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Expanded Programme on Immunization Field Guide for Health Workers

Volume 1: Vaccine Administration & Programme Management

Family Health Unit

Health Services Planning and Integration

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MINISTRY OF HEALTH AND WELLNESS, JAMAICA

EXPANDED PROGRAMME ON IMMUNIZATION

FIELD GUIDE FOR

HEALTH WORKERS

Volume 1: Vaccine Administration & Programme Management

JANUARY 2024

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Abbreviations & Acronyms

AEFI	Adverse Events Following Immunization
AESI	Adverse Events of Special Interest
AFP	Acute flaccid paralysis
AIDS	Acquired Immune Deficiency Syndrome
Anti-HBs	Hepatitis B surface antibody
ARV	antiretroviral
BCG	Bacillus Calmette–Guérin
bOPV	Bivalent Oral Polio Vaccine
CDC	Centre for Diseases Control and Prevention
CHA	community health aide
CHDP	Child Health and Development Passport
cm	centimetre
CMO	Chief Medical Officer
CRS	Congenital Rubella Syndrome
DPT/Hep B/Hib	Diphtheria Pertussis Tetanus/Hepatitis B/Haemophilus Influenzae type b
DT	Diphtheria Tetanus
DTaP	Diphtheria Tetanus and Acellular Pertussis
DTwP	Diphtheria Tetanus and Whole Cell Pertussis
DT(A)	Diphtheria Tetanus (adult)
DT(P)	Diphtheria Tetanus (paediatric)
EPI	Expanded Programme on Immunization
ESAVI	Events Supposedly Attributable to Vaccination or Immunization
FHU	Family Health Unit
GBS	Guillain-Barré Syndrome
GE	gastroenteritis
HBIg	Hepatitis B immunoglobulin
HBsAg	Hepatitis B surface antigen
HBV	Hepatitis B Vaccine
HCW	Health Care Workers
HepA	Hepatitis A
HepB	Hepatitis B
Hib	Haemophilus Influenzae type b vaccine
HIV	Human Immunodeficiency Virus
HPV	Human Papillomavirus

HSCT	Haematopoietic stem cell transplant
ID	intradermal
IgG, IgM, IgA	immunoglobin G/M/A
IM	intramuscular
IPV	Inactivated Poliomyelitis Vaccine
IU	International Units
IV	intravenous
IVIg	intravenous immunoglobulin
kg	kilogram
MDVP	Multi-Dose Vial Policy
mg	milligram
mL	millilitre
MO(H)	Medical Officer (Health)
MOHW	Ministry of Health and Wellness
MMR	Measles-mumps-rubella vaccine
MPV	Meningococcal polysaccharide vaccine
NEJM	New England Journal of Medicine
NHF	National Health Fund
NSAIDS	non-steroidal anti-inflammatory drugs
NSU	National Surveillance Unit
OPV	Oral Polio Vaccine
ORT	Oral rehydration therapy
PAHO	Pan American Health Organization
PCV13	13-valent Pneumococcal Conjugate Vaccine
PEP	post-exposure prophylaxis
PCV	Pneumococcal Conjugate Vaccine
PHN	Public Health Nurse
p.o.	per ounce (by mouth)
PPV	Pneumococcal Polysaccharide Vaccine
RN	Registered Nurse
sc	subcutaneous
STI	sexually transmitted infection
TB	Tuberculosis
TIg	Tetanus immunoglobulin
tOPV	Trivalent Oral Polio Vaccine
UNICEF	United Nations Children's Fund
VAPP	Vaccine-Associated Paralytic Polio
VPD	vaccine-preventable disease
VVM	vaccine vial monitor
VZV	Varicella Zoster Virus

WHO	World Health Organization
YF	Yellow Fever
°C	degrees Celsius
µg	microgram
<	less than
>	greater than

Foreword

Infectious disease such as measles, polio, diphtheria, tuberculosis, influenza, pneumonia, yellow fever and cholera were the prevailing causes of morbidity and mortality in the early 1900's. At that time in Jamaica, life expectancy at birth was as low as 38 years with an alarming infant mortality rate of 100-200 deaths per 1,000 live births. Mass immunization campaigns were instituted as measures to control frequent outbreaks of measles and poliomyelitis, especially among children being the vulnerable population most affected.

The Expanded Programme on Immunization (EPI) was established by the World Health Organization (WHO) in 1974 to reduce illness and death due to vaccine-preventable diseases through the provision of routine vaccination services in the primary care system. The Pan American Health Organization (PAHO) launched the EPI throughout the Americas, including Jamaica and the English-speaking Caribbean, in September 1977.

Over the decades, vaccination has proven to be the most effective tool globally against infectious diseases, saving millions of lives annually. Through the successful national immunization programme, Jamaica recorded the last cases of:

- Poliomyelitis (Polio) in 1982
- Locally transmitted Measles in 1991
- Diphtheria in 1995
- Congenital Rubella Syndrome in 1998
- Rubella (German Measles) in 2000
- Newborn Tetanus in 2001

Jamaica is grateful for the health workers in the public and private sectors that have worked assiduously over the years to maintain robust surveillance of vaccine preventable diseases, safeguard the integrity of vaccines through maintenance of the cold chain, raise the awareness in the community on vaccination, administer vaccines and manage the immunization programme – all these efforts have enabled the achievement of high vaccination coverage rates in our children and ultimately a reduction of the impact of vaccine-preventable disease on our population. International agencies, such as the PAHO and United Nations Children's Fund (UNICEF), should also be lauded for the continuous technical cooperation and support, which has contributed to the success of the programme.

The national immunization programme continues to evolve in various respects, including: expansion of vaccination services beyond the main target of children to accommodate the life course approach; introduction of digital solutions for enhanced efficiency of programme administration and management; and widening of the stakeholder network to

strengthen advocacy and mobilization. The policy framework must therefore evolve in tandem with the changing landscape of the immunization programme to maintain and sustain its achievements, especially in the face of the growing threat of vaccine hesitancy globally and locally.

The ***Expanded Programme on Immunization Field Guide for Health Workers*** was developed as a reference document for health workers participating in the national immunization programme. The field guide seeks to establish standards, support training and provide guidance for health workers in key components of the immunization programme, namely: disease surveillance; vaccine supply, quality and logistics; advocacy, communication and service mobilization; monitoring and evaluation; and service delivery.

This version of the field guide is produced as three volumes:

- *Volume 1: Vaccine Administration and Programme Management*
- *Volume 2: Cold Chain and Vaccine Logistics Management*
- *Volume 3: Surveillance of Events Supposedly Attributable to Vaccination or Immunization (ESAVIs) and Vaccine-Preventable Diseases (VPDs)*

Thanks to the PAHO and UNICEF for their support in the preparation and production of this manual and special thanks to the co-opted members in the Ministry of Health and Wellness and Regional Health Authorities that participated in the revision of this document.

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Chapter 1: Introduction

1.1 Introduction to the National Immunization Programme

The Expanded Programme on Immunization (EPI) is an essential programme in the prevention and control of communicable diseases. It is responsible for the reduction of childhood mortality and morbidity since the mid-1990's. The successes of the immunization programme are also protected by the Immunization Regulations 1986 (amended 2013) which mandates that all children entering school must be adequately immunized. All vaccines provided to Jamaica's population for routine immunization through the Ministry of Health and Wellness (MOHW) are purchased with funding from the national budget through the Pan American Health Organization (PAHO) Revolving Fund for Vaccines and offered free of cost to the public.

Significant investments in technological solutions have been made in recent years which are expected to enhance information systems for coverage monitoring and vaccination supplies stock management.

Outlined below are the policy, goal, objectives and strategies of the immunization programme. All members of health team must familiarise themselves with the contents of this manual.

1.2 Policy

In keeping with The Immunization Regulations of 1986 (amended 2013) and the adolescent and adult vaccination policies, the following are essential:

- All children under 7 years of age must be adequately immunized prior to school entry (daycare, nursery, preschool, basic schools and primary schools, whether the institutions are publicly or privately operated). Additionally, all adolescents, adults and special groups must be appropriately vaccinated.
- The primary vaccination schedule should be completed within 1 year of birth or soon thereafter. Re-immunization or boosters may be needed from time to time.
- Exemptions may only be granted for medical contraindications.
- Immunizations will be provided free of charge to children, adolescents and other special groups in the public health service in accordance with the Ministry of Health and Wellness's schedule of vaccines.

