

## Monkeypox Vaccines: Current Update

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Dear Editor,

Monkeypox belonging to the genus Orthopoxvirus (OPV) of the family poxviridae poses a major human threat even after 30 years after eradicating smallpox. OPV family includes other viruses like vaccinia virus (VACV), variola virus and cowpox virus. VACV smallpox vaccine provided cross protective antibody response against other orthopox viruses.<sup>1</sup>

The ongoing monkeypox outbreak has affected 31,800 people in more than 89 different countries. India has documented 9 confirmed cases with one death reported.<sup>2</sup>

Stockpile of smallpox vaccines that contain live vaccinia virus is maintained at two locations, one at Centre for Disease Control laboratory at Atlanta, Georgia and the other at VECTOR institute, Koltsovo, Russia. Data shows effectiveness of Smallpox vaccines against monkeypox to be 85%.<sup>3</sup>

Vaccine used in smallpox eradication were first generation vaccines which produced multiple side effects like eczema, progressive vaccinia and myopericarditis. This fear of adverse effects and safety concerns had led to the production of second and third generation vaccines like imvanex or ACAM2000.<sup>4</sup>

The interim guidelines for monkeypox vaccination does not urge the need for mass vaccination considering the side effects and the vaccine production. Countries like Canada, United Kingdom and USA are using ring vaccination to prevent monkeypox. The two vaccines currently being used against monkeypox are Jynneos vaccine and ACAM2000.<sup>5</sup>

JYNNEOS vaccine (Imvamune in Canada /Imvanex in Europe developed by Bavarian Nordiac) for adults aged 18 years and older was approved in Europe and U.S. The vaccine contains a replication deficient live vaccinia virus (Modified vaccinia Ankara-MVA BN) that is given as subcutaneous injection of 0.5 ml, two doses four weeks apart. The vaccine is used for post exposure prophylaxis against monkeypox virus. CDC recommends the intermediate or high risk group as potential group to receive post exposure prophylaxis of the vaccine (Unprotected contact with the body fluid of infected person or contact with less 6 meter distance with the infected person). Vaccine is available in countries like Canada, Europe and Britain.<sup>6</sup>

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ACAM2000, containing live replicating vaccinia virus that can replicate as compared to Jynneos vaccine. Owing to the side effects associated with the vaccine its only used for laboratory workers handling pox viruses or for military personnel.<sup>4,7,8</sup>

WHO has stated there is no need for mass vaccination and decision regarding vaccination should be based on the individual case accessing the risk and benefits.<sup>5</sup>

In India, the Serum Institute of India has confirmed its ongoing research to find vaccine against monkeypox. Monkeypox vaccine pipelines include 1. Tonix Pharmaceuticals Holding Corp TNX-8011, a preclinical live virus, which uses horsepox virus 2. EpiVax, Inc's-Epitome driven vaccine 3. VennVax, DNA prime peptide boost multi-T cell epitome Pox virus vaccine.<sup>9</sup>

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