

## **Multiple Injections: Acceptability and Safety**

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### **Background**

To minimize the risks associated with OPV2 withdrawal, the Strategic Advisory Group of Experts (SAGE) recommends that all countries introduce at least one dose of Inactivated Poliovirus Vaccine (IPV) into their routine immunization schedule by the end of 2015. The IPV dose should be administered at or after 14 weeks of age; for example, at the same time as DTP3 vaccination in countries with a routine DTP vaccine schedule at 6, 10, and 14 weeks of age. The IPV dose should be given in addition to scheduled OPV doses and other scheduled vaccine doses.

### **Giving multiple injections**

When infants need three injections during the same visit, the first two vaccine injections are given in one thigh, with injection sites separated by at least 2 cm. The third injection is given in the other thigh.

**Vaccination schedules that involve multiple injections during the same visit are based on many years of pre-licensure and post-licensure safety and effectiveness data, including concomitant use studies.**

### **Advantages of multiple vaccinations**

Giving a child several vaccinations during the same visit offers three major advantages:

1. **Protecting children:** Immunizing children as soon as possible provides protection during the vulnerable early months of their lives. Often, diseases are more severe in babies.
2. **Fewer vaccination visits:** Giving several vaccinations at the same time means parents and caregivers do not need to make as many vaccination visits.
3. **Increasing efficiency:** It means that health care providers are able to more efficiently provide and deliver other health services by reducing the time they need to spend providing vaccinations.

## **Children in many countries receive multiple vaccine injections**

Globally, most middle and high-income countries have been using multiple injections for more than a decade without any untoward effects to infants or to the country immunization program. Data from middle and high-income countries have reinforced the well-established record of safety and acceptance of multiple injections. For example, in the United States, infants often receive 3 or more injections during each of the primary series vaccination visits.

Recently, more low and middle income countries have begun using multiple vaccine injections with the addition of pneumococcal vaccine and recently, inactivated poliovirus vaccine (IPV). For example, South Africa and Brazil have been using 3 simultaneous injections in their Expanded Program on Immunization (EPI) routine childhood immunization schedule.

### ***Case study – Brazil***

In Brazil, communication strategies targeting healthcare workers, professional societies, opinion leaders, and parents included materials and messages that focused on the safety of multiple injections, including vaccination visits that involved stand-alone IPV. The result was successful acceptance of multiple injections, including high IPV coverage (>90%) among infants after the first year after vaccine introduction, similar to DTP. National surveillance for Adverse Events Following Immunization (AEFI) demonstrated that multiple injections were well-tolerated and not associated with adverse events (and this included not being associated with fever, convulsions or hypotonic-hypo-responsive episodes).

## **Common health care provider and parent/caregiver questions about multiple injections**

It is common for the administration of multiple vaccines or injections to cause health care providers and parents to have questions or concerns. Typical questions and concerns about multiple injections include:

- Concerns about child's pain during vaccinations, such as "Will the child experience more pain or discomfort?"
- Confidence in vaccine effectiveness, such as "Will the vaccines be as effective as if given alone?"
- Concern about adverse events, such as "Is there a greater likelihood of a child experiencing an adverse event?"

As a result, immunization programs should be prepared to provide information related to those concerns and questions, and health care providers should be prepared and able to answer parent or caregiver questions about multiple vaccine injections. This document will help immunization programs and providers address the most common questions.

## **Health care providers play important roles in parent/caregiver acceptance**

Research and experience have shown that a health care provider's recommendations to parents and caretakers are very important. Parents and caregivers are willing to have their children receive multiple injections during the same visit if recommended by the provider and the provider can effectively address parent/caregiver questions and concerns about the safety and effectiveness of multiple vaccinations.

## **Will a child experience more pain or discomfort during vaccination when there are multiple injections?**

Health workers should acknowledge that children will likely experience slightly more pain or discomfort when there are multiple injections. However, they should remind parents the pain or discomfort from vaccination is very brief – and that even one injection can cause pain or discomfort, with children often not noticing the pain or discomfort caused by subsequent injections. If more immunization visits are used to provide children with need vaccinations that means there will be more times when children will experience pain or discomfort from vaccinations.

## **What helps parents become willing to have their children receive two or more injections during the same vaccination visit?**

There are three things that health care workers can do to help make parents become more willing to have their children receive two or more vaccine injections during the same visit:

1. **Provide reassurance:** A strong health care provider or worker endorsement of administration of multiple injections is essential to increase parent or caregiver acceptance.
2. **Provide clear responses to caregiver questions:** Health care providers or workers need to be able to effectively answer or address parent/caregiver concerns and questions related to the safety of multiple injections, the effectiveness of the vaccines, and child pain or discomfort.
3. **Minimize pain during immunization:** Health care providers or workers should take appropriate steps to decrease pain during immunization.