1.3 Goal

- To prevent death and illness from vaccine-preventable diseases by protecting at least 95% of susceptible persons through vaccination achieved through an effective immunization programme

1.4 Objectives

- to immunize at least 95% of children by 0 – 11 months against tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, hepatitis B and *haemophilus influenzae* type b
- to immunize at least 95% of children 12 – 23 months against measles, mumps, and rubella
- to immunize at least 90% of girls by the age of 15 years against Human Papillomavirus (HPV)
- to immunize at least 95% of women of child-bearing age and pregnant women against tetanus and rubella to prevent neonatal tetanus and congenital rubella syndrome
- to prevent the reintroduction of yellow fever into Jamaica

1.5 Strategies and Activities

1. Administer BCG and Hepatits B birth-dose vaccination in hospitals and in postnatal clinics
2. Conduct routine immunization services in community, district and comprehensive health centres (types 1 to 5 health centres)
3. Provide immunization in school health programmes
4. Provide vaccination services for of travellers to endemic areas
5. Provide vaccination services at no cost to children and special groups
6. Use tracking registers to identify defaulters
7. Maintain and monitor drop-out lists
8. Conduct outreach sessions to include home visits in hard-to-reach areas
9. Organize periodic vaccination campaigns
10. Collect and analyse coverage data on a monthly basis to monitor the progress of the EPI
11. Conduct monthly monitoring of vaccination coverage by facility, health district, parish, regional and national levels

12. Conduct ongoing (daily) surveillance for vaccine-preventable diseases (with special emphasis on poliomyelitis, measles and rubella) and Events Supposedly Attributable to Vaccination or Immunization (ESAVIs)
13. Procure and maintain cold-chain equipment
14. Monitor the cold chain to ensure efficacy of vaccines
15. Ensure regular and consistent supply of quality vaccines and syringes/needles
16. Organize capacity building of health care providers, both in the public and private sectors
17. Conduct periodic evaluations of the immunization programme
18. Provide public education and social mobilization using all forms of media
19. Partner with the private sector (training, supply of vaccines and collection of coverage data)
20. Facilitate inter-sectoral collaboration (Ministry of Education and Youth; Ministry of Social Security)
21. Introduce new vaccines
22. Facilitate the smooth transition from child to family immunization

1.6 Family Immunization

Since the inception of the immunization programme, infants and young children have been the main target groups because they are the ones most at risk of contracting and succumbing to vaccine-preventable diseases. The immunization programme has evolved over the years to include vaccination throughout the life cycle to ensure protection of the family. This requires all members of the family to be adequately protected from vaccine-preventable diseases. All individuals should be assessed for their immunity to disease and advised accordingly. Special attention should be paid to adolescents, the elderly, persons living with disabilities and chronic illnesses, healthcare workers and other at-risk groups, such as frontline workers and those working in farming or animal husbandry.

At every contact with the health system, the patient should be questioned about vaccination. Efforts made to educate all clients on the importance of protection against vaccine-preventable diseases and to ensure that their immunizations are up to date. Health staff should include screening for vaccination at Casualty or Accident and Emergency departments of hospitals, as well as at clinics such as:

- Antenatal clinics
- Family Planning clinics
- Postnatal clinics
- STI/HIV clinics

- Chronic Diseases clinics
- Food Handlers' clinics
- Oral Health clinics
- School Medical clinics
- Curative clinics
- Mental Health clinics
- Adolescent Health clinics
- Adult Wellness clinics

1.7 Laws Governing Immunization in Jamaica

The Public Health Immunization Regulations 1986 (amended 2013) are part of the Public Health Act of Jamaica. According to the regulations:

- The Chief Medical Officer has the authority to approve the immunization schedule.
- Immunization may be performed by a public immunization officer or by a medical practitioner.
- Persons authorized to admit pupils to school *must require proof of immunization prior to admitting pupils to school or allowing their continued attendance.*

  N.B. Principals or administrators who fail to comply with these provisions are guilty of an offence and may be fined or imprisoned.

- Health care workers are legally responsible if they fail to seek out and immunize children, in accordance with the Immunization Regulations.
- Parents are also liable if they wilfully prevent their children from being vaccinated.
- Immunization performed by a public immunization officer, and any examination or certificate issued in connection therewith, shall be free of charge.

Refer to Appendix A for details of the Immunization Regulations 1986 (Amended 2013).

Chapter 2: Overview of the Expanded Programme on Immunization

2.1 Principles of Immunity

The Immune System

The immune system is the body's way of protecting itself from germs. It consists of specialized cells that fight bacteria, viruses and other substances foreign to the body, called antigens.

These specialized cells produce antibodies (protein molecules called immunoglobulins – IgG, IgM, IgA) to fight off invading organisms or foreign substances. A person who has been exposed to a disease or vaccine and who has developed immunity usually has antibodies specific to the disease detectable in his or her blood.

Types of Immunity – Active and Passive

Immunity to disease usually occurs when the body produces an immune response to a germ or foreign substance. This is active immunity. Vaccines usually produce active immunity.

Immunity to disease can also be given passively *when an individual receives antibodies from another human or animal*. Passive immunity lasts only a few weeks or months. Here are a few examples of passive immunity:

- A pregnant woman transfers her own antibodies to her foetus through the placenta
- A breastfeeding woman transfers her own antibodies to her infant through breastmilk
- A person receives a blood transfusion which contains some antibodies
- A person receives immune globulin

2.2 The Purpose of Vaccination

The purpose of vaccination is to give the body protection from a disease BEFORE the disease has a chance to cause illness. Vaccines contain weakened or killed/ inactive germs or parts of germs. Vaccination induces an immune response similar

to that of a natural infection, but without the development of signs and symptoms of the disease.

2.3 Types of Vaccines

Vaccines may consist of living or dead organisms, or components of dead organisms (such as their proteins). The contents of the vaccine influence how it should be handled and stored, as well as who should and should not receive the vaccine.

Some persons have poorly functioning immune systems, a condition known as immunosuppression or immunodeficiency. These persons require certain vaccines to protect against worsening of their condition and death. For example, persons with HIV/AIDS or cancer (e.g. leukaemia, lymphoma) may have difficulty fighting off various infections.

Some live vaccines can cause illness in persons who are immunosuppressed. It is important to know which live attenuated vaccines should and should not be given to immunosuppressed persons and their contacts. All other vaccines (killed, recombinant vaccines) help people with immunosuppression to be protected against deadly diseases.

In response to the COVID-19 pandemic, some relatively new vaccine platforms for SARS-CoV2 were developed. Two new platforms in use are: (1) viral vector vaccines, which can be divided into replicating and non-replicating, and (2) nucleic acid vaccines, which can be either deoxyribonucleic acid (DNA) or ribonucleic acid (RNA) vaccines. Details of these new platforms will not be discussed in this document but can be found in the World Health Organization (WHO) reference document – COVID-19 Vaccines: Safety Surveillance Manual, Second Edition.

2.4 Differences Between Live and Inactivated Vaccines

Live Attenuated Vaccines

These vaccines:

- are living bacteria and viruses that have been modified (weakened or attenuated) to reduce their ability to cause disease
- multiply in the body to produce an immune response
- will not work if they are damaged by light or heat. Handle carefully to avoid vaccine failure
- will not work if a person has circulating antibodies to the vaccine (e.g. due to injection of immunoglobulin or blood transfusion). The antibodies prevent the vaccine virus from multiplying and producing immunity
- should NOT be given to some immunosuppressed persons because severe and fatal reactions can occur
- in general, should NOT be given to pregnant women because of the theoretical risk of foetal infection

Vaccine virus from the oral polio vaccine can be transmitted from vaccinated persons to unvaccinated persons (horizontal transmission) through the faeco-oral route. This is of benefit in producing herd immunity.

Table 2.4. 1: List of Live Attenuated Vaccines

Live Attenuated Vaccines	
Live Attenuated Viral Vaccines Measles Mumps Rubella Oral Polio Yellow Fever Varicella (chickenpox) Vaccinia (smallpox) Influenza (intranasal)	**Live Attenuated Bacterial Vaccines** Bacillus Calmette-Guérin Oral Typhoid

Inactivated vaccines

These vaccines:

- consist of inactivated (dead) organisms, or parts of inactivated organisms
- are not alive and are, therefore, safe for people who have an immunodeficiency
- are unaffected by circulating antibodies

- need more than one dose to provide immunity against disease
- often require booster doses

The vaccine virus or bacteria is grown in a culture and then killed with heat or chemicals. Adjuvants (aluminum phosphate or aluminum hydroxide) are added to some inactivated vaccines to enhance immune response. They can be irritants to the skin. Therefore, they can cause local reactions at the injection site, especially if given superficially into the subcutaneous tissue. There is no evidence, however, that aluminum given in this way either exceeds the safety levels approved by the WHO or has any other untoward effects.

