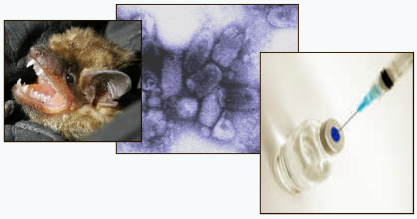
# A Community Intervention to Reduce Misadministration of Rabies PEP in Maryland



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Zoonotic Disease Update—June 23, 2011

# Infectious Disease & Environmental Health Administration

- To improve the health of Marylanders by reducing the transmission of infectious diseases, helping impacted persons live longer, healthier lives, and protecting individuals and communities from environmental health hazards
- We work in partnership with local health departments, providers, community based organizations, and public and private sector agencies to provide public health leadership in the prevention, control, monitoring, and treatment of infectious diseases and environmental health hazards

## Overview

- Explain the need for this project
- Present the approach that was used
- Describe the activities taken
- Discuss next steps

## The Problem

- Deviations from Advisory Committee on Immunization Practices (ACIP) guidelines are known to occur with the administration of rabies postexposure prophylaxis (PEP)
- Identified as a problem worth addressing in Maryland
- CDC Preventive Medicine Fellow tasked with addressing it

## What is rabies PEP?

- Indicated for anyone exposed to rabies
- In previously *un*vaccinated patients:
  - Wound cleansing
  - Rabies immune globulin (RIG), locally infiltrated, with any remainder given intramuscularly
  - Rabies vaccine in deltoid on days 0, 3, 7, and 14
- In previously *vaccinated* patients:
  - Wound cleansing
  - Rabies vaccine in deltoid on days 0 and 3

## Why are deviations from ACIP guidelines a concern?

- Increased risk of PEP failure
  - Most serious consequence
  - High proportion of documented PEP failures involve suboptimal RIG administration (Wilde, 2007)
- Excessive medical costs
  - Most common consequence
  - Corrective doses of biologics
  - Serological testing
  - Extra hospital fees
  - Indirect costs (time off work, travel, etc.)

## Relevant Literature Findings

- Jerrard, 2004
  - Retrospective analysis of 110 PEP recipients at university hospital EDs
  - 42% received RIG in manner contrary to ACIP guidelines
    - Outdated 50:50 method
  - Conclusion: Low clinician compliance with most current guidelines

## Relevant Literature Findings (cont.)

- Moran et al., 2000
  - Prospective study of 2030 patients w/ animal exposures
  - 18% of PEPs were unnecessary
    - Dog or cat was available for observation
  - 6% of patients did not receive PEP when it was indicated
  - Conclusion: PEP is often used unnecessarily <u>and</u> withheld inappropriately in EDs

## Relevant Literature Findings (cont.)

- Pearson, 2000
  - Editor commentary about personal experience as a rabies PEP recipient after a bat scratch
  - Noted 4 errors in care
    - 911 dispatcher advised her to not seek care
    - Vaccine in gluteus
    - RIG mistaken for vaccine
    - 5th vaccine dose given a week early
  - Conclusion: Need for providers to take medical errors seriously

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**Near-miss only; patient corrected clinician**

# Characterizing the Problem in Maryland

- How frequently do deviations occur?
- Which deviations most frequently occur?
- What could be causing these deviations?
- What should be focused on in this intervention?

# Frequency Estimate

- Montgomery County HD
- 100 PEP records from 2009 reviewed
- 4% documented errors
  - 2 involved vaccine in gluteus
  - 1 failure to infiltrate wound w/ RIG
  - 1 failure to administer RIG
- 4% were unnecessary
  - Involved dogs available for testing or observation
- Possibly underestimated?

# Clinician Knowledge Assessment

- ID physicians and physicians-in-training at a university teaching hospital in Baltimore
  - Administered identical pre- and posttest in association w/ case-based lecture
  - n = 10

- Objectives:
  - Assess baseline knowledge
  - Evaluate effectiveness of rabies lecture

# Pretest Results

- Average score 43%
  - Range 20 – 60%
- Weakest performance on questions related to PEP administration
  - Only 10% correctly ID'ed when RIG should be withheld
  - Only 10% ID'ed correct vaccine site
  - None could identify an example of correct PEP administration
- Other areas of weakness
  - Assessing exposure risk

