Diseases Unit (ZDU)**
 - **Minnesota Board of Animal Health (BAH)**
- **Complicated system requiring good communication**
 - **Quarterly Rabies Surveillance Meetings**

Minnesota's Rabies Surveillance System: Phone Calls

- **Animal bites/rabies risk call line available to the public during business hours and 24:7 for physicians, veterinarians, law enforcement, and local public health**
- **Approximately 2500 calls/ year**
- **Most calls about bat exposures, dog and cat bites**
- **Approximately 1 of 5 calls results in a recommendation for PEP**
- **Major purpose of the surveillance system is to minimize PEP administration by recommending observation or testing of the animal**

Minnesota's Rabies Surveillance System: Testing

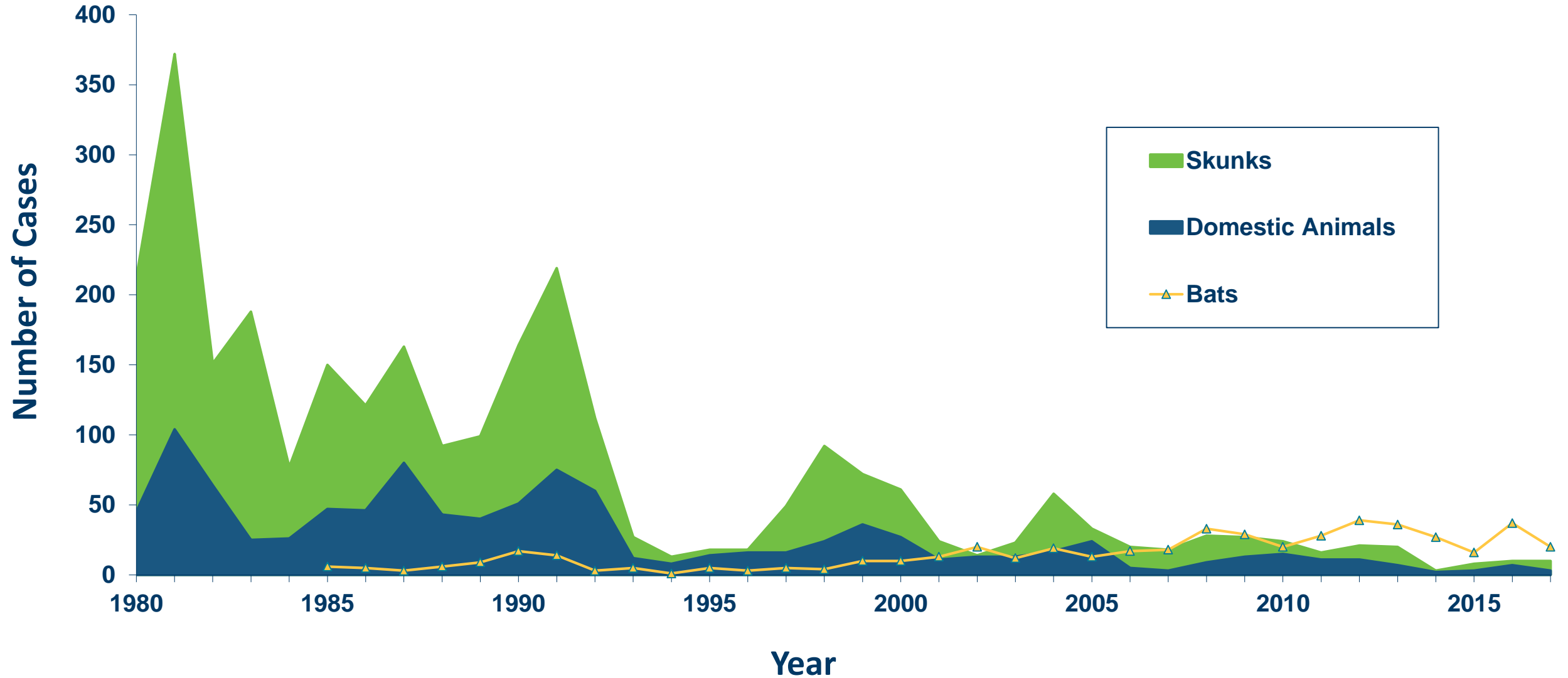
- **Cost for testing is \$30.00**
- **Suspect animals are received by the VDL, and the brain sections are prepared.**
- **Samples are delivered by courier to MDH-PHL, where the testing is performed**
- **The DFA test is set up and read the following day**
 - **Expedited tests available in 4-6 hours**



Minnesota's Rabies Surveillance System: Investigation

- **MDH ZDU contacts all the veterinarians and people associated with a rabies-positive animal to:**
 - **Discuss exposure and rabies risk**
 - **Ensure all exposed people receive medical care**
- **Information shared with Board of Animal Health (BAH)**
- **When there is animal exposure, a BAH district veterinarian visits the premises and conducts an investigation**
 - **Site visit allows the veterinarian to get the whole story and serve as a safety net**
 - **Quarantines or otherwise handles exposed animals**