Despite the success of vaccination to greatly mitigate or eliminate threat of diseases caused by pathogens, there are still known diseases and emerging pathogens for which the development of successful vaccines against them is inherently difficult. In addition, vaccine development for people with compromised immunity and other pre-existing medical conditions has remained a major challenge. Besides the traditional inactivated or live attenuated, virus-vectored and subunit vaccines, emerging non-viral vaccine technologies, such as viral-like particle and nanoparticle vaccines, DNA/RNA vaccines, and rational vaccine design, offer innovative approaches to address existing challenges of vaccine development. They have also significantly advanced understanding of vaccine immunology and can guide future vaccine development for many diseases, including rapidly emerging infectious diseases, such as COVID-19, and diseases that have not traditionally been addressed by vaccination, such as cancers and substance abuse.[1]

[1] Brisse M, Vrba SM, Kirk N, Liang Y and Ly H (2020) Emerging Concepts and Technologies in Vaccine Development. Front. Immunol. 11:583077. doi: 10.3389/fimmu.2020.583077

Table 2.4. 2: List of Inactivated Vaccines

Inactivated Vaccines		
Whole Virus Vaccines IPV Influenza (injectable) Rabies Hepatitis A	**Whole Bacterial Vaccines** Pertussis (whole cell) Typhoid (injectable) Cholera Plague Anthrax	**Fractional Vaccines** (consist of parts of inactivated organisms) **Subunit Vaccines** Hepatitis B (surface antigen) Influenza Pertussis (acellular) *Haemophilus influenzae* type b Meningococcal Pneumococcal (conjugate & polysaccharide) **Recombinant Vaccines** Human Papillomavirus **Toxoids** Diphtheria Tetanus

2.5 More Information about the Immune Response

Most vaccines exert their protective effect by stimulating the production of antibodies – usually immunoglobulins (IgG and IgM). Some, including poliomyelitis and rubella, also induce surface acting IgA antibodies. BCG promotes a cell-mediated reaction detectable by the tuberculin skin test.

In an individual without prior exposure to natural infection, a first injection of an inactivated vaccine usually produces a low antibody response, predominantly involving IgM. After the initial injection, further vaccination at suitable intervals will result in an accelerated response, with the IgG antibody rising to a higher level. This is the secondary response. Thus, further injections can be expected to lead to prolonged high levels of antibody, usually sustained over many years. Following vaccination, exposure to the natural organism will lead to a similar immune response without (or with a modified) clinical illness.

If too little time has passed between doses of the same vaccine, antibodies persisting from the primary response will eliminate the vaccine (antigen), making the second dose ineffective. Hence, a 4-week interval is recommended between doses of the same vaccine.

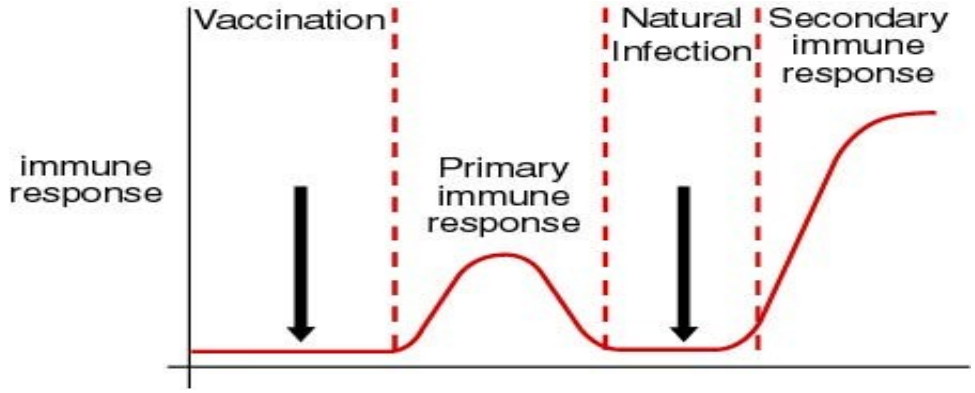


Figure 2.5. 1: The Immune Response[2]

2.6 General Guidelines for All Immunizations

> Individuals can be vaccinated against several diseases in a single visit to increase efficiency and reduce the risk of delinquency. Scientific studies have shown that when different vaccines are given at the same time, they are as effective as when given separately, and there is no increased risk of reactions or complications.

- If two injections of vaccine occur on the same day, they should be given on different sites of the body. For example, one injection in the right arm or thigh and the other injection in the left arm or thigh
- Vaccines should not be mixed in the same syringe unless they are designed for this purpose.

[2] Source: Mackett M, Williamson J.D., Human Vaccines and Vaccination. Oxford: Bios; 1995

- The recommended timing and spacing of vaccinations are shown in the Immunization Schedule (Table 2.7.1.1; Appendix B). The following general rules apply:

GENERAL GUIDELINES FOR ALL IMMUNIZATIONS

1. Health care workers should strive to immunize according to the schedule.
2. An appropriate interval must pass between doses of the same vaccine. If the second, third, or fourth dose in a series is given too early, it may not be protective.
3. Similarly, do not give a vaccine earlier than the recommended age. It may not protect the child.
4. If the interval between vaccinations exceeds the scheduled interval, do not re-start the schedule or add doses. Continue from where the schedule left off.
5. OPV and inactivated vaccines can be given at any time before or after each other as long as the immunization schedule is followed.
6. If doses of BCG, MMR, yellow fever and varicella vaccines are not given simultaneously, the vaccines should be separated by at least four weeks.
7. OPV and the inactivated vaccines can be given any time before or after BCG, MMR, yellow fever and varicella vaccines in keeping with the immunization schedule.
8. Immunoglobulins (antibodies) may interfere with the response to live viral vaccines. If an individual has received immune globulin or a transfusion before or after vaccination with a live attenuated vaccine, consult a paediatrician or the Family Health Unit to revise the patient's immunization schedule. This rule does not apply to post-partum immunization with MMR. Immediate post-partum immunization with MMR should continue despite blood transfusion or immune globulin given during pregnancy or the post-partum period.
9. Inactivated vaccines are not affected by immune globulin or transfusion.

2.7 The Immunization Schedule

Immunization is an integral part of Family Health Services. Jamaica's goal is to completely immunize all children, adolescents, special groups and women of childbearing age as early as possible in accordance with the National Immunization Schedule. The schedule is designed to minimize the number of clinic visits the client has to make for the purpose of immunization.

Generally, vaccinations can be given at any age. It is never too late for someone to be vaccinated. They are given throughout the life cycle. Adults and children over 7 years of age receive DT instead of DPT. Women of childbearing age should be up to date with their rubella and DT immunizations.

Immunization schedules vary from country to country and may be modified from time to time as new scientific evidence and vaccines emerge. The immunization schedule is, therefore, a guideline and is flexible.

Table 2.7. 1 Summary of routine immunization in Jamaica

Antigen	Children	Adolescents	Adults	Considerations
BCG	1 dose at birth	-	-	Exception: HIV
Polio	3 doses (6wks, 3mths, 6mths); 2 boosters (18mths, 4-6yrs)	-	-	Type of vaccine (bOPV, IPV). At least 2 doses with IPV for all children; IPV only for immunocompromised
DPT	3 doses (6wks, 3mths, 6mths); 2 boosters (18mths, 4-6yrs)	3rd booster with Td at 11-12yrs; adults as necessary if not fully immunized		Maternal Td immunization; Combination vaccines for children
Hepatitis B	Birth-dose; 3 doses (with DPT)	3 doses in high risk groups if not previously vaccinated		Combination vaccines for children
Haemophilus Influenzae type b	3 doses (with DPT)	-	-	High risk children (e.g. with SCD) get a booster at 15-18 months
Measles, mumps and rubella	2 doses (12 and 18mths)	1 dose (if not previously vaccinated with 2 doses in childhood)		-
HPV	-	1 dose for males & females 9-14yrs; 2 doses for females 15-26yrs		Immune-compromised get 3 doses

Vaccines for consideration outside of the routine schedule include influenza, meningococcus, yellow fever, pneumococcus, DTaP, COVID-19 and others, as deemed necessary.

2.7.1 Children

Children under two years of age are the main target group because they are at highest risk of illness due to vaccine-preventable diseases. The Immunization Schedule is designed to ensure young children are comprehensively immunized against the ten targeted diseases – *H. Influenzae type b, hepatitis B, tuberculosis, diphtheria, pertussis, tetanus, poliomyelitis, measles, rubella, and mumps* – before their second birthday. Booster doses of DPT and Polio vaccines are given prior to school entry.

Modifications to the recommended schedule may be needed because of missed appointments or illnesses. Interruption of a recommended series *does not* require restarting the series, regardless of the interval that has elapsed. Children who do not receive all their immunizations as per the national schedule can be given vaccines according to the catch-up schedule (Table 2.8.1).

See Table 2.7.1.1 for the immunization schedule by age, for children in Jamaica. Note also that additional vaccines may be available and given in the private sector.