## Posttest Results

- Average score 74% (range 50-60%)
  - 72 % improvement (95% CI 40-106%)
- Largest improvement on questions related to PEP
  - 89% correctly ID'ed when RIG should be withheld
  - 56% ID'ed correct vaccine site in adult
  - 56% ID'ed an example of correct PEP administration
- Conclusions:
  - Low awareness of ACIP-recommended PEP among ID MDs
  - Case-based lecture showed effectiveness

## Strategy for Intervention

- Goal:
  - Reduce PEP misadministration by raising clinician awareness of ACIP guidelines
- Initial target:
  - 5 major EDs in Montgomery County (MoCo)
- Objectives:
  - Design new patient fact sheet
  - Create educational poster for EDs/clinics
  - Promote use of PEP algorithm in ED ordering systems
  - Train clinicians

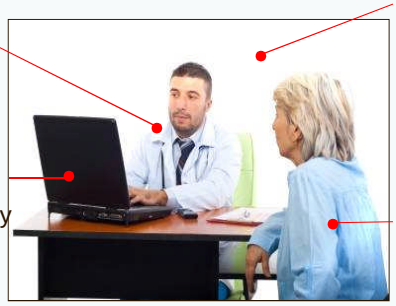
# Rationale for Strategy

**Training**

- Combination of instructor-led and self-study
- Raises clinician awareness directly

**PEP algorithm**

- Incorporation into ED's computerized physician order entry system (CPOE)
- Provides patient-tailored guidance to the clinician, minimizing guesswork



**Poster**

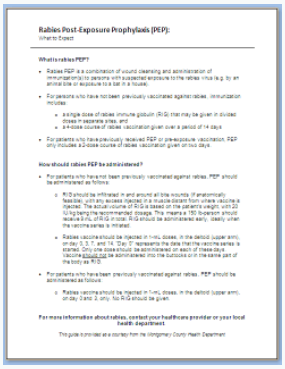
- Places guidance in the ED environment
- Serves as a constant, convenient source of education

**Patient fact sheet**

- Informs patient on what to expect
- Information may trickle into exam room

# Patient Fact Sheet

- Emailed to MoCo residents referred to ED following possible rabies exposure
- Easy to understand info about what to expect
- Empowers patient
- Can be printed and carried into exam room



Rabies Post-Exposure Prophylaxis (PEP):
What to Expect

What is rabies PEP?

- Rabies PEP is a combination of wound cleansing and administration of immunoprophylaxis (serums) with suspected exposure to the rabies virus (e.g. by an animal bite or exposure to a bat in a house).
- For persons who have not been previously vaccinated against rabies, immunization includes:
  - a single dose of rabies immune globulin (RIG) that may be given in divided doses in separate sites; and
  - a 4-dose course of rabies vaccination given over a period of 14 days
- For patients who have previously received PEP or pre-exposure vaccination, PEP only includes a 2-dose course of rabies vaccination given on two days

How should rabies PEP be administered?

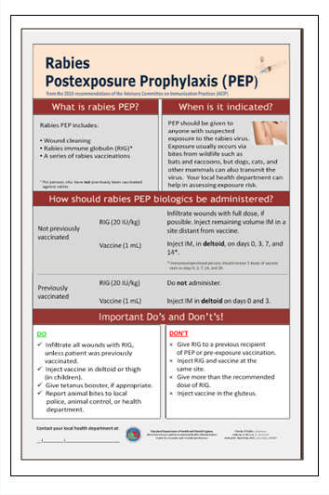
- For patients who have not been previously vaccinated against rabies, PEP should be administered as follows:
  - RIG should be infiltrated in and around all bite wounds (if anatomically feasible), with any excess injected in a muscle distant from where vaccine is injected. The actual volume of RIG is based on the patient's weight, with 20 IU/kg being the recommended dosage. This means a 150 lb-person should receive 1 mL of RIG in total. RIG should be administered early, ideally when the vaccine series is initiated.
  - Rabies vaccine should be injected in 1-mL doses, in the deltoid (upper arm) on day 0, 3, 7, and 14. (Day 0 represents the date that the vaccine series is started. Only one dose should be administered on each of these days. Vaccine should not be administered into the buttocks or in the same part of the body as RIG.
- For patients who have been previously vaccinated against rabies, PEP should be administered as follows:
  - Rabies vaccine should be injected in 1-mL doses, in the deltoid (upper arm) on day 0 and 3 only. No RIG should be given.

For more information about rabies, contact your healthcare provider or your local health department.