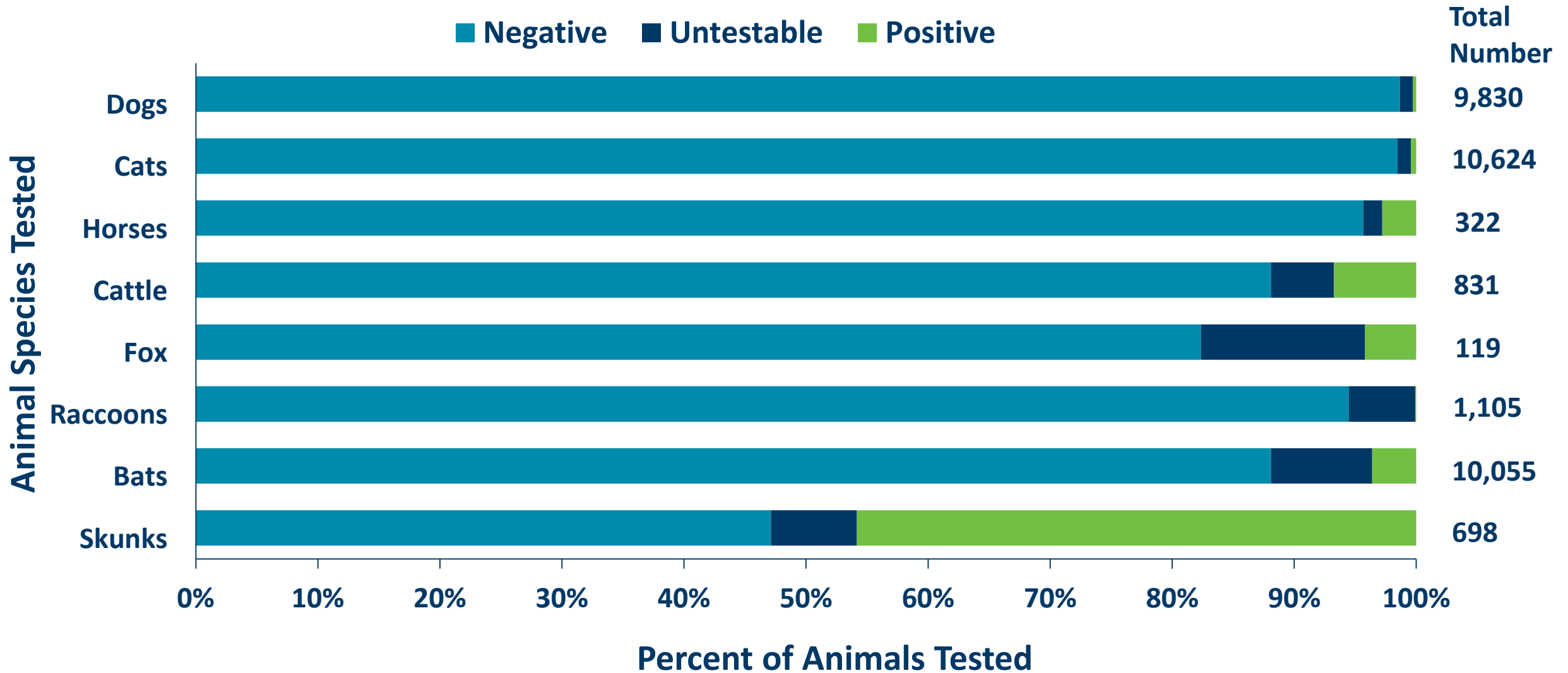
Rabies Trends in Bats, Skunks, and Domestic Animals, Minnesota, 1980-2017



Minnesota Rabies Surveillance Data, 2003-2017

- **35,402 suspect animals were submitted for rabies testing by DFA**
 - **median, 2,369 samples per year**
- **833 (2.4%) positive**
- **32,992 (94%) negative**
- **37 (0.1%) equivocal**
- **1361 (3.9%) unsatisfactory samples**
- **178 (0.5%) not tested**

Animals Tested for Rabies, by Species and Test Result, 2003-2017



Background: Rabies Post Exposure Prophylaxis for Vets and Techs

- **Test titer every 2 years; a single booster rabies vaccination is given if titer drops below 0.1-0.2 IU/mL by the RFFIT test**
- **If exposed to rabies, two rabies vaccinations are given on days 0 and 3**
 - **No human rabies immune globulin; no titer**

Advisory Committee on Immunization Practices, 2008

Background: Rabies Post-Exposure Prophylaxis (PEP)

- **Two components for persons who have not previously been vaccinated:**
 - 1. Human rabies immune globulin (HRIG)**
 - **HRIG is administered on day 0, the first day of treatment**
 - **Based on bodyweight; 20 IU/kg**
 - and*
 - 2. Rabies vaccine**
 - **Vaccine is given on days 0, 3, 7, 14**
 - **Immunocompromised given an extra dose on day 28**

Study Objectives

- **Determine the cost of PEP in Minnesota**
- **Determine if PEP costs vary by healthcare facility type and location within the state**
- **Determine which healthcare facility types stock and administer both HRIG and rabies vaccine**

Methods: Facility Selection

- **Convenience sample of healthcare facilities in Minnesota**
 - **Primary care clinics**
 - **Urgent care centers**
 - **Hospitals with emergency departments (EDs)**
- **Location**
 - **Inside the 7-county Minneapolis/St. Paul metro area (Metro)**
 - **Greater Minnesota (Non-Metro)**

