



# Rabies pre-exposure prophylaxis: Summary of background information

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# Strategies to prevent rabies in the United States

- Avoidance of risky behaviors
- Vaccination of pets and wildlife
- Proper use of personal protective equipment
  
- Pre-exposure prophylaxis (PrEP)
- Post exposure prophylaxis (PEP)

# “Recognized” and “unrecognized” exposures



- Exposures from terrestrial mammals (above): Canine tooth size 15-50mm and bite strength ~320 lbs of pressure causing “recognized” trauma when exposures occur
- Exposure from bats (below): Canine tooth size: 2-10mm and bite strength ~2 lbs of pressure which can cause both recognized and unrecognized exposures



Unrecognized bat exposure:

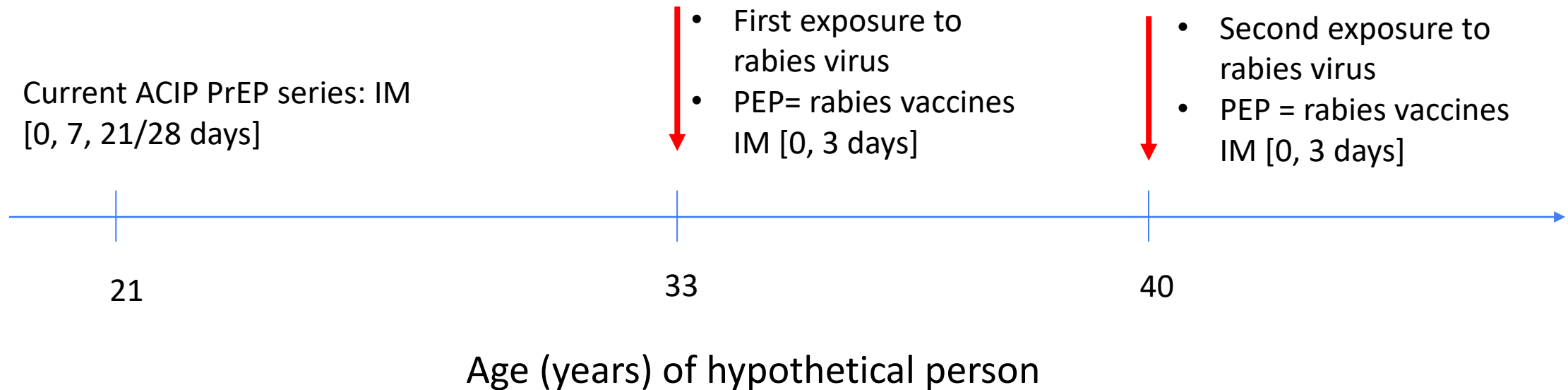
- Child
- Persons with altered mental status, e.g., due to intoxication or dementia
- Persons frequently rushed by bats, i.e., those who often enter heavily populated bat area like bat biologist

# Role of PEP

- Timely PEP alone is effective in preventing rabies
- Challenges of relying on only PEP
  - Uncertain access to prompt PEP for some travelers
  - Potential for unrecognized or high concentration exposures for select populations
  - Risk for multiple rabies exposures for persons who work with rabies virus or suspect rabid animals
- PEP schedule
  - PrEP naïve persons: Rabies immune globulin (RIG) + rabies vaccine IM [0, 3, 7, 14 days]
  - PrEP vaccinated persons: Rabies vaccine IM [0, 3 days]