This guide is provided as a courtesy from the Montgomery County Health Department

# Poster

- Designed for use in EDs and similar settings
- Major content
  - Table showing PEP regimens
  - Important “do’s” and “don’ts”
- Feedback from ED clinicians used in development
- Statewide distribution via 24 local HDs



Rabies
Postexposure Prophylaxis (PEP)

| What is rabies PEP? | When is it indicated? |
|---|---|
| Rabies PEP includes:<br>• Wound cleaning<br>• Rabies immune globulin (RIG)*<br>• A series of rabies vaccinations | PEP should be given to anyone with suspected exposure to the rabies virus. Exposure usually occurs via bites from wildlife such as bats and raccoons, but dogs, cats, and other mammals can also transmit the virus. Your local health department can help in assessing exposure risk. |

How should rabies PEP biologics be administered?

| | | |
|---|---|---|
| Not previously vaccinated | RIG (20 IU/kg) | Infiltrate wounds with full dose, if possible. Inject remaining volume IM in a site distant from vaccine. |
| | Vaccine (1 mL) | Inject IM, in **deltoid**, on days 0, 3, 7, and 14*. |
| Previously vaccinated | RIG (20 IU/kg) | Do **not** administer. |
| | Vaccine (1 mL) | Inject IM in **deltoid** on days 0 and 3. |

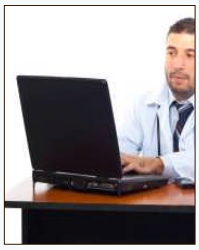
Important Do’s and Don’t’s!

| DO | DON’T |
|---|---|
| ✓ Infiltrate all wounds with RIG, unless patient was previously vaccinated.<br>✓ Inject vaccine in deltoid or thigh (in children).<br>✓ Give tetanus booster, if appropriate.<br>✓ Report animal bites to local police, animal control, or health department. | • Give RIG to a previous recipient of PEP or pre-exposure vaccination.<br>• Inject RIG and vaccine at the same site.<br>• Give more than the recommended dose of RIG.<br>• Inject vaccine in the gluteus. |

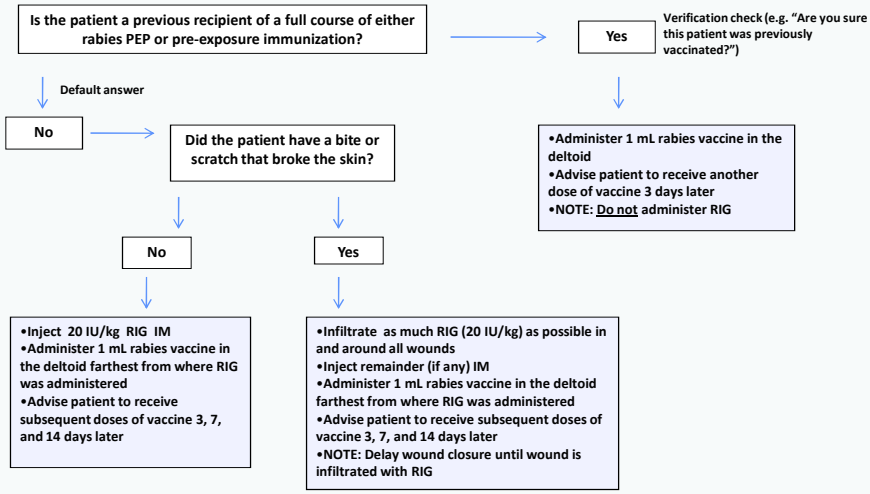
Contact your local health department at: _____

# Leveraging information technology

- Clinical decision support increasingly provided electronically
- Computerized physician order entry (CPOE) systems are widely used
- Provides patient-centered, evidence-based guidance
- Why not program CPOEs with an algorithm for PEP?



# PEP Algorithm




# Promotion of PEP Algorithm

- Discussions with ED pharmacists about incorporating a PEP decision algorithm into their CPOE
- Pharmacists at one ED agreed to the idea
  - Anticipated to adopt this spring, with the launch of upgraded CPOE
- Success may lead to adoption at other hospitals
  - Administrator involvement necessary

# Clinician Training

- Idea inspired by earlier lecture to ID physicians
- Why do it?
  - Direct method to educate
  - Training need apparent

# Cost-Benefits?

**Pros**

- Can be more comprehensive than other methods
- Allows face-to-face interaction
- If online, can potentially reach a huge audience