Methods: Enrollment

- **Healthcare system = two or more facilities located at separate addresses**
 - **Excluded specialty health systems**
- **Contact with each facility attempted 3 times between January-July 2018**
 - **Hypothetical patient: 165 lb person with non-bite bat exposure**
- **Billing charges and any potential financial discounts offered**
- **Charge: what facilities charge insurance companies and people without insurance**

Methods: Current Procedural Terminology (CPT) Codes

Bill Description	CPT Codes
Rabies Vaccine	90675
Vaccine Administration	90471
HRIG	90375, 90376
HRIG Administration	96372
Level 1 ED Room Charge	99281
Level 1 Clinic/UC Room Charge	99211, 99201
Level 3 Clinic/UC Room Charge	99213, 99203

Methods: PEP Visit Structure and Billing

Initial Visit

HRIG + Administration fee
Vaccine + Administration fee
Room Charge: Level 1 or 3



Return Visit (3x)

Vaccine + Administration fee
Room Charge: Level 1



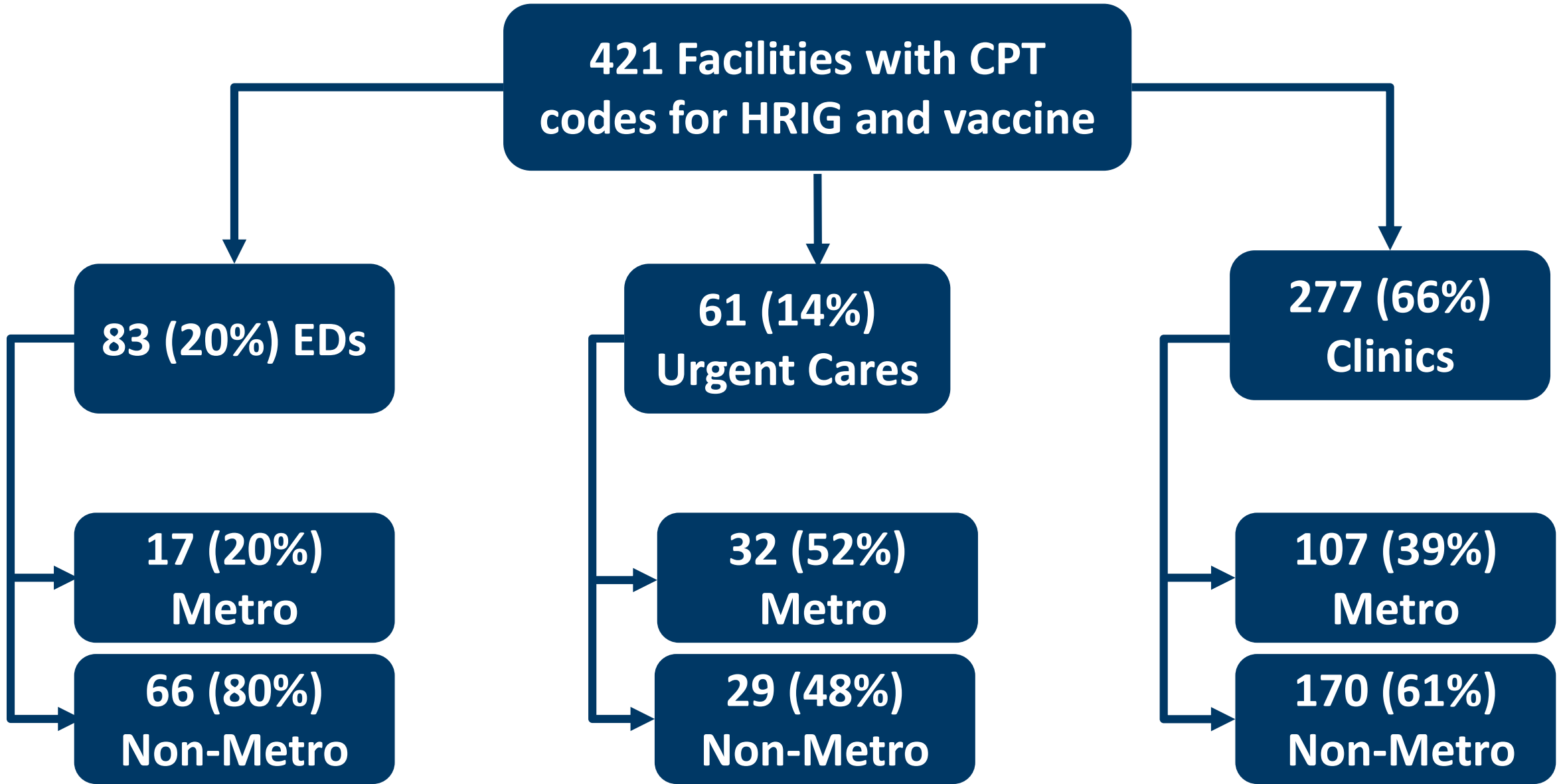
Total PEP Charge

1024 facilities from 75 non-specialty health systems in the state

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graph TD; A[1024 facilities from 75 non-specialty health systems in the state] --> B[453 (44%) facilities able to be contacted and provided information]; B --> C[421 (93%) facilities had CPT codes for both HRIG and rabies vaccine];
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453 (44%) facilities able to be contacted and provided information

421 (93%) facilities had CPT codes for both HRIG and rabies vaccine



Study Results: Cost of Rabies PEP in Minnesota, 2017-2018

n = 421

- **The median cost of rabies PEP in Minnesota, including all facility types is:**