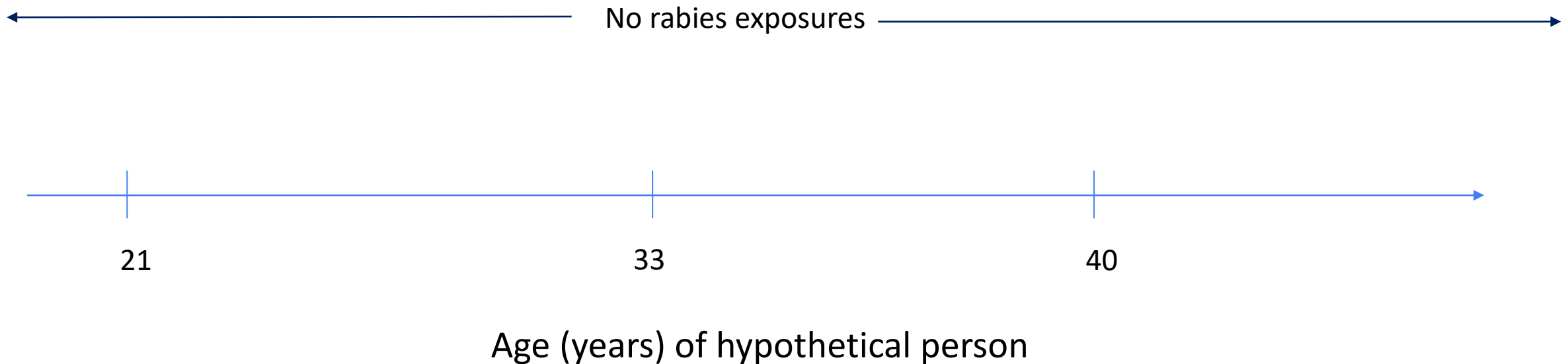
# Role for PrEP in some populations

- Provide some coverage if PEP is delayed or is inadvertently not given
- Eliminate need for RIG which is expensive and is not always easily accessible
- Shorten PEP series



# No role for PrEP in general U.S. population

- No rabies exposures
- PrEP not indicated



# Updated table with rabies pre-exposure prophylaxis (PrEP) recommendations

Risk category	Nature of Risk	Typical Population	Disease Biogeography <sup>1</sup>	Primary Immunogenicity PrEP	Long-term immunogenicity
<b>#1: Elevated risk for unrecognized and recognized exposures including unusual / high risk exposures (e.g., aerosol exposures and high concentration exposures)</b>	Risk of virus exposure is continuous. Exposure is often in high concentrations, may go unrecognized, and can be unusual (e.g., aerosolized virus).	Laboratory personnel working with live rabies virus in research, diagnostic, or vaccine production capacities (e.g., necropsy of suspect rabid animal or working with rabies virus cultures)	Laboratory	IM [0, 7 days]	Titers every 6 months (booster if titer <0.5 IU/mL)
<b>#2: Elevated risk of unrecognized and recognized exposures</b>	Risk of virus exposure is episodic. Exposure typically recognized but could be unrecognized. Unusual exposures do not occur	Persons who frequently handle bats or at frequent risk for <u>coming into contact with bats</u> because of entry into high density bat environments (e.g., bat biologist)	All geographic regions where bats are a reservoir for rabies <sup>2</sup>	IM [0, 7 days]	Titers every 2 years (booster if titer <0.5 IU/mL)
<b>#3: Elevated risk of recognized exposures</b>	Risk of virus exposure greater than population at large. Exposure is almost always a recognized one.	Persons who work with animals <ul style="list-style-type: none"> <li>Animal care professionals (e.g., veterinarians, technicians, animal control officers)</li> <li>Others who repeatedly handle terrestrial reservoir species (e.g., wildlife biologists, rehabilitators, and trappers)</li> <li>Spelunkers</li> <li>Veterinary students</li> <li>Short-term / volunteer hands-on animal care workers where increased risk is expected for short time periods*</li> </ul>	All geographic regions where terrestrial <sup>3</sup> and non-terrestrial mammals are reservoirs for rabies	IM [0, 7 days]	Titer once at 1-3 years (booster if titer <0.5 IU/mL)  OR Booster no sooner than day 21 and no later than year 3.
		Travelers who will be performing activities (e.g., occupational or recreational) that put them at increased risk for exposure to rabid dogs and may have difficulty getting access to safe PEP (e.g., in rural area). Children may receive PrEP depending on the country to which they will travel (see CDC Traveler's Health destination pages)	Geographic regions internationally with canine rabies		
<b>#4: Low risk of exposure / (i.e., general population)</b>	Risk of virus exposure is uncommon. Bite or non-bite exposure	U.S. population at large	Nationwide	<ul style="list-style-type: none"> <li>No pre-exposure prophylaxis</li> <li>No serologic monitoring</li> </ul>	n/a

