Use of Vaccinia Virus Vaccine in Persons at Risk for Occupational Exposure to Orthopoxviruses: Introduction

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Background

- *Poxviridae* are a family of DNA viruses that infect a broad range of hosts

- *Orthopoxvirus* genus includes several species that cause disease in humans
  - *Variola virus* (causative agent of smallpox)
  - *Vaccinia virus* (principal source of smallpox vaccine)
  - *Monkeypox virus* (cause of multiple outbreaks in Africa and imported cases to other countries including U.S.)
  - Cowpox virus (endemic in Europe)
  - Newly discovered species (*Akhmeta virus, Alaskapox virus*)
Occupational Exposures

- Diagnostic laboratorians directly handle specimens from persons with suspect orthopoxvirus infections
- Research personnel use replication-competent orthopoxviruses in biomedical research
- Healthcare workers in U.S.
  - Administer *Vaccinia virus* vaccine to (e.g., to military personnel)
  - Would treat patients with smallpox or monkeypox due to accidental or intentional exposures
Serious Infections Have Occurred During Laboratory and Research Work

Ocular vaccinia in laboratory worker

Needlestick inoculation of researcher using Vaccinia Virus as a vector

- Vaccination with an Orthopoxvirus vaccine can prevent these infections
Vaccinia Virus Vaccine Prevents Other Orthopoxvirus Infections

- Provides cross-protective immunity against other orthopoxviruses
- Facilitated smallpox eradication as main component of smallpox vaccine
- Recommended by ACIP for use in laboratory and healthcare personnel at risk for occupational exposure to orthopoxviruses

**Use of Vaccinia Virus Smallpox Vaccine in Laboratory and Health Care Personnel at Risk for Occupational Exposure to Orthopoxviruses — Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2015**

Brett W. Peresman, MD; Tiara J. Harms, MS, MPH; Mary G. Reynolds, PhD; Lee H. Harrison, MD
Timeline of Vaccinia Virus Vaccines Licensed When ACIP Recommendations Were Made
Timeline of Vaccinia Virus Vaccines Licensed at Time of ACIP Recommendations

First generation / Dryvax®
(Wyeth Laboratories, Inc.)
Propagated in calf skin

Year ACIP was updated

2001
Timeline of Vaccinia Virus Vaccines Licensed at Time of ACIP Recommendations

Second generation vaccine / ACAM2000™ (Acambis, Inc.™) had replaced Dryvax®
Propagated in tissue culture

Year ACIP was updated

2001

2015

2019
Second generation vaccine / ACAM2000™ (Acambis, Inc.™) had replaced Dryvax®
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Timeline of Vaccinia Virus Vaccines Licensed at Time of ACIP Recommendations

ACAM2000™ AND Third generation / JYNNEOS™ (Bavarian Nordic) licensed
Timeline of Vaccinia Virus Vaccines Licensed at Time of ACIP Recommendations

ACAM2000™ AND JYNNEOS™ (Bavarian Nordic) licensed

JYNNEOS™
- Attenuated, live, replication deficient vaccinia virus
- Licensed in September 2019
- Can be used in persons for whom ACAM2000™ is contraindicated
Reason for Work Group

Update ACIP recommendations for use of JYNNEOS™ to prevent orthopoxviruses in persons at risk for occupational exposure
Work Group Activities

- Review available data about safety and effectiveness of JYNNEOS™, including among persons with atopic dermatitis, immunocompromising conditions, and pregnancy.
- Consolidate U.S. recommendations for vaccination of persons who may have occupational exposures to orthopoxviruses.
- Identify areas in need of further research for informing potential future vaccine recommendations to prevent *Orthopoxvirus* infection.
### Tentative Timeline (Subject to Change)

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<th>October 2019</th>
<th>Nov-Dec 2019</th>
<th>~January 2020</th>
<th>~June 2020</th>
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Medical Officers, CDC Poxvirus and Rabies Branch
  – Agam Rao, MD
  – Brett Petersen, MD MPH
ACIP Work Group Co-Leads

Medical Officers, CDC Poxvirus and Rabies Branch

– Agam Rao, MD
– Brett Petersen, MD MPH

Next Steps:

- Identify work group members
- Begin review of data and work group meetings