

national program of JE vaccination is certainly worth consideration.

doi:10.1016/j.ijid.2008.05.131

55.003

### The Landscape of New Vaccines for Japanese Encephalitis: Country-Level Strategies for Introduction

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The first recorded major outbreak of Japanese encephalitis (JE) in Sri Lanka occurred in 1985–86 with 385 cases and 64 deaths in the North Central province. Outbreaks occurred in 1986–87 and 1987–88, the latter being the largest with 812 cases and 192 deaths in three adjoining districts. Cases occurred in rice cultivating areas with a network of irrigation canals supported by seasonal, moderate to heavy rainfall. Children aged 5– and young adults aged 20–24 years were predominantly affected.

JE was also spreading to new areas with previously low transmission. To cope with this emerging challenge, the Ministry of Health's Epidemiology Unit initiated phased JE immunization in 1988. Children aged 1–10 years were offered three primary doses and a booster of inactivated vaccine in the interpandemic period through a campaign approach. Over the years, JE incidence decreased as immunisation coverage increased. However, cases and occasional outbreaks were reported in other districts where immunization was not carried out, and the programme ultimately expanded to 18 districts. An increasing trend of adverse events following immunization with the inactivated JE vaccine threatened repercussions to the programme. Another obstacle was the increasing cost of the inactivated vaccine—US\$4.50 per dose in 2006, a prohibitive factor to programme sustainability. Identifying an affordable, safe and immunogenic vaccine alternative was a high priority.

The live, attenuated SA 14-14-2 JE vaccine (LJEV) appeared to be an appropriate, low cost, safe and potent alternative. With support from PATH, the Epidemiology Unit initiated a clinical trial in 2007 to ascertain the safety and immunogenicity of LJEV. Based on preliminary results, the government decided to introduce LJEV in place of the inactivated vaccine, hopefully expanding to routine EPI very soon.

Currently, the Ministry of Health is negotiating a public sector price for procurement of LJEV and finalizing the recommended schedule. Cost savings from transitioning to LJEV will enable the introduction of new vaccines and will extend the JE immunization programme to adults in high endemic areas.

doi:10.1016/j.ijid.2008.05.132

### Japanese Encephalitis Control: What Can Be Achieved?

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JJE is the leading cause of viral neurological infection (encephalitis) in the Asian region, primarily affecting children aged 1–15 years in rural areas. JE vaccination has been successful in effectively controlling the disease in many countries where JE was identified as a public health problem, often linked to epidemic manifestation. These experiences show the way to successful JE control and, recently, several additional countries have started to introduce JE vaccination.

Today, there is great opportunity to sustain and expand momentum for JE control through vaccination, building on recent advances achieved through country, WHO and partners' efforts, in particular PATH. Increasingly, countries are establishing surveillance to document the burden of disease. Live, attenuated vaccine has shown great potential in preventing disease and is becoming available in large volume at a highly preferential public-sector price. Additionally, promising JE vaccines under development should become licensed for pediatric use during the coming years. Moreover, cost-effectiveness analysis gives favorable figures in many country settings (estimated 75\$/DALY loss averted for GAVI-eligible countries), providing a strong rationale for vaccine introduction. Most important, however, is public and government recognition of the JE problem, and the will to take action.

To advance sustainable introduction of JE vaccination where it matters, priorities include documentation of disease burden—in particular in countries with no visible epidemics—and the establishment of a public sector reporting system. Building local capacity for strengthening JE surveillance, including quality-assured diagnostic laboratories, is key. The decision on vaccine introduction and optimal immunization strategy has to follow a rationale process as recommended for any other vaccine, with a particular emphasis on cost-effectiveness analysis and financial and managerial planning to sustain the effort beyond initial campaigns. This includes an assured vaccine procurement plan and an AEFI system to monitor vaccine safety.

Countries have shown leadership in introducing JE vaccination. Targeted financial and technical support from the international community can sustain and expand this momentum to develop a comprehensive control effort in all disease-endemic countries.

doi:10.1016/j.ijid.2008.05.133