<sup>1</sup>For questions about the disease biogeography of the region where an exposure occurred, please contact your local or state health department

<sup>2</sup>Bats are reservoirs for rabies in all US states except Hawaii

<sup>3</sup>Terrestrial mammals are non-bat species (e.g., racoons, skunks, livestock)

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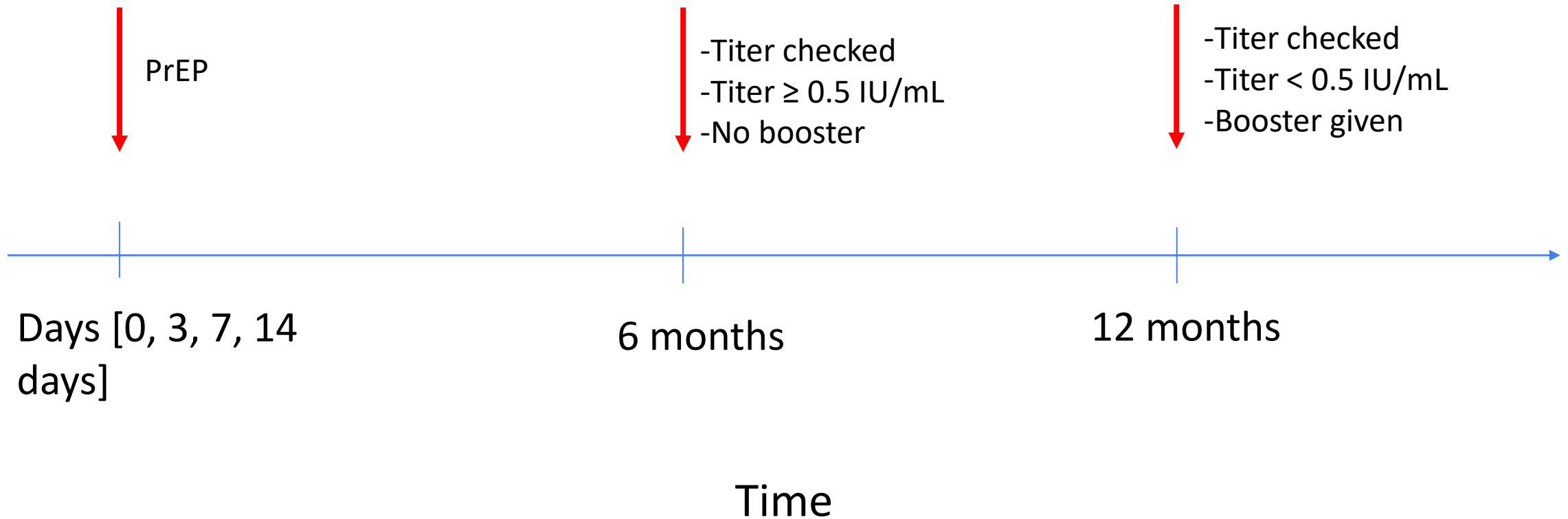
<sup>3</sup>Terrestrial mammals are non-bat species (e.g., racoons, skunks, livestock)



# Current ACIP PrEP recommendations

Risk group	Populations	Primary immunogenicity	Long-term immunogenicity
#1	Research laboratorians	IM [0, 7, 21/28 days]	Titer check ever 6 months
	Diagnostic laboratorians		Titer check every 2 years
#2	Persons who frequently handle or come into contact with bats because of entry into high density bat regions		Titer check every 2 years
#3	Animal care professionals and others who frequently handle terrestrial mammals in regions <u>with</u> terrestrial rabies <sup>2</sup>		Titer check every 2 years
	Animal care professionals and others who frequently handle terrestrial mammals in regions <u>without</u> terrestrial rabies <sup>2</sup>  Students, spelunkers, travelers, and short-term animal care professionals		No titer checks

