



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 years¹⁻³
 - 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 strain¹
 - No NHP challenge studies with Asian genotype virus strain
- Sera from vaccinated persons showed neutralization of all genotypes^{2,3}
 - Some variability in neutralizing antibody titers between lineages
- CHIK-VLP will likely cross-protect against all virus strains but not proven

1. Akahata W et al, Nat Med 2010. 2. Goo et al, J Infect Dis 2016. 3. Chang LJ et al, Lancet 2014.

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
Public health problem	No, not of public health importance overall	<ul style="list-style-type: none"><li data-bbox="1049 377 1846 465">• Only occasional laboratory-acquired infections reported in United States<li data-bbox="1049 476 1846 618">• For laboratorians potential exists for acute infection with severe polyarthralgia and possible chronic arthralgia

Domain: Benefits and Harms*

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

*Based on GRADE assessment

Domain: Benefits and Harms*

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

*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">• Scientists understand risks of disease and risks and benefits of vaccination

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">Scientists understand risks of disease and risks and benefits of vaccination
Acceptability	Yes, acceptable to key stakeholders	<ul style="list-style-type: none">Acceptable for occupational health directors, laboratory managers, and laboratorians because will improve safety

Domain: Resource Use

Topic	Decision	Considerations
Resource use	Yes, reasonable and efficient allocation of resources	<ul style="list-style-type: none"><li data-bbox="1049 377 1792 517">• Vaccination for limited number of staff undertaking research or specific diagnostic work with chikungunya virus<li data-bbox="1049 530 1792 620">• Small cost to avoid impact and costs of worker becoming infected

Domain: Equity

Topic	Decision	Considerations
Resource use	Yes, reasonable and efficient allocation of resources	<ul style="list-style-type: none"><li data-bbox="1049 377 1792 519">• Vaccination for limited number of staff undertaking research or specific diagnostic work with chikungunya virus<li data-bbox="1049 532 1792 620">• Small cost to avoid impact and costs of worker becoming infected
Equity	Probably increased	<ul style="list-style-type: none"><li data-bbox="1049 687 1823 827">• If employer offers vaccination, will improve safety for staff and addresses an occupational health issue

Domain: Feasibility

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

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

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

ACIP Chikungunya Vaccines Work Group

Arboviral Diseases Branch, CDC

- Susan Hills

For more information, contact CDC
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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.

