

## Expected RATE of Vaccine-Associated Paralytic Poliomyelitis: A Simulation Analysis Regarding Transition from the Trivalent to Bivalent Oral Poliovirus Vaccine

Dear Editor,

Poliomyelitis is a preventable infection by vaccine. At present, natural disease exists in some countries, especially those in Africa. The vaccine-associated paralytic poliomyelitis (VAPP) is an unwanted adverse event of vaccination. Recently, transition from the trivalent to bivalent oral poliovirus vaccine becomes a global public health manipulation.<sup>[1]</sup> Thailand is a tropical country in Indochina that already implemented the transition (in April 2016).<sup>[2]</sup> Of interest, the study on overall poliovirus shredding rate in random collected stool in Thailand showed similar observed rates prior and post transition (estimated 0.44%).<sup>[3]</sup>

Here, the authors performed a mathematical model study to find the expected VAPP rate in Thailand. The primary included data for further analysis included: (a) frequencies of isolated vaccine-related poliovirus<sup>[4]</sup> and (b) the reported rate of VAPP in Thailand before transition of vaccine<sup>[5]</sup> [Table 1]. First, the frequencies of isolated vaccine-related polio virus strains were determined based on the available data.<sup>[4]</sup> The mentioned primary data are used for construction of mathematical model based on path probability calculation. The path probability is the chance that an event will occur if the event occurs in that path. In the present model, a path is a polio virus strain (PV1, PV2, or PV3). The final rate is calculated using the following formula “VAPP rate due to a polio virus strain = frequency of that strain × rate of VAPP before transition.”

**Table 1: Derive data according to mathematical modeling in the present study**

Parameters	Rate (%)	
	Before	After
Frequencies of isolated vaccine - related poliovirus	0.61	0.61
PV 1	0.153	0.305
PV 2	0.153	0
PV 3	0.304	0.305
VAPP rate before transition	<0.000033	To be studied

For pre-transition, the expected VAPP rates due to PV1, PV2, and PV3 are equal to less than 0.00001650%, 0.00001650%, and 0.00000825%, respectively. For post-transition, the expected rates of VAPP due to PV1, PV2, and PV3 are less than 0.00000165%, 0%, and 0.00000165%, respectively. The overall expected VAPP rate is equal to less than 0.00000330%. There is no change of mathematical model derived overall VAPP but there is a change of the strain specific rate. Now, the surveillance for VAPP according to PV1 and PV2 is still necessary.

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### Conflicts of interest

There are no conflicts of interest.

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