# Actions taken in response to titer checks for #1 Risk Category

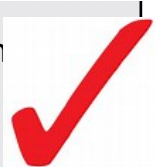


# Proposed changes

Risk group	Populations	Primary immunogenicity	Long-term immunogenicity	
#1	Research laboratorians	IM [0, 7 days]	Titer check ever 6 months <sup>1</sup>	
	Diagnostic laboratorians		Titer every 6 months	
#2	Persons who frequently handle or come into contact with bats because of entry into high density bat regions			Titer check every 2 years <sup>2</sup>
#3	Animal care professionals and others who frequently handle terrestrial mammals in regions <u>with</u> terrestrial rabies <sup>2</sup>			Titer once (1-3 years after primary series) OR Booster no sooner than day 21 and no later than year 3
	Animal care professionals and others who frequently handle terrestrial mammals in regions <u>without</u> terrestrial rabies <sup>2</sup>			
	Students, spelunkers, travelers, and short-term animal care professionals			

# Implications of proposed changes

Risk group	Population	Primary immunogenicity	Implications	Long-term immunogenicity	Implications
#1	Research laboratorians	IM [0, 7 days]	Fewer vaccine doses but equivalent efficacy	Titer check ever 6 months	No change
	Diagnostic laboratorians			Titer every 6 months	Makes sense to consider all laboratorians equally
#2	Bat biologists			Titer check every 2 years	No change
#3	Animal care professionals in terrestrial rabies regions			Titer once (1-3 years after primary series)	Fewer vaccine doses, fewer titer checks
	Animal care professionals in non-terrestrial rabies regions, students, spelunkers, persistent travelers			OR Booster no sooner than day 21 and no later than year 3	Same number of vaccine doses OR instead of 3 vaccine, a titer
	Short-term animal care professionals and persons without sustained risk for rabies			No additional vaccination and no titers	



# Policy question #1

**Should a 2 dose pre-exposure prophylaxis (PrEP) series involving HDCV\* or PCECV† IM [0, 7 days] replace the 3 dose series IM [0, 7, 21/28 days] for all those for whom rabies vaccine PrEP is recommended?**

