

# **Evidence to Recommendations and proposed recommendations for use of virus-like particle chikungunya vaccine among laboratory workers**

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# Infections among laboratory workers

- At least 44 chikungunya virus infections identified among laboratory workers worldwide over ~50 years<sup>1–3</sup>
  - 43 cases overt disease, 1 asymptomatic infection, no deaths
- 4 disease cases in US laboratorians since chikungunya became notifiable disease in 2015
- Identified cases underestimate all infections as no formal laboratory surveillance system

1. The Subcommittee on Arbovirus Laboratory Safety of the American Committee on Arthropod-Borne Viruses. Am J Trop Med Hyg 1980;  
2. Rusnak JM, et al. J Occup Environ Med 2004; 3. US national arboviral disease surveillance system, 2015–2024

# Routes of transmission in the laboratory

- Aerosol
- Percutaneous
  - Needlestick while working with and injecting mice
  - Forceps prick while dissecting mosquitoes infected with chikungunya virus
- Mucosal (possible)



# Cross-protection against different chikungunya virus genotypes by chikungunya virus-like particle vaccine (CHIK-VLP)

- Three main genotypes of chikungunya virus (Asian, West African, and East/Central/South African [ECSA])
  - CHIK-VLP based on West African genotype virus, most genetically distinct
  - Chikungunya virus strains generally considered to constitute single serotype
- Non-human primates (NHPs) immunized with virus-like particles were protected from challenge with ECSA chikungunya virus strain<sup>1</sup>
  - No NHP challenge studies with Asian genotype virus strain
- Sera from vaccinated persons showed neutralization of all genotypes<sup>2,3</sup>
  - Some variability in neutralizing antibody titers between lineages
- CHIK-VLP will likely cross-protect against all virus strains but not proven

## Policy question

Should chikungunya virus-like particle vaccine be recommended for laboratory staff at risk for chikungunya virus infection?

# Domain: Public Health Problem

Topic	Decision	Considerations
<b>Public health problem</b>	No, not of public health importance overall	<ul style="list-style-type: none"><li>• Only occasional laboratory-acquired infections reported in United States</li><li>• For laboratorians potential exists for acute infection with severe polyarthralgia and possible chronic arthralgia</li></ul>

## Domain: Benefits and Harms\*

Topic	Decision	Considerations
Benefits and Harms	Desirable anticipated effects of vaccination are <b>moderate</b>	<ul style="list-style-type: none"><li>• Very good short-term seroresponse rates</li><li>• Limited long-term seroresponse data; sustained protection important for staff if work in laboratory for many years</li><li>• CHIK-VLP likely protects against all chikungunya virus genotypes but not proven</li></ul>
	Undesirable anticipated effects of vaccination are <b>small</b>	<ul style="list-style-type: none"><li>• Rates of serious adverse events and all arthralgia/arthritis outcomes not significantly different between vaccinated and placebo groups in clinical trials</li></ul>

\*Based on GRADE assessment

## Domain: Benefits and Harms\*

Topic	Decision	Considerations
<b>Benefits and Harms</b>	Desirable effects outweigh the undesirable effects (favors intervention)	<ul style="list-style-type: none"><li>• Acceptable immunogenicity and safety results from clinical trials</li><li>• Prevention of potentially severe illness</li></ul>
	Certainty of evidence for prevention of disease: Low (short-term efficacy) and very low (long-term efficacy)	<ul style="list-style-type: none"><li>• Review of clinical trial data in GRADE assessment</li></ul>
	Certainty of evidence for potential adverse events: Low	

\*Based on GRADE assessment



## Domain: Values

Topic	Decision	Considerations
Values	Laboratorians likely think desirable effects large relative to undesirable effects  No important variability	<ul style="list-style-type: none"><li>Scientists understand risks of disease and risks and benefits of vaccination</li></ul>

# Domain: Acceptability

Topic	Decision	Considerations
Values	Laboratorians likely think desirable effects large relative to undesirable effects  No important variability	<ul style="list-style-type: none"><li>• Scientists understand risks of disease and risks and benefits of vaccination</li></ul>
Acceptability	Yes, acceptable to key stakeholders	<ul style="list-style-type: none"><li>• Acceptable for occupational health directors, laboratory managers, and laboratorians because will improve safety</li></ul>

## Domain: Resource Use

Topic	Decision	Considerations
Resource use	Yes, reasonable and efficient allocation of resources	<ul style="list-style-type: none"><li>• Vaccination for limited number of staff undertaking research or specific diagnostic work with chikungunya virus</li><li>• Small cost to avoid impact and costs of worker becoming infected</li></ul>

## Domain: Equity

Topic	Decision	Considerations
Resource use	Yes, reasonable and efficient allocation of resources	<ul style="list-style-type: none"><li>• Vaccination for limited number of staff undertaking research or specific diagnostic work with chikungunya virus</li><li>• Small cost to avoid impact and costs of worker becoming infected</li></ul>
Equity	Probably increased	<ul style="list-style-type: none"><li>• If employer offers vaccination, will improve safety for staff and addresses an occupational health issue</li></ul>

# Domain: Feasibility

Topic	Decision	Considerations
Resource use	Yes, reasonable and efficient allocation of resources	<ul style="list-style-type: none"><li>• Vaccination for limited number of staff undertaking research or specific diagnostic work with chikungunya virus</li><li>• Small cost to avoid impact and costs of worker becoming infected</li></ul>
Equity	Probably increased	<ul style="list-style-type: none"><li>• If employer offers vaccination, will improve safety for staff and addresses an occupational health issue</li></ul>
Feasibility	Yes, feasible	<ul style="list-style-type: none"><li>• Likely incorporated into existing occupational health program</li></ul>

# Balance of consequences for CHIK-VLP vaccination of laboratory workers at risk for chikungunya virus infection

<ul style="list-style-type: none"><li>○ Undesirable consequences <i>clearly outweigh</i> desirable consequences in most settings</li></ul>	<ul style="list-style-type: none"><li>○ Undesirable consequences <i>probably outweigh</i> desirable consequences in most settings</li></ul>	<ul style="list-style-type: none"><li>○ The balance between desirable and undesirable consequences <i>is closely balanced or uncertain</i></li></ul>	<ul style="list-style-type: none"><li>○ Desirable consequences <i>probably outweigh</i> undesirable consequences in most settings</li></ul>	<ul style="list-style-type: none"><li>○ Desirable consequences <i>clearly outweigh</i> undesirable consequences in most settings</li></ul>	<ul style="list-style-type: none"><li>○ There is insufficient evidence to determine the balance of consequences</li></ul>
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# Draft recommendation for CHIK-VLP vaccination for laboratory workers

ACIP recommends virus-like particle chikungunya vaccine for laboratory workers with potential for exposure to chikungunya virus.\*

\*Consistent with language of recommendation for vaccination of laboratory workers with live attenuated chikungunya vaccine approved by ACIP in February 2024

# Information accompanying recommendations

- Local biosafety committee should undertake risk assessment of potential for chikungunya virus exposure considering
  - Type of work to be performed
  - Biosafety level at which work is being conducted
- Vaccination not necessary for workers handling routine clinical samples



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# Acknowledgments

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For more information, contact CDC  
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