**Cons**

- Hard to organize in-person, on large-scale, for busy professionals
- Face time requires hospital invitation
- Incentives needed to attract participation in online training (e.g. CME)

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**Decision: Combination of in-service training and online training**

## In-Service Trainings

- Contacted ED directors at 5 target MoCo hospitals
- Invited to 3 out of 5
- Delivered 10-15 min talk in between shifts
  - Brief rabies overview
  - Assessment topics: bat in a bedroom and dog risks
  - Do's and don'ts for rabies PEP
- In total, ~ 70 clinicians trained
  - Physicians, nurses, and pharmacists

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## Creating Online CME/CE Training

- Must be approved by an ACCME accredited provider
- Approval contingent upon several criteria
  - Educational needs linked to a desired outcome
  - Needs assessment used to plan CME activity
- CE for other professional groups obtained similarly
- Effectiveness must be evaluated prior to approval
  - Pilot tested by 5 representatives from each profession that CE is requested

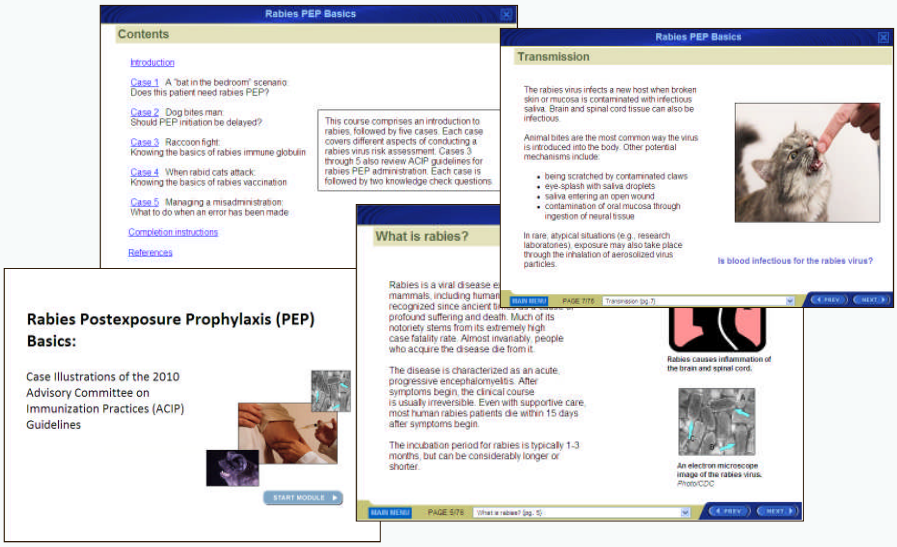
## "Rabies PEP Basics"

- Developed in collaboration with CDC Rabies Team
- Case study format with 5 scenarios
- Learning objectives include:
  - How to assess various exposure situations
  - How to administer RIG and vaccine
  - How to manage a previous misadministration
- Pulls together info from major references
  - ACIP, 2008 and 2010
  - 2009 national rabies surveillance report (JAVMA)
  - Compendium of Animal Rabies Prevention
  - CDC Yellow Book

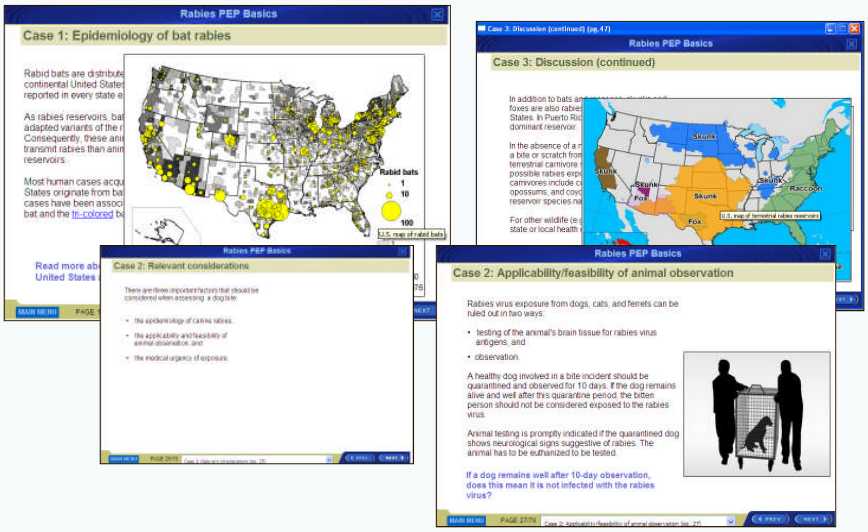
# Other Course Features

- CDC-accredited for CME/CE
  - Physicians, nurses, pharmacists, veterinarians
- Interactive quiz questions and pop ups
- Links to relevant MMWR articles
- Photos from real life
- Content shaped by actual questions asked by ED clinicians
- Maryland emphasis, but applicable to a national audience