\*Human diploid cell vaccine

† Purified chick embryo cell vaccine

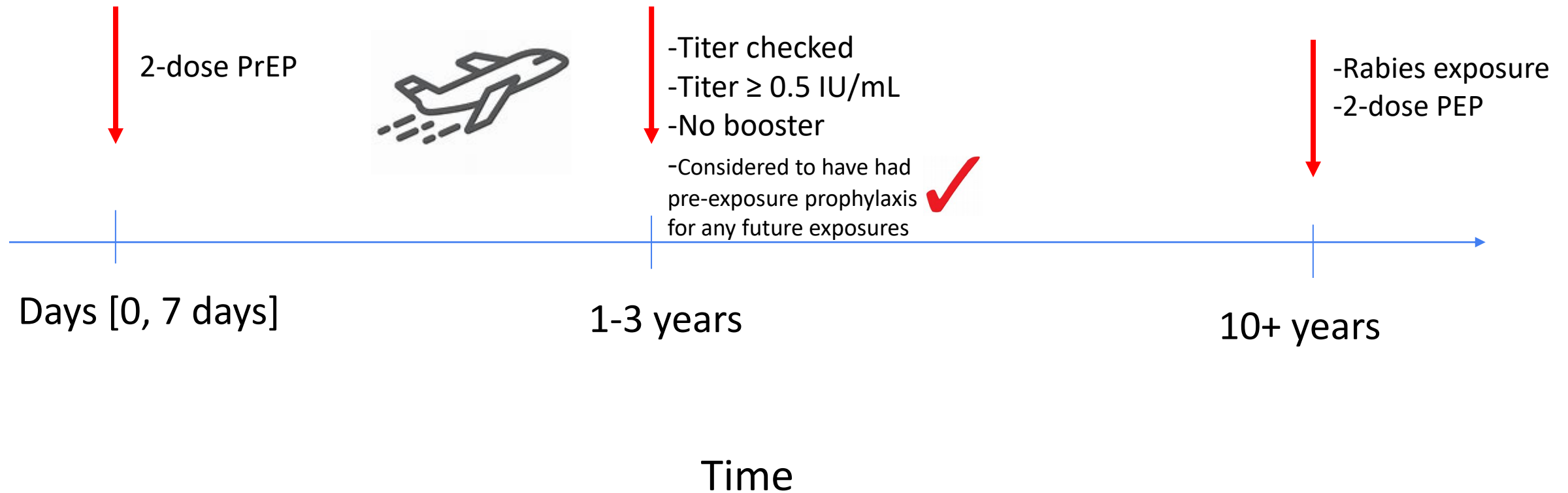
## Policy question #2

**Should an IM booster dose of rabies vaccine (\*PCECV or †HDCV) be recommended as an alternative to a titer check no sooner than day 21 and no later than 3 years after the two-dose pre-exposure (PrEP) series IM [0, 7 days] for those in the #3 risk category who receive PrEP?**