Table 2.7.1. 1: Recommended Childhood Vaccination Schedule

Diseases	Recommended ages vaccines should be given								
	Birth	6 weeks	3 months	6 months	12 months	18 months	4-6 years	11-12 years	9-26 years
Tuberculosis (TB)	BCG								
Poliomyelitis		Polio	Polio	Polio		Polio	Polio		
Diphtheria, Pertussis (Whooping Cough), Tetanus		Penta, DPT or DT	Penta, DPT or DT	Penta, DPT or DT		DPT or DT	DPT or DT	DT	
Haemophilus Influenzae Type B		Penta or Hib	Penta or Hib	Penta or Hib					
Hepatitis B	Hep B	Penta or Hep B	Penta or Hep B	Penta or Hep B					
Measles, Mumps, Rubella					MMR	MMR			
Human Papillomavirus (HPV)									HPV*
	Above vaccines necessary for entry to nursery and basic school								
	Above vaccines necessary for entry to primary school								

*Females 9-26 years; Males 9-14 years

2.7.2 Adults and Older Children, Including Pregnant Women

The Human Papillomavirus (HPV) vaccine was introduced in Jamaica as part of the national immunization in October 2017. HPV vaccination in Jamaica is part of a coordinated and comprehensive approach to cervical cancer control that also includes secondary prevention through screening and treatment of adult women for pre-cancerous lesions, and tertiary and palliative care for women affected by cervical cancer. Refer to Chapter 5 for further details.

The MOHW provides certain vaccines for special populations in addition to traditional routine vaccination for children:

- women of childbearing age and pregnant women
- adolescents
- elderly
- persons living with disabilities and chronic illnesses
- people with wounds that require administration of DT

- contacts of persons infected with Hepatitis B
- health care workers
- travelers
- other at-risk groups (e.g. frontline workers, workers in farming or animal husbandry)

When a vaccine is given to an adult or adolescent for any reason, it must be recorded in the *older child and adult immunization register*, the health record and the client immunization card.

Table 2.7.2. 1: Catch-up Immunization Schedule for Adults and Children over 6 years: DT(A), Hepatitis B and MMR

Vaccine	First Contact	Second Contact (At least 4 weeks after first contact)	Third Contact (At least 6 months after second contact)	Fourth Contact (At least 1 year after third contact)	Fifth contact (At least 1 year after last contact)
DT(A)*	1st	2nd	3rd	4th	5th
Hep B	1st	2nd	3rd	---	---
MMR	1st	2nd			

* If the person has a vaccination history of receiving DPT refer to Table 5.4.2.1

Table 2.7.2. 2: Catch-up Immunization Schedule for Adults and Children over 6 years: Polio

Vaccine	First Contact	Second Contact (At least 4 weeks after first contact)	Third Contact (At least 4 weeks after second contact)	Fourth Contact (At least 4 weeks after third contact)	Fifth Contact (At least 4 weeks after fourth contact)
IPV/ OPV*	1st	2nd	3rd	4th	5th

*If at least one dose of OPV was administered prior to the national tOPV to bOPV switch in April 2016, then continue the schedule with OPV (that is, bOPV). If there in no history of polio vaccination prior to the national tOPV to bOPV switch in April 2016, then administer IPV on first and third contacts to protect against poliovirus type 2 and continue the schedule with OPV (that is bOPV) as long as there is no contraindication to the use of OPV.

In summary, adults and adolescents should have received in total the vaccines shown in Table 2.7.2.3.

Table 2.7.2. 3: Summary of adult and adolescent vaccines

Vaccine	Number of Required Doses
Tetanus	6 doses (in accordance with above schedules)
Diphtheria	6 doses (in accordance with above schedules)
Pertussis	5 doses
Hepatitis B	3 doses
Hib	3 doses
Polio	5 doses
Measles	2 doses
Mumps	1 or 2 doses
Rubella	1 or 2 doses
Human Papillomavirus	1, 2 or 3 doses

If the requisite numbers of doses have not been received, immunization should be updated. Additionally, adults should be reminded of the necessity to update immunization and to consider immunization requirements well in advance of overseas travel, tertiary education, employment in the police or military service, or healthcare sector.

See Chapter 5 for further details on vaccination of adults and older children.

2.8 Accelerated or 'Catch-up' Vaccination for Children

For children one to six years of age, with no history of vaccination, the health care worker should immunize according to the following schedules (Table 2.8.1). This

schedule is specific to older children and does not apply to those under the age of one.

Table 2.8. 1: Accelerated or 'Catch-up' Vaccination of Children 1-6 years of age[3]: BCG, DPT and Polio

Vaccine	*First Contact*	*Second Contact (At least 4 weeks after 1st immunization)*	*Third Contact (At least 4 weeks after 2nd immunization)*	*Fourth Contact (At least 6 months after 3rd immunization)*	*Age 4-6 years AND At least 6 months after last immunization*
BCG	1st	---	---	---	---
DPT	1st	2nd	3rd	4th	5th
IPV/ OPV*	1st	2nd	3rd	4th	5th

*If at least one dose of OPV was administered prior to the national tOPV to bOPV switch in April 2016, then continue the schedule with OPV (that is, bOPV). If there in no history of polio vaccination prior to the national tOPV to bOPV switch in April 2016, then administer IPV on first and third contact to protect against poliovirus type 2 and continue the schedule with OPV (that is bOPV) as long as there is no contraindication to the use of OPV.

Table 2.8. 2: Accelerated or 'Catch-up' Vaccination of Children 1-6 years of age: MMR and Hepatitis B

Vaccine	*First Contact*	*Second Contact (At least 4 weeks after 1st immunization)*	*Third Contact (At least 4 months after 1st immunization)*
MMR	1st	2nd	-
Hep B	1st	2nd	3rd

If a child between the ages of one and six years has never been vaccinated, priority should be given to MMR, polio and DPT. All these vaccines should be given to the child at the same time unless there are contraindications.

[3] Note that this schedule for DPT is aligned to the current CDC catch-up schedule for children four months to six years of age.

2.9 What is a Contraindication?

A contraindication is a circumstance that greatly increases the risk of a serious adverse reaction from vaccination. If there is a true contraindication, the client should not be vaccinated. There are few true contraindications to vaccination. Table 2.9.1 shows the contraindications that apply to all vaccines, as well as additional contraindications for specific vaccines.

Table 2.9. 1: Contraindications for Vaccines

Vaccine	Contraindication
All Vaccines	- Severe allergic reaction to the vaccine or any of its constituents - Moderate to severe acute illness, including fever >38ºC • This is a temporary contraindication; once illness or fever has resolved, the vaccine may be given • This does not apply to mild illnesses
BCG	- Immunosuppression/ Immunodeficiency - Positive tuberculin skin test - Extensive skin disease or burns - Pregnancy
DPT	- Encephalopathy within 7 days of a previous dose - The following reactions within 48 hours of a previous dose: • Temperature > 40.5ºC (105ºF) • Collapse or shock-like state (hypotonic-hypotensive episode) • Persistent, inconsolable crying for > 3 hours - Convulsions with or without fever within 3 days of a previous dose
Hepatitis B	- Severe allergy to baker's yeast
Hib	- Age < 6 weeks
OPV	- Immunosuppression / Immunodeficiency - Contact with immunosuppressed/immunodeficient person - Pregnancy
IPV	- Anaphylaxis to prior dose of IPV, streptomycin, polymyxin B, or neomycin
MMR	- Severe allergic reaction to prior dose of MMR, gelatin, neomycin‡ - Pregnancy - Severe immunodeficiency/immunosuppression - Receipt of transfusion or immune globulin within past 7 months or subsequent 14 days (consult physician to revise immunization schedule)

‡ Egg allergy is no longer considered a contraindication to MMR vaccination. Measles and mumps containing vaccines are produced in chick embryo fibroblasts; however, reactions to the vaccine have been shown to be related to other vaccine components (e.g. gelatin) and not to egg. Therefore, MMR may be given to children allergic to egg, with little associated risk.

2.10 False Contraindications to Vaccination

The following are not contraindications to vaccination:

- Mild illness such as (fever <38°C), cold or upper respiratory tract infection, mild diarrhoeal illness (≤ 2 episodes of loose stool per day), otitis media, asthma
- Premature birth or low birth weight
- Breastfeeding mothers and their infants
- Meningitis which has been treated
- Disease exposure or recent hospitalization
- Pregnancy in the household
- Allergies to products not in vaccine
- Family history unrelated to immunosuppression
- Need for TB skin testing
- Need for multiple vaccines
- Family history of convulsions
- Treatment with antibiotics, topical or inhaled steroids
- Local skin infections, eczema
- Children with Down's syndrome or cerebral palsy
- History of jaundice (yellow skin) at birth
- Infant of an HIV infected mother

In these circumstances, persons should be immunized according to the routine immunization schedule.