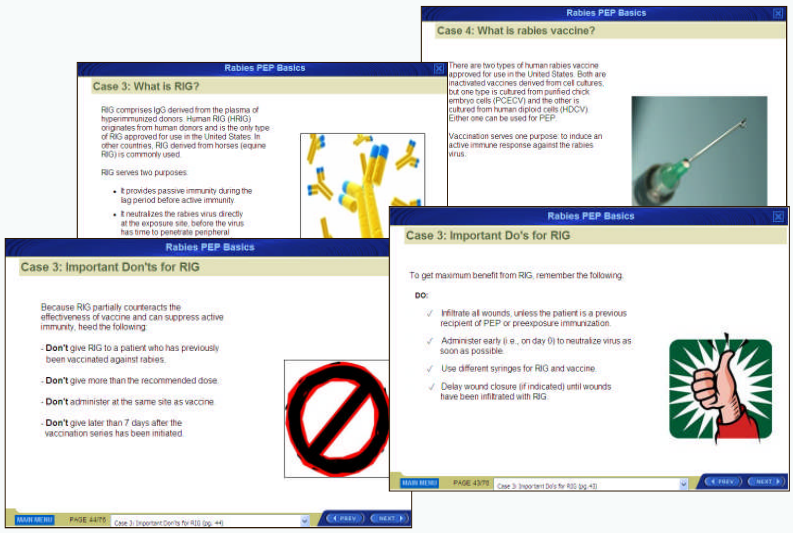
# Screen Shots: Intro



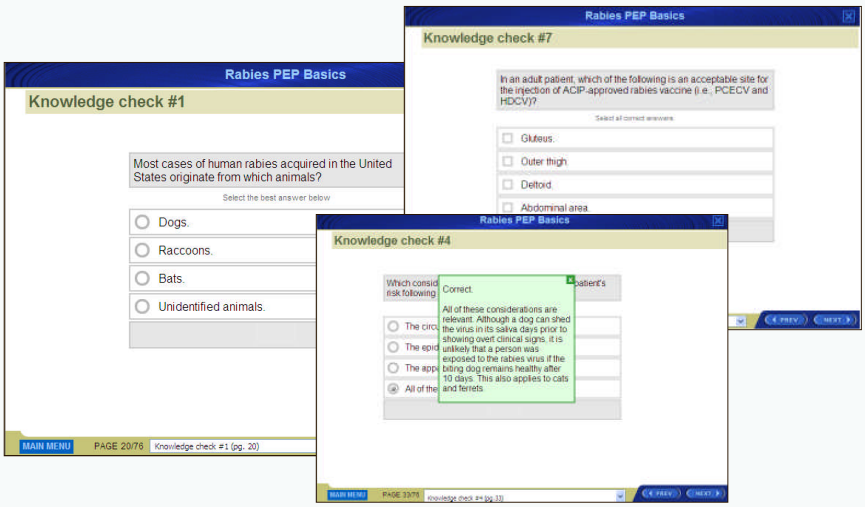
# Screenshots: Exposure Assessment Considerations




# Screenshots: RIG and Vaccine



# Screenshots: Knowledge Check Questions




# Access

- Poster and course can be assessed at the DHMH Rabies website, under the section for healthcare providers
- http://ideha.dhmh.maryland.gov/CZVBD/rabies.aspx
- Participants register with CDC to obtain CE certificates

# Next Step: Evaluation

- Posters in EDs and urgent care centers
  - Presence
  - Frequency of use
  - Perceived usefulness
- PEP algorithm
  - Staff acceptance
  - Perceived usefulness
- Course participation
  - Evaluation form
- Record review
  - Decline in errors?

# Closing Thoughts

- Collaborating with others important
- Seek and use input from targeted community
- Share ideas and experiences to inspire

# Acknowledgements


| | | | |
|---|---|---|---|
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# Questions ?

**Maryland Infectious Disease and Environmental Health Administration**

**http://ideha.dhmh.maryland.gov/**

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.