\$7,195.00

Range, \$3,764.00 to \$23,801

The Median Charge for PEP at EDs in Minnesota, n = 82

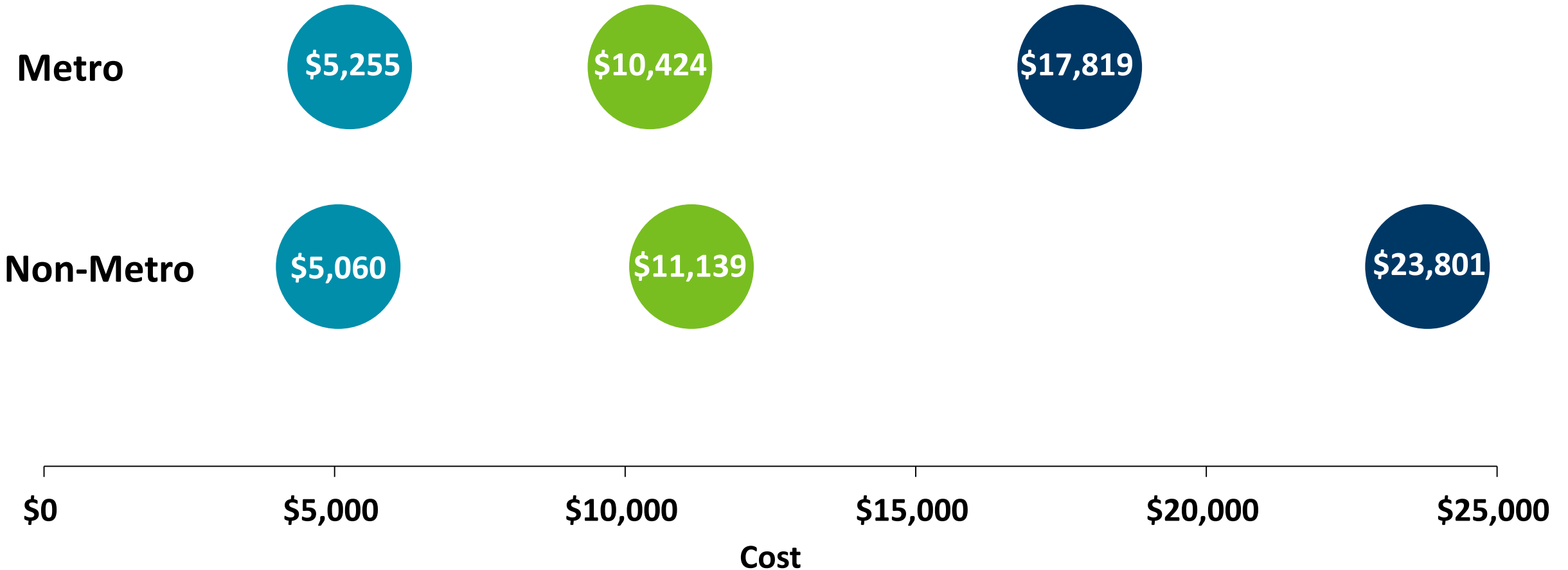
\$11,139

Range of Charges for PEP at Metro and Non-Metro EDs

● Minimum

● Median

● Maximum



The Median Charge for PEP at Urgent Cares in Minnesota

n = 61

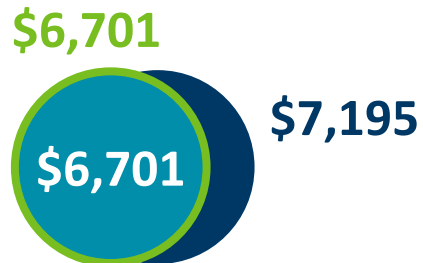