2.11 Special Populations

Pneumococcal, meningococcal, varicella zoster, hepatitis A, influenza, and yellow fever vaccines should also be considered for special populations of adults and children that are at risk.

Certain health conditions increase the risks associated with infectious disease. Children and adults with such conditions should be immunized as a matter of priority. Vaccination in special circumstances must be approved by the attending physician.

2.11.1 Preterm Infants

The risk of infectious disease is higher for preterm and infants with low birth weight than for other infants. Preterm infants should be immunized according to their chronological age (based on the usual immunization schedule), provided they have no medical contraindications. Further protection of the preterm infant should be ensured by immunization of the family and caregivers, including hospital personnel.

Preterm infants who develop chronic respiratory diseases can be given the influenza vaccine from age six months. This is dependent on the advice of the paediatrician.

2.11.2 Infants of Mothers with Hepatitis B

Infants of mothers who have Hepatitis B (acute or chronic), whether preterm or not, should receive a dose of Hepatitis B vaccine and a dose of Hepatitis B immunoglobulin at birth. The three other Hepatitis B doses should be given according to the regular schedule as part of the combination Pentavalent vaccine.

2.11.3 Infants in Hospital when Immunizations are Due

If an infant is still in hospital when other immunizations are due:

- Pentavalent (DPT/HepB/Hib) and Polio vaccine should be given at the scheduled time.
- OPV should be given upon discharge from the hospital (at the appropriate age) to avoid circulation of vaccine virus in hospital to patients who may be immunosuppressed.

2.11.4 Bleeding Disorders

For persons with thrombocytopaenia, haemophilia, or other bleeding disorders, consider the use of alternate vaccines that may be administered by the non-intramuscular route. Additionally, some vaccines that are usually administered IM may be given subcutaneously. Ensure that you check the product instructions.

If an IM injection is necessary:

- consult the patient's physician regarding the need for specific clotting factors or observation in hospital following vaccination.
- a fine needle (23 gauge or smaller) should be used for the injection.
- apply direct pressure (without rubbing) to the injection site for at least five minutes following injection.
- the patient or family should receive instructions regarding the risk of haematoma formation from the injection and what to do in case of an emergency.
- the patients should be warned against the use of NSAIDs

Patients who receive plasma-derived products, are at higher risk of contracting Hepatitis A and B, and should, therefore, be offered vaccination for these diseases.

2.11.5 Immunosuppression / Immunodeficiency

A poorly functioning immune system can be due to diseases or treatments (e.g. drugs, radiation.) People with immune responses which are inadequate or lower than usual are referred to as having immunosuppression or immunodeficiency.

Conditions characterized by immunosuppression or immunodeficiency are:

- congenital immunodeficiency
- chronic renal disease
- leukaemia, lymphoma or generalized malignancy (cancer)
- receipt of $\geq$ 20 mg of prednisone or > 2 mg/kg/day prednisone (or corticosteroid equivalent) for over two weeks, or widespread use of potent topical corticosteroids; MMR and varicella vaccines should not be given until 1 month after discontinuation of high dose corticosteroid therapy
- treatment with alkylating agents, antimetabolites, or radiation (e.g. for cancer); live vaccines should not be given until 3 months after therapy has been discontinued
- HIV

Remember that some persons who are infected with HIV have no symptoms and are only mildly immunosuppressed, while others with HIV are severely immunosuppressed. Certain live vaccines may be given to HIV+ individuals. Table 2.11.5.1, 2.11.6.1 and 2.11.6.2 show which vaccines may be given to HIV+ individuals and infants exposed to HIV

General recommendations for immunosuppression/immunodeficiency are as follows:

- Remember that the live vaccines are MMR, OPV, Yellow Fever, Varicella, Vaccinia (smallpox), Influenza (intranasal), BCG, and Oral Typhoid
- In general, live vaccines are contraindicated for immunosuppressed individuals
- OPV should not be given if there is an immunosuppressed person in the household. All other live vaccines can be given to close contacts of immunosuppressed persons because they are not transmitted from person to person
- Inactivated vaccines are safe and necessary for immunosuppressed or immunodeficient people. However, immune response to inactivated vaccines may be sub-optimal
- In addition to the routine immunization schedule, other vaccines (pneumococcal conjugate vaccine, pneumococcal polysaccharide vaccine, meningococcal polysaccharide vaccine, hepatitis A vaccine, influenza vaccine, IPV, and varicella vaccine) may be indicated for specific immune conditions. Immunosuppressed/immunodeficient persons and their family members should be given these vaccines on the advice of a physician

Live vaccines may be used in the following circumstances:

- patient regularly or intermittently uses inhaled corticosteroids
- previously healthy child receiving less than two weeks of corticosteroids
- previously healthy child receiving low to moderate dose (0.5-1 mg/kg/day) prednisone (or corticosteroid equivalent) long-term for a condition which is not of itself immunosuppressive
- use of corticosteroids in the skin or eyes, or in the form of intra-articular, bursal or tendon injections

Table 2.11.5. 1: Vaccination of Persons with Symptomatic and Asymptomatic HIV Infection

Vaccine	Give to Asymptomatic HIV+	Give to Symptomatic HIV+
BCG	Yes	No
DPT	Yes	Yes
OPV	Yes (2nd choice; recommend IPV)	No (recommend IPV)
IPV	Yes (1st choice)	Yes
MMR	Yes	Depends on severity of immunosuppression (e.g. CD4 count, symptoms); check with paediatrician before immunizing
Hepatitis B	Yes	Yes
Yellow Fever	No (a travel waiver may be needed)	No (a travel waiver may be needed)
Live Attenuated Influenza Vaccine (intranasal)	No (recommend Inactivated Influenza vaccine)	No (recommend Inactivated Influenza vaccine)
Inactivated Influenza Vaccine	Yes	Yes
Varicella	Consult paediatrician prior to vaccination	Consult paediatrician prior to vaccination
Hepatitis A	Yes	Yes
Meningococcal Polysaccharide Vaccine	Yes	Yes
Pneumococcal Conjugate & Polysaccharide Vaccines	Yes	Yes
HPV	Yes	Yes

2.11.6 HIV-Exposed Infants

All infants of HIV+ mothers may be exposed to the virus during delivery. Therefore, HIV-infected women are given antiretroviral prophylaxis.

Routine childhood immunizations are not hazardous to children born to HIV positive mother. These infants should follow the special immunization schedule in Table 2.11.6.1 until their HIV status can be confirmed.

Table 2.11.6. 1: Recommended Childhood Vaccination Schedule for HIV-exposed Infants

Age	Vaccine
Birth to 6 weeks	BCG **if asymptomatic** (paediatrician or physician should assess)
6 weeks	**1st IPV** 1st DPT/Hepatitis B/Hib (Pentavalent)
3 months	**2nd IPV** 2nd DPT/Hepatitis B/Hib (Pentavalent)
6 months	**3rd IPV** 3rd DPT/Hepatitis B/Hib (Pentavalent)
12 months	1st MMR **if the child is well**
18 months	1st Booster DPT/DT(P) **1st Booster IPV** 1st Booster MMR **if the child is well**
4-6 years	2nd Booster DPT/DT(P) **2nd Booster IPV**
11-12 years	3rd Booster DT
9-26 years	HPV **x 3 doses**

Asymptomatic children should receive the same immunization as other children (refer to Table 2.6.11.2). However:

- infants with HIV infection should be vaccinated with IPV rather than OPV. BCG is not recommended for symptomatic HIV infected individuals
- IPV should also be used to immunize household contacts of a child with HIV

Table 2.11.6. 2: Vaccine Schedule for Symptomatic and Asymptomatic HIV Exposed Infants[4]

Vaccine	Give to asymptomatic HIV exposed	Give to symptomatic HIV exposed	Optimal timing of immunization
BCG	Yes	No	Birth to 6 weeks
DPT or paed DT	Yes	Yes	6 weeks, 3 months, 6 months; boosters at 18 months, 4-6 years and 11-12 years
OPV	No	No	
IPV	Yes	Yes	
Hepatitis B	Yes	Yes	6 weeks, 3 months, 6 months
Hib	Yes	Yes	
MMR	Yes	No	12 months; booster at 18 months
Influenza (inactivated)	Yes	Yes	As for uninfected individuals
Pneumococcal Conjugate	Yes	Yes	
Varicella	Yes	Yes	
Rotavirus	Yes	Yes	
HPV	Yes	Yes	≥9 years (3 dose vaccination schedule: 2nd dose 1-2 months after 1st: 3rd dose 6 months after 1st)

2.11.7 Splenic Disorders (including Sickle Cell Disease)

Individuals may lack a spleen or may have a poorly functioning spleen due to:

- surgical removal (e.g. post-trauma)
- diseases such as sickle cell anaemia, thalassemia major, essential thrombocytopaenia, celiac disease or inflammatory bowel disease

[4] Adapted from MOHW pMTCT manual, 2020. Chapter 10.

