

# SA 14-14-2 LIVE JAPANESE ENCEPHALITIS (JE) VACCINE

## Description

The SA 14-14-2 JE vaccine is a live, attenuated vaccine. It was developed and is produced for domestic use and export by Chengdu Institute of Biological Products Co., Ltd. (CDIBP), China. The vaccine name derives from the virus strain used in the vaccine, the SA 14-14-2 JE virus.

## Vaccine development

The SA 14-14-2 live JE vaccine strain was obtained from its wild-type SA 14 parent by serial passages in cell cultures (primary hamster kidney cells) and in animals (mice, hamsters) with successive plaque purifications (in primary chick embryo cells). The master seed virus of the SA 14-14-2 live JE virus strain was screened for and shown to be free of adventitious viruses at Q-One Biotech, United Kingdom. The primary hamster kidney cell line used to prepare the vaccine was also certified pathogen free. The manufacturer similarly tests all vaccine lots for adventitious agents as part of its quality assurance processes.

## Vaccine production and quality control

The vaccine is produced in accordance with technical specifications in “Guidelines for the production and control of Japanese encephalitis vaccine (live) for human use” developed by the World Health Organization (WHO) Expert Committee on Biological Standardization.<sup>1</sup>

Although there are several producers of the vaccine in China, CDIBP is the only currently authorized export manufacturer of the WHO prequalified vaccine. CDIBP has the capacity to produce 80 million doses annually.

## History of vaccine use

The vaccine has been used for more than 20 years, and more than 400 million doses have been administered in China and other Asian countries. Other countries that have licensed and/or used the vaccine include Nepal, Democratic People’s Republic of Korea, South Korea, Sri Lanka, India, Thailand, Laos, Cambodia, Myanmar, Malaysia, and Vietnam.

## Immunogenicity and efficacy

Several studies have demonstrated an excellent immune response after a single dose of SA 14-14-2 live JE vaccine, with neutralizing antibody responses produced in 85 to 100 percent of non-immune children.<sup>2,3,4,5</sup>

Several field trials in China have yielded protective efficacy rates above 95 percent.<sup>5,6,7</sup> One early case control study found 80 percent vaccine efficacy in children receiving one dose and 98 percent for two doses. A more recent study in an endemic area of Nepal established a single-dose protective efficacy of 99.3 percent against JE cases that occurred at a median of two weeks after vaccination.<sup>8</sup> One year after immunization, a follow up study in the same region

reported efficacy of 98.5 percent, and at five years the protective efficacy was 96.2 percent.<sup>8,9</sup>

## Safety

WHO’s Global Advisory Committee on Vaccine Safety has reviewed the SA 14-14-2 live JE vaccine and acknowledged its excellent safety and efficacy profile.<sup>10</sup>

More than one million children have been followed in safety studies of the vaccine, which have shown side effects are rare. The most common reactions observed were transient fever in approximately 5 to 10 percent of vaccine recipients and local reactions, rash or irritability in no more than 1 to 3 percent. Neither acute encephalitis nor hypersensitivity reactions have been associated with this vaccine.<sup>5,11</sup> Similar results have been obtained from post-marketing surveillance conducted in South Korea since 2002.<sup>10</sup>

In 2006, the Government of India collected data on adverse events following immunization during campaigns in which more than 9 million children were

### At-a-Glance

**Presentation:** Five-dose or single-dose vial; lyophilized powder requiring reconstitution with supplied diluent.

**Dosage and schedule:** One 0.5mL dose is given by subcutaneous injection. Studies show a single primary dose from eight months of age can provide at least five years of protection in JE-endemic areas.<sup>9</sup>

**Storage and use after reconstitution** Stored and transported between 2°C and 8°C. The vaccine should be used within 30 minutes of reconstitution.



vaccinated. Despite media misreporting at the time, a scientific investigation found no link between the SA 14-

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14-2 live JE vaccine and any serious event that occurred in temporal association with vaccination. Since then, more than 88 million children in India have been vaccinated.

## Administration with other vaccines

Results of a trial conducted in the Philippines in 2006 determined that the short-term safety profile of SA 14-14-2 live JE vaccine is satisfactory and can be safely co-administered with measles vaccine at nine months of age with no significant effect on the immunogenicity of either.<sup>12</sup>

## Contraindications

- A very severe adverse reaction (anaphylaxis) to a prior dose of SA 14-14-2 live JE vaccine.
- A severe hypersensitivity reaction to any vaccine component (gelatin, gentamicin).
- Congenital immunodeficiency, immunocompromised subjects or those receiving or recently received immunodepressive therapy (no data available on use in these groups).
- Pregnancy (no data available on use in pregnancy).
- The following additional contraindications are listed in official product information: acute infectious disease; renal, hepatic, or cardiac disease; active tuberculosis; otitis media; and epilepsy.

## Precautions

- In a child with fever, vaccination should be postponed until fever settles.
- There are no data on administration in HIV-positive children.

## Cost

In 2006, a maximum public-sector price for the vaccine has been established to allow for its use in the public health systems of lower-income endemic countries in Asia (gross national income [GNI] per capita <US\$1,000) over the next 20 years. This maximum public-sector price does not apply to sales to countries with higher GNI or to the private sector. The price is “Ex Works” (i.e., excludes product liability insurance, cold chain package expenses, vaccine vial monitor costs, transportation fees and insurance, and relative tariffs) and will be subject to adjustment based on changes in currency exchange rates or changes in labor and raw material costs.

## Prequalification

The SA 14-14-2 live JE vaccine has been prequalified by WHO. It is the first JE vaccine with a pediatric indication to reach prequalification and now enables procurement of the vaccine by United Nations agencies. Achieving this milestone will help secure vaccine financing and accelerate the availability of SA-14-14-2 live JE vaccine to those who need it most.

## References

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