\$6,812

Range of Charges for PEP at Metro and Non-Metro Urgent Cares

● Minimum ● Median ● Maximum

Metro



Non-Metro



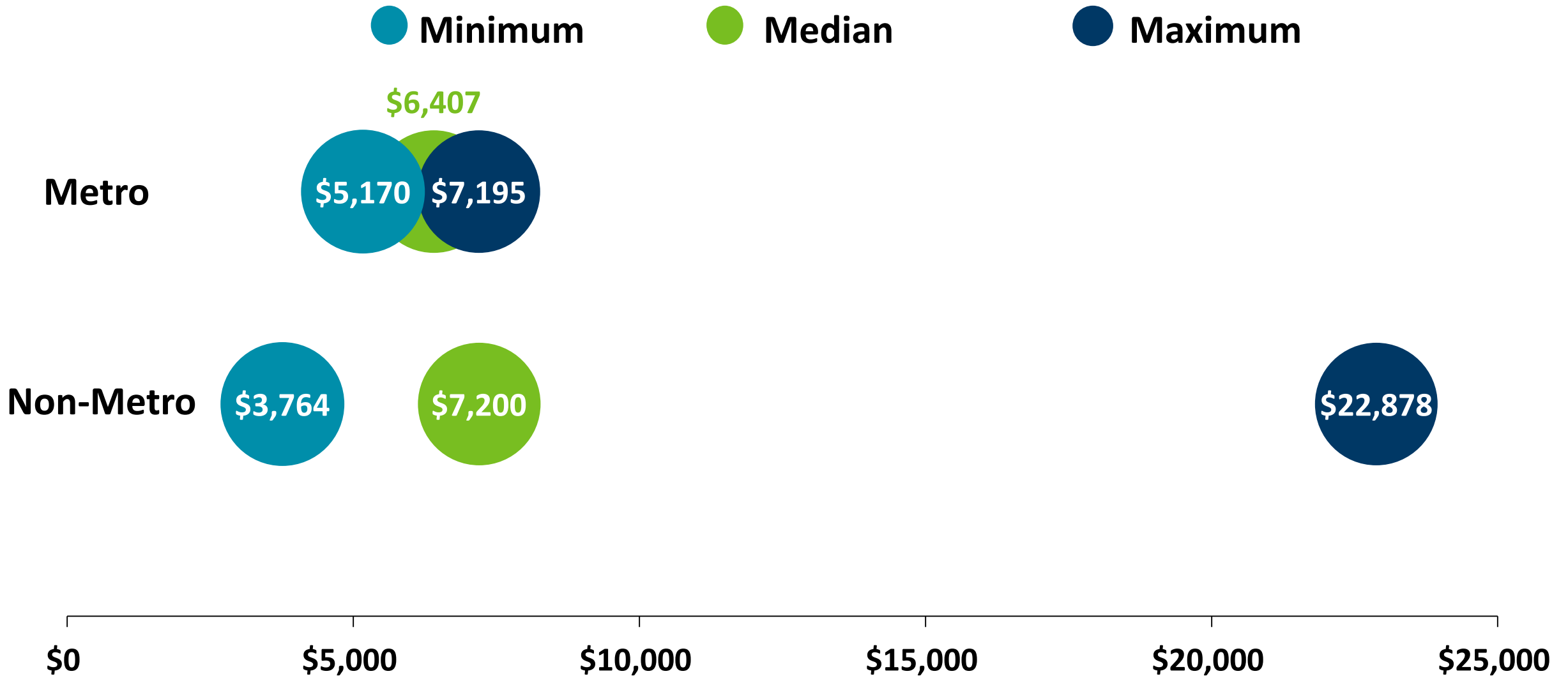
\$0 \$5,000 \$10,000 \$15,000 \$20,000 \$25,000

Charges

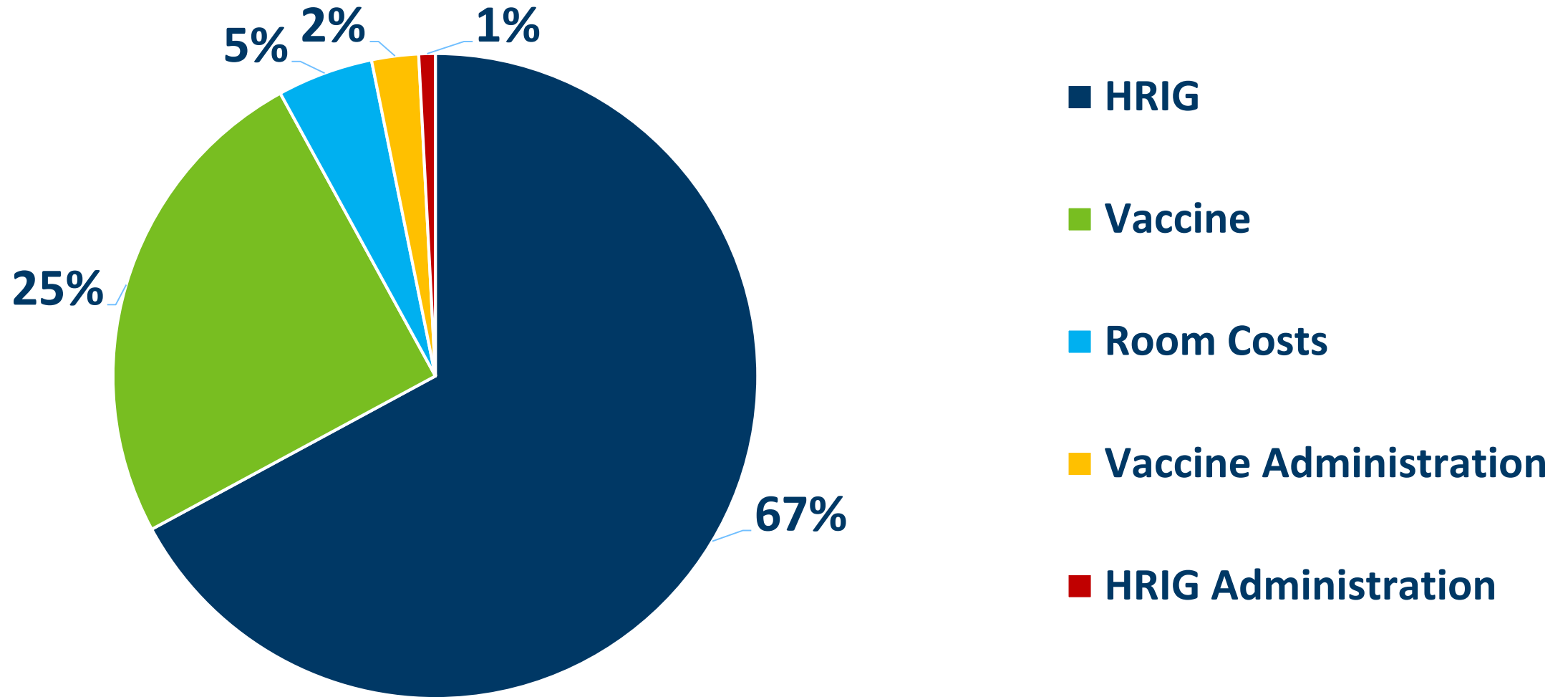
The Median Charge for PEP at Clinics in Minnesota, n = 277