- congenital asplenia

These conditions increase the risk of fulminant bacteraemia (bacteria in the blood), which is associated with high mortality rate, particularly among infants. The organisms that most commonly cause fulminant sepsis in these individuals are *Streptococcus pneumoniae* (most frequent), *Neisseiria meningitidis*, *Haemophilus influenzae* type b, and *Escherichia coli*. As such, the following additional vaccines are recommended:

- Pneumoccocal conjugate vaccine (PCV) up to the age of 5 years.
    - 3 doses: six weeks to 2 months; 3 to 4 months; and 6 months
    - booster dose at 12 to 15 months
- Pneumococcal polysaccharide vaccine (PPV or PPSV) for children at 4 years and older and adults.
- Meningococcal polysaccharide vaccine for children and adults over 2 years of age.
- Influenza vaccine annually for adults and children over 6 months of age.

2.11.8 Pregnant and Breastfeeding Women

Pregnancy does not constitute an absolute contraindication to the use of standard vaccines. There is no evidence of risk to the breastfeeding baby if the mother is vaccinated with any of the live or inactivated vaccines in the immunization schedule. Breastfeeding does not adversely affect immunization and is not a contraindication for the administration of any vaccine to the baby.

Inactivated vaccines may be given during pregnancy and are recommended when the risks of maternal or foetal infection and associated disease are high (e.g. tetanus, woman at high risk of complications from influenza). However, a precautionary position is taken in pregnancy. That is, if the risk of infection from a particular disease is not immediate and significant, then the relevant vaccine should be postponed until after the pregnancy. In some cases, the risk of exposure (and the need for vaccination) can be eliminated by changing travel plans.

Live vaccines are usually not given during pregnancy because of the *theoretical risk* of foetal infection. However, no adverse effects have ever been demonstrated from licensed vaccines (with the historical exception of smallpox vaccine). For example, even though the rubella vaccine virus can cause viremia, there is no evidence that rubella vaccine causes congenital rubella syndrome in infants born

to susceptible mothers vaccinated during pregnancy. For women who are vaccinated and then subsequently found to be pregnant, abortions are not recommended. It is not necessary to counsel women to avoid pregnancy following rubella vaccination because there is no known risk of adverse foetal outcome.

Pregnant women travelling to areas where the risk of yellow fever is high (e.g. ongoing epidemic) should receive live attenuated yellow fever vaccine. This is the only circumstance when yellow fever vaccine may be given during pregnancy.

Similarly, if a woman is at substantial risk of exposure to poliovirus and cannot complete the IPV series prior to the expected exposure, she should be given OPV.

Refer to Chapter 5 for more information on maternal and neonatal immunization.

2.11.9 Haematopoietic Stem Cell Transplant (HSCT)

- HSCT is given to patients who have received chemotherapy or radiation because of cancer, blood or immune disorders
- After HSCT, antibody titres to vaccine-preventable diseases decline. Therefore, patients must be re-vaccinated according to the recommendations of the treating physician
- Revaccination usually begins 1 year following HSCT, with the exception of influenza vaccination, which can begin 6 months after HSCT
- In general, live vaccines should not be given until 2 years post-transplant
- Consultation with the treating physician is recommended
- Patients are usually not vaccinated with varicella, pneumococcal and meningococcal conjugate vaccines

Chapter 3: Vaccines

3.1 Introduction

A vaccine is a product that induces immunity to a disease and can be administered by way of injections, by mouth, or by aerosol.

The objectives of this chapter are to:

1. describe the purpose, schedule, method of administration and storage of each vaccine
2. outline the contraindications and common adverse reactions to each vaccine in the immunization schedule

The vaccines that will be discussed in this chapter are:

- Bacillus of Calmette and Guérin
- Diphtheria Toxoid (Paediatric)
- Diphtheria Toxoid (Adult)
- Diphtheria, Pertussis and Tetanus
- Hepatitis B
- Haemophilus Influenzae type b
- Pentavalent
- Oral Poliovirus
- Inactivated Poliovirus
- Measles, Mumps and Rubella
- Human Papillomavirus
- Yellow Fever
- Meningococcal
- Varicella
- Pneumococcal
- Influenza
- Rotavirus

Any adverse reaction to vaccination should prompt the health care workers to complete an adverse event reporting form and forward it to the Family Health Unit, MOHW. Details of all adverse events should also be recorded in the adverse events register and the patient medical record.

3.2 Bacillus of Calmette and Guérin Vaccine: BCG

The vaccine contains live attenuated (weakened) *Mycobacterium bovis,* which protects against severe or disseminated Tuberculosis (TB) in children, especially severe form of the disease. It comes as a freeze-dried preparation (powder) that must be mixed with diluent for reconstitution.

Schedule

The vaccine:

- should be administered at birth, preferably within the first 24 hours of life, or as soon as possible thereafter
- should not be given to children over age 6 years or to adults
- should not be given within 4 weeks of administration of any other live vaccine as this can suppress the tuberculin reaction; see Figure 3.2.1 for the minimum time interval between administration of live vaccines

Figure 3.2. 1: Minimum Time Interval between Administration of Live Vaccines

Storage

- The vaccine should be stored between +2°C and +8°C in a refrigerator or vaccine carrier
- The vaccine should not be exposed to direct sunlight or heat
- BCG vaccine and diluent should be stored side-by-side
- The vaccine must be used within 6 hours of mixing

Method of Administration

- Read the pamphlet accompanying the vaccine to determine the dose. The usual dose is either 0.05 ml for infants less than 1 year old or 0.1 ml for infants 1 year and older
- Use a special syringe and needle to measure and inject such a small dose accurately. The choice of syringe and needle depends on the age of the child receiving the dose
    - 0.05ml syringe and 26G x 3/8 inch needle for children less than 1 year old
    - 0.1ml syringe and 27G x 3/8 inch needle for children 1 year and older
- Inject the vaccine intradermally (top layer of the skin) in the upper right arm. The same site is used for every child for ease of identification of the scar

Contraindications

These include:

- moderate to severe acute illness, including fever > 38°C
- immunosuppression due to drugs, radiation, cancer or other impairment of the immune system (e.g. hypogammaglobinaemia, impaired cell-mediated immune response, symptomatic HIV/AIDS)
- extensive active skin disease or burns
- a positive tuberculin skin test
- pregnancy

For BCG vaccination of very low birth weight and extremely low birth weight infants (<1.5 grams), there are insufficient data to assess safety, immunogenicity and efficacy. These cases should therefore be treated carefully.

Note that infants born to HIV infected individuals who are clinically well and immunologically stable should be vaccinated.

What to Expect Following Administration of BCG

- Once injected correctly a small raised lump will appear on the skin. This has an orange peel appearance and usually disappears within 30 minutes
- After approximately two weeks, a red sore or ulceration develops which is about the size of the end of an unsharpened pencil (10 mm)
- The sore heals after another one to three months. A small scar, about 5mm across, usually remains at the site of immunization

Adverse Reactions

These include:

- swelling of one or more lymph nodes in the child's armpit on the same side as the inoculation (Figure 3.2.2)
- a draining sinus over a lymph node
- abscess or ulcer at the injection site
- keloid formation (which can be avoided by injecting below the insertion of the deltoid muscle near the middle of the upper arm)
- rare complications include lupus vulgaris, erythema nodosum, iritis, osteomyelitis, anaphylaxis and disseminated BCG

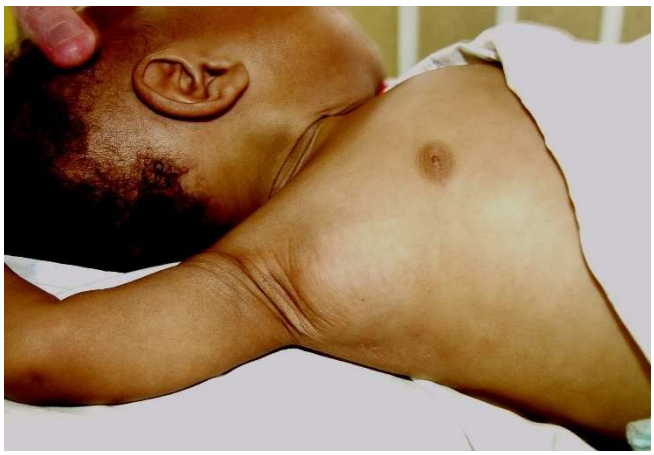


Figure 3.2. 2: Ancillary Lymphadenopathy[5]

[5] Source: Safe Vaccination Presentation, Technical Aspects, PAHO/WHO 2003

3.3 DT Paediatric Vaccine: DT(P)

The paediatric DT vaccine is a liquid that contains diphtheria and tetanus toxoids (DT). The vaccine is administered to infants and children in whom pertussis vaccine is contraindicated due to history of a febrile or afebrile convulsion according to the same schedule as the Pentavalent (DTwP/HepB/Hib).