It is important to remember that additional vaccination visits mean children will have more stressful and painful vaccination experiences – not fewer. Also, spreading out vaccinations means parents/caregiver will have to schedule additional visits and bring children back. It may be very difficult for parents/caregivers to bring children back, and if children are not brought back, they will be unprotected from serious diseases.

### **Are there things that health care providers or workers can do to decrease or minimize the pain from multiple vaccine injections?**

Yes. There are things that health care providers can do when providing multiple injections to minimize pain. Studies have found that pain during immunization can be decreased by:

1. Having the child sit up to receive injections or by having a caregiver or provider hold an infant during the vaccinations;
2. Stroking the skin or applying pressure close to the injection site before and during injection;
3. Injecting the least painful vaccine first when two vaccines are being administered sequentially during a single office visit; and
4. Performing a rapid intramuscular injection without aspiration.

### **Is it safe for children to receive two or three injections of vaccines at one time?**

Yes. Children are given vaccines at a young age because this is when they are most vulnerable to polio, diphtheria, whooping cough (pertussis), Hib and pneumococcal disease. Vaccination schedules that involve multiple vaccine injections during the same visit are based on many years of pre-licensure and post-licensure safety and effectiveness data, including concomitant use studies. An infant's immune system is more than ready to respond to the very small number of weakened and killed antigens (bacteria and viruses) in vaccines. However, if exposed to a disease without having been vaccinated, an infant's immune system may not be strong enough to fight the disease.

### **Is it safe for children to receive three vaccine injections at one time at or near 14 weeks of age?**

Yes. An infant's immune system is more than ready to respond to the very small number of weakened and killed antigens (bacteria and viruses) in vaccines. From the time they are born, babies are exposed to thousands of germs and other antigens in the environment and their immune systems are readily able to respond to these large numbers of antigenic stimuli.

### **Wouldn't it be safer to separate vaccine injections and spread them out?**

No. Spreading out vaccinations leaves babies unprotected for a longer time. Further, the available scientific data show that simultaneous vaccination with multiple vaccines has no adverse effect on the normal childhood immune system. A number of studies have been conducted to examine the effects of giving various combinations of vaccines simultaneously. These studies have shown that the recommended vaccines are as effective in combination as they are individually.

### **Is IPV effective and safe when given in combination with other vaccines?**

Yes. IPV is equally effective when given alone or with the other vaccines. IPV does not interfere with mounting a good immune response to the other vaccines, and giving IPV simultaneously with other vaccines is as safe as giving the vaccines without IPV.

### **Can IPV be administered during the same visit as DTP/Penta, PCV, OPV or rotavirus vaccine?**

Yes. IPV can be administered together with vaccines routinely given to infants and children during immunization visits. Rotavirus vaccine can be administered together with DTP/Penta vaccine, Hib vaccine, IPV, hepatitis B vaccine, and pneumococcal conjugate vaccine. Available evidence suggests that rotavirus vaccine does not interfere with the immune response to these vaccines.

### **Is there any evidence that some multiple injections of vaccines may increase the risk for adverse events?**

In most cases, multiple injections carry no greater risk for adverse events. However, a recently published study found simultaneous administration of PCV13 and trivalent inactivated influenza vaccine resulted in greater incidence of fever in children under 12 months old and in children in the second year of life, increased febrile seizures. These risks must be balanced against the risk of disease if one of the vaccinations is deferred. For example, in the U.S., where this study was performed, the National Immunization Technical Advisory Group still recommends simultaneous vaccination. As noted above, numerous studies have shown adding IPV immunization does not result in higher incidence of significant adverse events.

### **Can many vaccines, given so early in life, overwhelm a child's immune system, suppressing it so it does not function correctly?**



There is no evidence that the recommended childhood vaccines can “overload” the immune system. In contrast, from the moment babies are born, they are exposed to numerous bacteria and viruses on a daily basis. Eating food introduces new bacteria into the body; numerous bacteria live in the mouth and nose; and an infant places his or her hands or other objects in his or her mouth hundreds of times every hour, exposing the immune system to still more antigens. When a child has a cold they are exposed to at least 4 to 10 antigens and bacterial infections of the throat and tonsils (e.g., “strep throat”) bring exposure to about 25 to 50 antigens.

*Adverse Events Associated with Childhood Vaccines*, a 1994 report from the United States Institute of Medicine, states: “In the face of these normal events, it seems unlikely that the number of separate antigens contained in childhood vaccines ...would represent an appreciable added burden on the immune system that would be immunosuppressive.”

## **Sources**

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