\$6,407

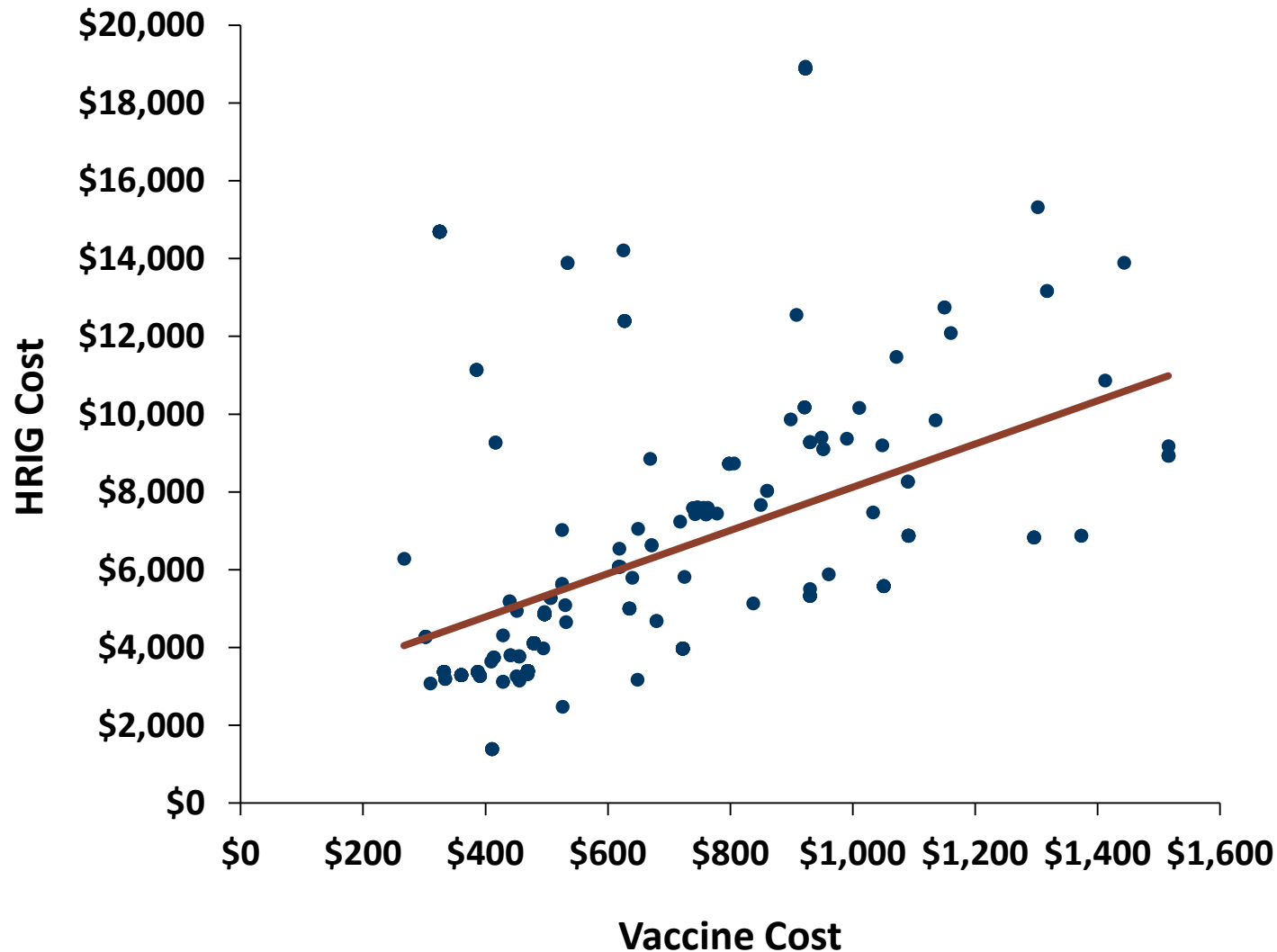
Range of Charges for PEP at Metro and Non-Metro Clinics



Proportionate Breakdown of the Cost of PEP Components Minnesota 2017-2018, n=421



Does a High HRIG Cost Mean a High Vaccine Cost?



- Categorized HRIG and vaccine costs into quartiles
- Fisher's Test of Independence $p < 0.001$
- Pearson correlation $r = 0.41$ $p < 0.001$
- If a facility has a HRIG cost in a quartile, the vaccine cost is likely to be in the same quartile

Median Uninsured Discount by Facility Type

Facility (n)	ED (68)	Urgent Care (50)	Clinic (224)	All (342)
Metro Discount	49%	15%	15%	15%
Non-Metro Discount	25%	40%	26%	26%
Minnesota Discount	32%	15%	15%	15%