Schedule

The vaccine should be administered:

- at 6 weeks, 3 months and 6 months of life
- to children between 7 and 10 years (DTwP should NOT be given over age 7)
- with a minimum interval of at least 4 weeks between doses

Storage

- The vaccine should be stored between +2°C and +8°C in a refrigerator or vaccine carrier
- Freezing damages the diphtheria and tetanus toxoids
- Perform the shake test described in Volume 2 to check if DT Paediatric vaccine has been frozen

Method of Administration

- The standard dose is 0.5 ml
- Infant <18 months of age should receive the vaccine via IM injection in the anterolateral aspect of the thigh muscle (vastus lateralis), at the junction of the middle and upper third
- Older child ≥ 18 months of age (i.e. for all booster doses) should receive the vaccine via IM injection in the deltoid muscle of the upper arm

Contraindications

These include:

- moderate to severe acute illness, including fever > 38°C. DT immunization should be postponed until the child is well
- history of a severe allergic reaction to a previous dose of DT vaccine

Adverse Reactions

These include:

- swelling, pain, and redness at the injection site
- a small painless nodule at the injection site; this usually disappears after a few weeks
- malaise, fever and headache
- abscess at the inoculation site
- rare reactions such as:
    - anaphylaxis
    - generalized urticaria
    - neurological reactions (brachial neuritis and Guillain-Barré Syndrome)
    - exaggerated local reaction involving extensive painful swelling between the shoulder and elbow. This local reaction is thought to occur in persons who have received frequent doses of diphtheria and tetanus toxoids

3.4 DT Adult Vaccine: DT (A), DT or Td

The adult DT vaccine is a liquid that contains tetanus toxoid and a lower dose of diphtheria toxoid than is present in the paediatric DT vaccine. In Jamaica, adult DT vaccine is administered to persons beginning at age 10 years and can be administered to a child as young as 7 years if the paediatric DT is unavailable.

Schedule

The vaccine should be administered to:

- persons 10 years and older for primary immunization or boosters
- pregnant women to prevent the occurrence of maternal and neonatal tetanus. Pregnant women who are partially immunized or have never been immunized should complete the series in accordance with Tables 5.4.1.1 and 5.4.1.2 respectively.
- special high-risk populations such as farmers, persons living with diabetes, elderly, carpenters, and those of similar occupational hazards, as well as those who received a wound (refer to Table 3.4.1 for requirements for DT vaccination and TIG administration for persons with wounds)

- other adults who have never been immunized should follow the adult and adolescent schedule in Chapter 2 (Table 2.7.2.1) to receive 5 doses of DT vaccine.

The minimum interval between doses is 4 weeks.

> Adults who have received a total of 5 or 6 doses of tetanus toxoid (as part of DT, DPT, or Pentavalent (DTP/HepB/Hib)), either in childhood or adulthood, should not routinely be given booster doses, other than at the time of tetanus prone injury. The practice of routine booster doses for adults beyond the recommended regime can be associated with severe local reactions.

Table 3.4. 1: Requirements for DT immunization and TIG following injury to a person with normal immune system[6]

	Clean, Open, Minor Wound (not deep, not due to puncture, <6hrs old)		All Other Wounds (contaminated with saliva, stool, soil or other foreign matter, major tissue damage, more than 6 hrs old, due to puncture, or very deep)	
Vaccination received	DT	TIG	DT	TIG
Primary series & DT within 5 years	No	No	No	No
Primary series & DT within 5-10 years	No	No	Booster DT	No
NO DT in past 10 years, but received ≥ 3 doses in lifetime	Booster DT	No	Booster DT	No
< 3 DT in lifetime or status unknown	Complete adult DT series (5 doses)	No	Complete adult DT series (5 doses)	Yes

Note: DT vaccine and TIG may be given at the same time as long as they are injected into different limbs, using separate syringes.

Storage

- The vaccine should be stored between +2°C and +8°C in a refrigerator or vaccine carrier
- Freezing damages the diphtheria and tetanus toxoids
- Perform the shake test described in Volume 2 to check if DT Paediatric vaccine has been frozen

[6] Adapted from: Center for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases. Hamborsky J, Kroger A, Wolfe S, eds. 13th ed. Washington D.C. Public Health Foundation, 2015.

Method of Administration

- The standard dose is 0.5 ml
- The vaccine should be administered via IM injection vaccine in the deltoid muscle of the upper arm

Contraindications

These include:

- moderate to severe acute illness, including fever > 38°C. DT immunization should be postponed until the child is well
- history of a severe allergic reaction to a previous dose of DT vaccine

Adverse Reactions

These include:

- swelling, pain, and redness at the injection site
- a small painless nodule at the injection site; this usually disappears after a few weeks
- malaise, fever and headache
- abscess at the inoculation site
- rare reactions such as:
    - anaphylaxis
    - generalized urticaria
    - neurological reactions (brachial neuritis and Guillain-Barré Syndrome)
    - exaggerated local reaction involving extensive painful swelling between the shoulder and elbow. This local reaction is thought to occur in persons who have received frequent doses of diphtheria and tetanus toxoids

3.4.1 Prevention of Tetanus following Injury

a) *For a clean minor wound (e.g. open, not contaminated, not deep, not due to puncture, less than 6 hours old, negligible tissue damage):*
    - Tetanus immunoglobulin (TIG) is not necessary

- a DT booster should be given as soon as possible if someone received a primary series (3 doses of tetanus toxoid as DT, TT, DTwP or Pentavalent (DTwP/Hib/HepB)), but more than 10 years have passed since the last dose
- a complete adult series should be started as soon as possible if the immunization history is unknown or 0 doses were received in the person's life

b) *For any other type of wound (e.g. contaminated with saliva, stool, soil or other foreign matter, major tissue damage, more than 6 hours old, due to puncture, or very deep):*
   - TIG may be indicated if the immunization history is unknown or the person has received fewer than three doses of DT in their lifetime, because early doses of toxoid do not induce immunity. TIG serves as an anti-toxin, thereby providing temporary passive immunity
   - a DT booster should be given if the person received a primary series (three doses of tetanus toxoid as DT, TT, DTwP or Pentavalent (DTwP/Hib/HepB)), but more than five years has passed since the last dose
   - a complete adult series of DT (five doses) should be given if the immunization history is unknown or zero to two doses were received in the person's lifetime
   - antibiotics are needed, and the decision should be considered on a case by case basis for the prophylaxis of wound infection

c) *For unclean wound in a person with impaired immunity (e.g. HIV infection):*
   - Such a person should ideally be hospitalized

Tetanus Immune Globulin (TIG)

TIG may be needed, depending on the immune problem, age of the patient and vaccination history; a physician should be consulted.

TIG is issued in ampoules, each containing 250 IU. Ampoules should be protected from light and stored in a refrigerator at +2° to +8°C. TIG must never be frozen.

If a patient requires TIG for *prevention* of tetanus:

- For patients under age 7 years: administer 4 units TIG/ kg intramuscularly (Hospital for Sick Children Toronto dose)
- For patient over age 7 years: administer 250 IU of TIG intramuscularly
- For highly tetanus-prone wound (more than 24 hours have elapsed since injury, it is a burn related injury, or there is a risk of heavy contamination): >250 IU TIG may be needed (consult specialist)

Note: Human intravenous immunoglobulin (IVIG) contains some tetanus immune globulin and has been given in cases where tetanus immune globulin is unavailable.

The optimal dose of TIG for *treatment* of Tetanus disease has yet to be established. Doses as high as 3,000-6,000 IU have been recommended, however, 500 IU is enough to neutralize systemic antibodies.

3.5 Diphtheria-Tetanus-Whole Cell Pertussis Vaccine: DTwP

The vaccine is a liquid that contains Diphtheria toxoid, Tetanus toxoid and killed whole cell Bordetella pertussis.