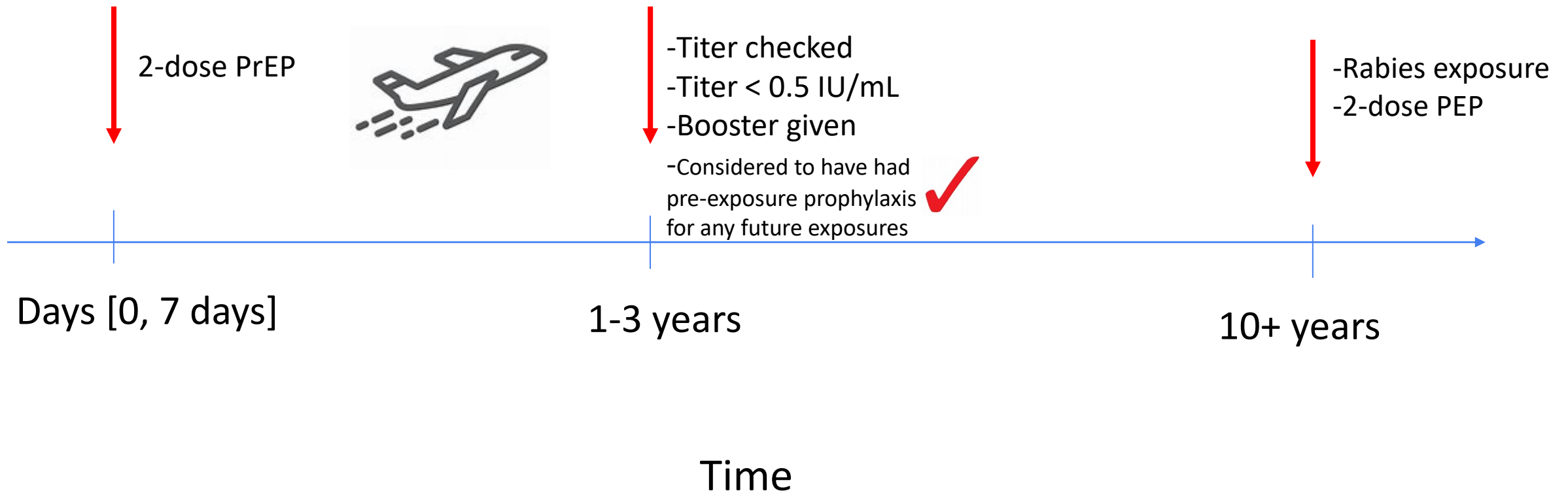
\*Human diploid cell vaccine

† Purified chick embryo cell vaccine

# Actions taken in response to titer check for #3 risk group

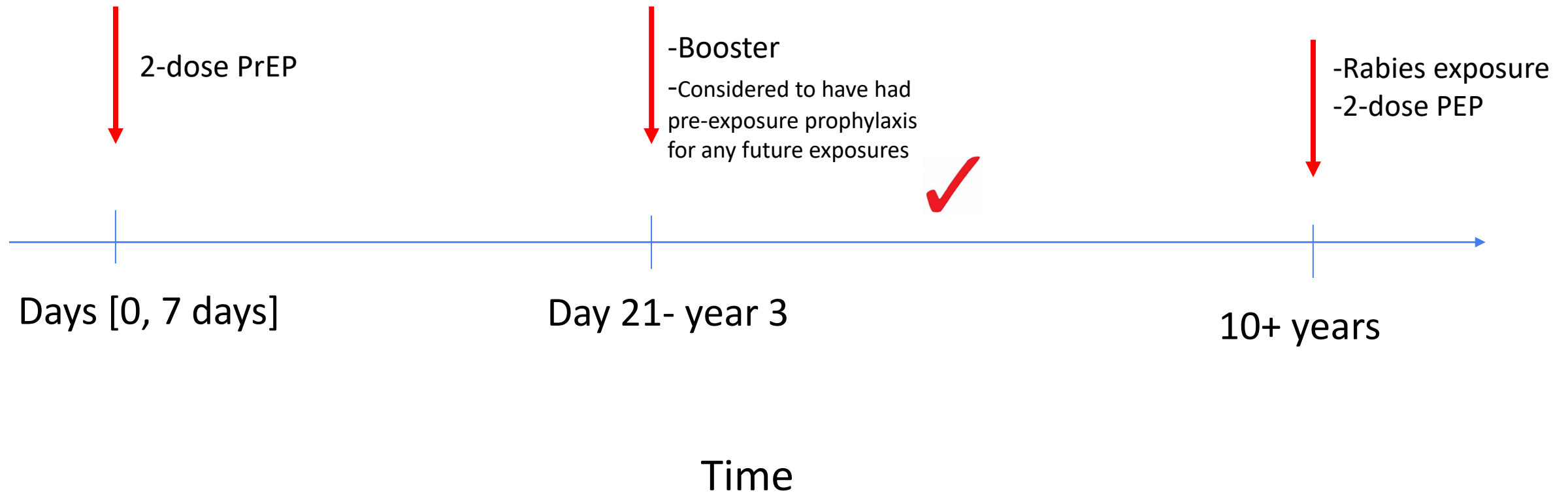


# Actions taken in response to titer check for #3 risk group





# Actions taken in response to titer check for #3 risk group



# Implications of proposed changes

Risk group	Population	Primary immunogenicity	Implications	Long-term immunogenicity	Implications
#1		IM [0, 7 days]	Fewer vaccine doses but equivalent efficacy	Titer check ever 6 months <sup>1</sup>	No change
	Diagnostic laboratorians			Titer every 6 months	Small population Makes sense to consider all laboratorians equally
#2	Bat biologists			Titer check every 2 years <sup>2</sup>	No change
#3	Animal care professionals in terrestrial rabies regions	IM [0, 7 days]	Fewer vaccine doses but equivalent efficacy	Titer once (1-3 years after primary series)	Fewer vaccine doses and/or fewer titer checks
	Animal care professionals in non-terrestrial rabies regions, students, spelunkers, persistent travelers			OR Booster no sooner than day 21 and no later than year 3	Same number of vaccine doses OR instead of 3 <sup>rd</sup> vaccine, a titer
	Short-term animal care professionals and persons without sustained risk for rabies				No additional vaccine and no titers

# Next presentation

- Summarize the Evidence to Recommendations Framework
- Show wording of 2 recommendations that will be voted on today

# Acknowledgements

- ACIP rabies WG
- Ryan Wallace
- Jesse Blanton
- Doug Campos-Outcalt
- Rebecca Morgan
- Jessica MacNeil
- Whitney Davidson

# Thank you

For more information, contact CDC  
1-800-CDC-INFO (232-4636)  
TTY: 1-888-232-6348 [www.cdc.gov](http://www.cdc.gov)

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