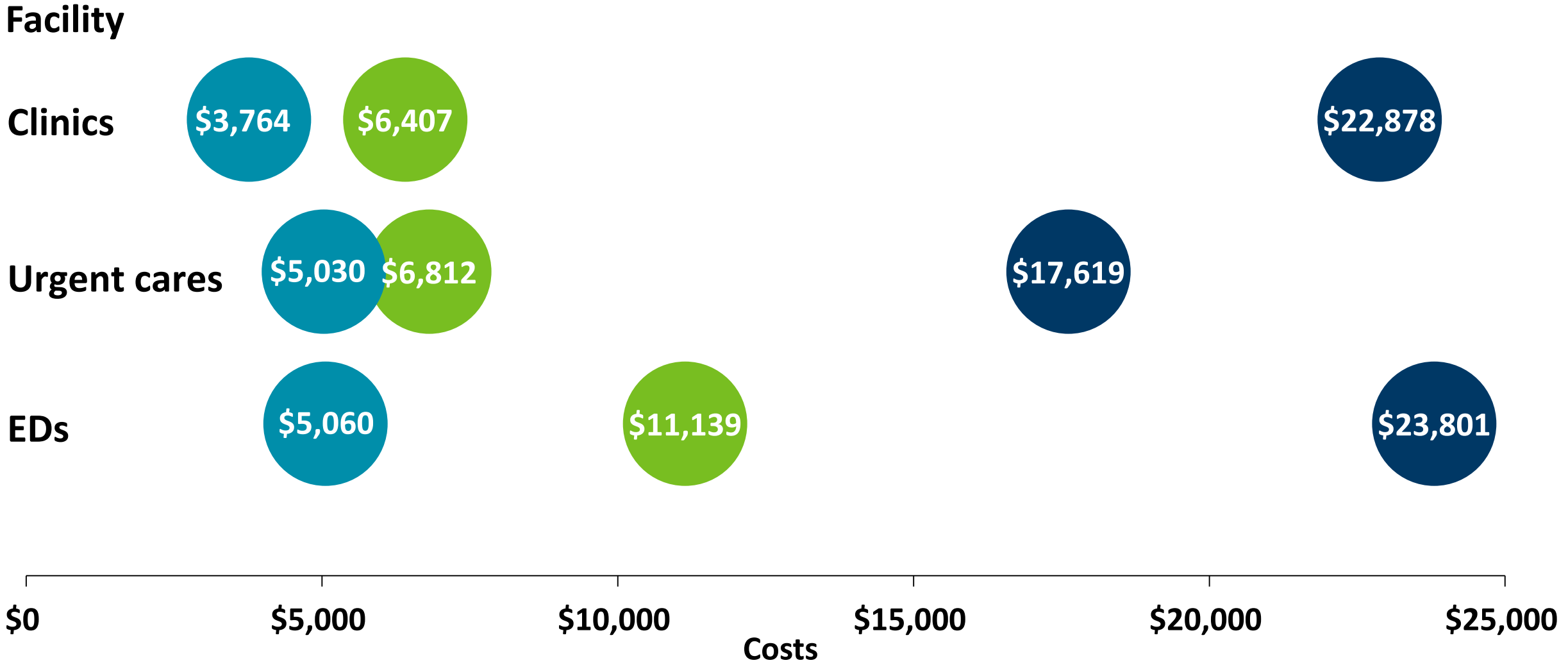
- **342 (81%) of 421 facilities had an uninsured discount policy**
- **Metro EDs had the largest median discount, followed by non-metro urgent cares**

Uninsured in Minnesota

- **6.3% of Minnesota's population are uninsured**
 - **Approximately 349,000 people without coverage**
- **Rose from 4.3% in 2015 to 6.3% in 2017**
- **And many people have high-deductible policies**

PEP Charges by Facility Type, Minnesota 2017-2018

● Minimum ● Median ● Maximum



Discussion

- **PEP is incredibly expensive, no matter the facility type**
- **HRIG is the driving factor in costs -- accounts for 2/3 of total cost**
 - **Cost of PEP varies widely with a person's weight**
- **HRIG wholesale cost for 10 mL has risen nearly 400% from 2007 to 2017**
 - **Sanofi Pasteur: \$740 → \$3,612**
 - **Grifols: \$756 → \$3,550**

Discussion

- **National median 10 mL wholesale cost of HRIG is \$3,581**
 - **Median charge for HRIG in Minnesota is \$4,075**
 - **14% markup and a gross profit of \$494**
- **National median vaccine wholesale cost is approximately \$260**
 - **Median charge for vaccine in Minnesota is \$448**
 - **72% markup and a gross profit of \$188 per vaccine**
 - **\$752 profit for four administrations of the vaccine**

Discussion

- **In Minnesota, most clinics and urgent cares have CPT codes in their billing systems for both rabies vaccine and HRIG**
 - **They carry and administer rabies vaccine, but they do not actually stock or administer HRIG**
 - **Patients are being forced to the ED for the initial visit**
- **State wide the median charge for an ED initial visit is \$7,118**
 - **Higher than the median charge for all 4 visits at clinics and urgent cares**

Conclusion: Raising Awareness

- **Raising awareness among facilities and the general public of the extreme variability in charges may help shrink the wide range**
- **Managers of urgent cares and clinics may be more willing to order in and administer HRIG at their facilities so the entire series can be administered there**
- **Raising awareness among healthcare providers of the extraordinary cost may decrease unnecessary PEP administration**

Conclusion

- **Its important for everyone concerned to be aware of what constitutes a rabies exposure to avoid unnecessary PEP**
- **When possible, confinement and observation, or testing of animals is preferred**
 - **Animal testing is inexpensive and reliable**
 - **There is time to wait for the 10 day observation period or the results of animal testing in the vast majority of cases**

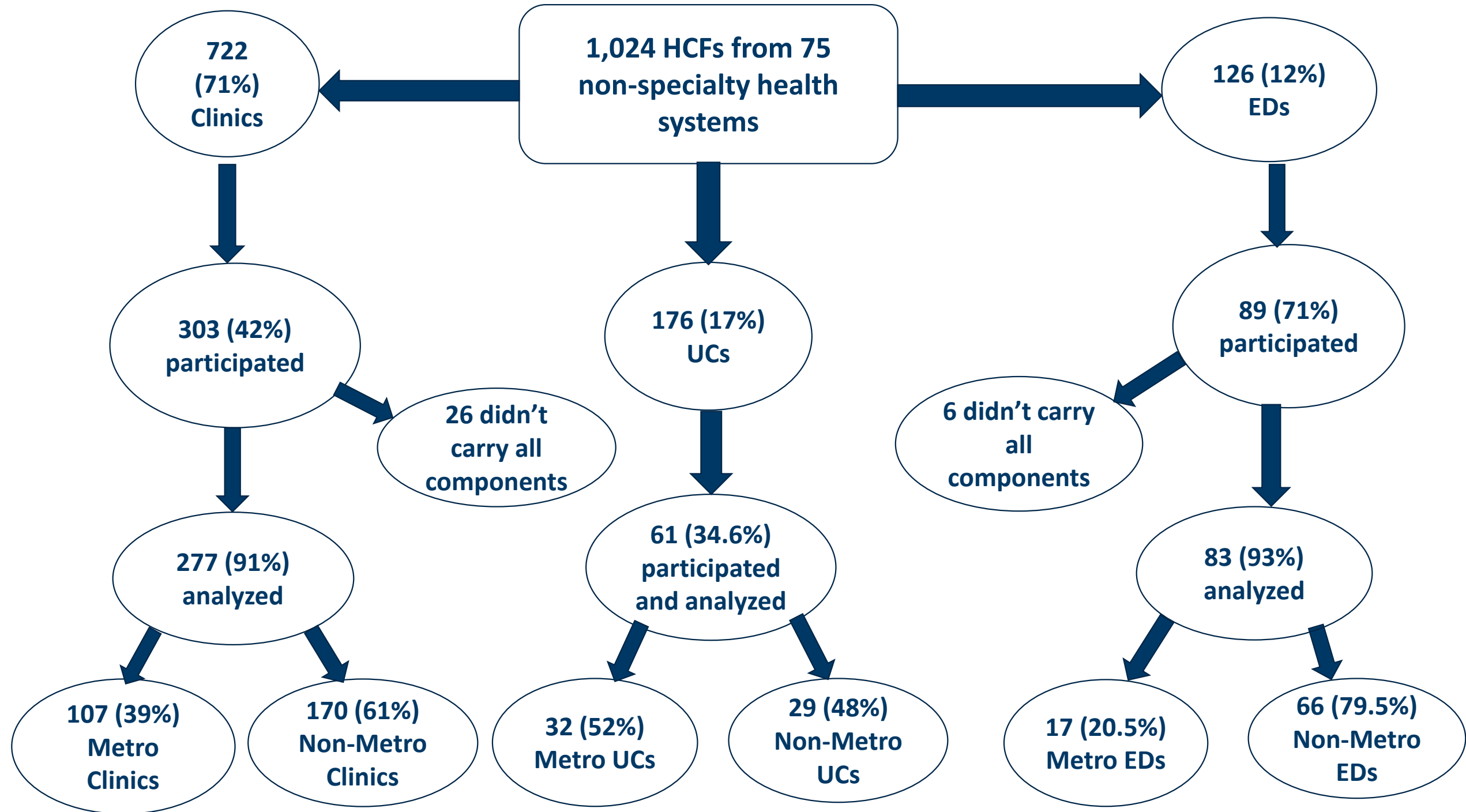
Conclusion: Next Steps

- **Next a study looking into what patients are actually paying to expand our understanding of:**
 - **Insurance coverage**
 - **True burden of animal bites and PEP in Minnesota**

Thank you!

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Urgent Care Results

- **The 32 Metro urgent cares are associated with 2 healthcare systems**
 - **Median number of urgent cares for each metro system: 16**
 - **Range: 10-22**
- **The 26 Non-Metro healthcare systems were associated with 16 healthcare systems**
 - **Median number of urgent cares for each non-metro system: 1**
 - **Range: 1-5**

Clinic Results

- **The 107 Metro clinics are associated with 3 large healthcare systems**
 - **Median number of clinics for metro systems is 30**
 - **Range: 4-55 clinics/system**
- **The 170 Non-Metro clinics are associated with 36 healthcare systems**
 - **Median number of clinics for non-metro system is 3**
 - **Range: 1-30 clinics/system**

HRIG CPT Codes

- **Most HCFs used only 1 CPT code for HRIG, but <40% used both**
- **When HCFs gave both codes, we took median**
- **Originally designed to be used for separate brands of HRIG**
 - **90375-HyperRab by Grifols**
 - **90376-Imogam by Sanofi Pasteur**
- **When talking to pharmacists, they had no distinction and used both for either CPT**