Schedule

- The vaccine should be administered
  - to infants at 6 weeks, 3 months and 6 months of age as part of the Pentavalent (DTwP/Hib/HepB) vaccine or on its own as DTwP vaccine
  - at 18 months and 4-6 years on its own as booster doses
- The minimum interval between doses of DTwP is 4 weeks, if given separately from the Pentavalent (DTwP/Hib/HepB)

Storage

- The vaccine should be stored between +2°C and +8°C in a refrigerator or vaccine carrier
- Freezing damages the diphtheria and tetanus toxoid components of the DTwP
- Whole cell pertussis is damaged by heat
- If DTwP vaccine stands for a long time, granules separate from the liquid and look like fine sand at the bottom of the vial. Shaking the vial mixes the vaccine and gives a homogenous suspension
- Perform the shake test described in Volume 2 to check if DTwP vaccine has been frozen

Method of Administration

- The standard dose is 0.5 ml
- The vaccine should be administered by intramuscular injection
- For infants <18 months of age: inject the vaccine into the antero-lateral aspect of the thigh muscle (vastus lateralis), at the junction of the middle and the upper third
- For older children ≥ 18 months of age (i.e. for all booster doses): inject the vaccine into the deltoid muscle of the upper arm

Contraindications

DTwP vaccine should not be given to:

- children over 7 years of age as adverse reactions to the pertussis component are more likely in older children and adults
- children with moderate to severe acute illness, including fever > 38°C. DTwP immunization should be postponed until the client is well
- Children with a history of a severe allergic reaction to a previous dose of DTwP vaccine

Adverse Reactions

These include:

- fever: usually appears within 3-6 hours, but can be seen up to 48 hours post-vaccination
- Local reactions (swelling, redness, and tenderness): usually resolve by themselves and require no therapy

> Acetaminophen (Paracetamol) may help to reduce adverse effects of the vaccine and may be given before the immunization and every 4-6 hours thereafter, as needed.

- a painless lump at the injection site: usually disappears on its own
- irritability, malaise and other non-specific symptoms (e.g. drowsiness, decreased appetite) in up to 55% of children: usually resolve on their own, but symptomatic treatment, including an aspirin-free antipyretic (e.g. paracetamol), may be given

- an abscess: may develop at the site of injection a week or more following vaccination. This can happen for several reasons including the vaccine not being injected deep into the muscle

Rare and severe reactions which may prevent further vaccination with DTwP-containing vaccines, such as:

- encephalopathy, a disorder of the brain which presents with major changes in consciousness or behaviour and/or seizures, within 3 days of immunization. This may occur in children who were previously healthy and usually does not cause chronic harm
- convulsions (i.e. seizures) within 3 days of immunization
- inconsolable crying lasting ≥ 3 hours within 48 hours of immunization
- collapse or shock-like state (hypotonic hypotensive episode) within 48 hours of immunization
- high fever > 105°F (≥40.5°C) not due to another identifiable cause within 48 hours of immunization
- exaggerated local reaction (extensive painful swelling between shoulder and elbow)
- anaphylaxis; generalized urticaria (hives)
- peripheral neuropathy (e.g. brachial neuritis, GBS)

If any of the severe reactions occurs, a doctor's advice should be sought before giving a future dose of DTwP-containing vaccine. The physician may recommend giving DT instead of DTwP or using an aspirin-free antipyretic to reduce the risk of future febrile convulsions.

If a third dose of DPT has been administered, and at least 6 months have elapsed since the last convulsion, DPT can be continued.

In the case of history of a seizure a thorough physical exam and history with lab tests must be done to evaluate whether an evolving neurological disorder is present. If not present, DPT can be continued.

3.6 Hepatitis B Vaccine: HBV

The vaccine contains Hepatitis B surface antigen (HBsAg) adsorbed to aluminum hydroxide and is available in 2 preparations:

1. part of the combination Pentavalent (DTwP/HepB/Hib) vaccine, or
2. a single (monovalent) vaccine preparation that does not need to be mixed

The preparations come as single dose vials for paediatric and adult formulations and 10 dose vials for the adult formulation.

Schedule

- The vaccine should be administered:
  - to newborns at birth ("zero dose") within the first 24 hours of life, to prevent mother-to-child transmission of Hepatitis B, using the monovalent vaccine
  - to infants at 6 weeks, 3 months and 6 months of age as part of the Pentavalent (DTwP/HepB/Hib) vaccine or as Hep B single vaccine preparation when Pentavalent is contraindicated
- The birth dose of hepatitis B vaccine can be co-administered with Bacillus Calmette–Guérin (BCG) vaccine
- The minimum interval between the "zero" and first doses, and the first and second doses, is 4 weeks. The third dose should be given at least 2 months after the second dose and at least 4 months after the first dose
- Vaccination of the following groups of persons is recommended:
  - persons at high risk of infection such as health care workers, emergency care staff and other persons with the risk of occupational exposure to infected blood and other body fluids, according to the schedule in Table 2.7.2.1
  - persons at risk of Hepatitis B infection (e.g. contacts of cases, prisoners, transplant recipients, injecting drug users, etc.), if the primary series is not already completed
- For adults and adolescents, the first two doses are given 4 weeks apart and the third dose is given six months after the first dose
- Persons with normal immune systems currently require no boosters
- Persons with poor antibody response to the vaccine (e.g. haemodialysis patients) may require booster doses and should have their antibody levels tested per physician instructions.

Storage

- The vaccine should be stored between +2°C and +8°C in a refrigerator or vaccine carrier
- If Hepatitis B vaccine stands for a long time the granules separate from the liquid and look like fine sand at the bottom of the vial. It must be mixed by shaking
- Freezing and heat destroy the potency of the vaccine
- Perform the shake test described in Volume 2 to check if the vaccine has been frozen

Method of Administration

- Dose and route of administration vary according to client characteristics and are shown in Table 3.6.1
- If not being administered as Pentavalent, do not inject Hep B and DTwP in the same site.

Table 3.6. 1: Recommended Dose and Route of Administration for Single Preparation Hepatitis B vaccines

Population	Dose	Route
Infants up to 18 months	0.5 ml (10µg)	Inject into the muscle of the antero-lateral thigh (IM)
Children ≥ 18 months and adolescents (up to 19 years of age)	0.5 ml (10µg)	Inject into the deltoid muscle of the upper arm (IM)
Adults ≥ 20 years of age	1 ml (20µg)	Inject into the deltoid muscle of the upper arm (IM)
Adults who may have lower than normal antibody response (hyporesponsive) e.g. haemodialysis patients	To be advised by physician 2 ml (40µg)	Inject into the deltoid muscle of the upper arm (IM)

Contraindications

Hepatitis B vaccine should not be administered to persons with:

- moderate to severe acute illness, including fever > 38°C. Immunization should be postponed until the client is well
- a history of anaphylaxis after a previous dose of Hepatitis B vaccine
- allergy to yeast (Hepatitis B vaccine is developed in baker's yeast)

Adverse Reactions

- Mild fever may occur for 1 to 2 days after vaccination in < 6% of patients
- Soreness and redness at the injection site occurs in 3-9% of children and 13-29% of adults
- Mild systemic symptoms such as fatigue, headache and irritability may occur in 0-20% of children and 11-17% of adults
- Rare adverse reactions include:
    - a combination of fever, rash and malaise
    - flu-like syndrome, with joint/muscle pains and abnormal liver function

3.6.1 Post-Exposure Prophylaxis to prevent Hepatitis B Infection

Persons exposed to Hepatitis B require vaccination to prevent infection. They may also require Hepatitis B immune globulin (HBIG). HBIG can be given at the same time as Hepatitis B vaccine but should be given at a different anatomic site.

Exposures that may require Hepatitis B vaccine and HBIG include:

- an infant born to a woman who is HBsAg-positive
- an infant living with a caregiver who is HBsAg-positive
- exposure to blood, blood products or bodily fluids (e.g. needle stick injury)
- household contact or sexual partner of person with acute or chronic Hepatitis B infection

In the absence of post-exposure prophylaxis, vertical transmission of Hepatitis B is highly efficient; 70-90% of infants of HBsAg and HBeAg positive mothers will contract the virus.

1. *Infant born to a woman who is HBsAg-positive (acute or chronic HBV infection)*

- Give Hepatitis B single preparation vaccine within 12 hours of birth
- Continue with the routine vaccination schedule at six weeks, three months and six months, so that the child receives four doses of Hepatitis B vaccine (one single vaccine preparation at birth and three Pentavalent doses)
- Give 0.5 ml HBIG intramuscularly immediately after birth and within 48 hours; efficacy of HBIG declines significantly after 48 hours. It may be given at the same time as HBV in the contra-lateral site
- Give HBV vaccine and HBIG at the first opportunity if they cannot be given within the above time frames because of extenuating circumstances
- Give premature infants HBV and HBIG at birth as described above. The paediatrician may, however, wish to alter the timing of the next dose of HBV vaccine

Table 3.6.1. 1: Immunization Schedule for Infants who require Hepatitis B Vaccination at Birth

Birth	1) BCG* 2) **Hepatitis B Vaccine** 3) HBIG
6 Weeks	1) Pentavalent (DTwP/Hib/**Hep B**) 2) Polio
3 Months	1) Pentavalent (DTwP/Hib/**Hep B**) 2) Polio
6 Months	1) Pentavalent (DTwP/Hib/**Hep B**) 2) Polio

*If mother is HIV positive and HBsAg-positive, no BCG is given until review of the infant's health by a physician. Hepatitis B and BCG vaccines can be given to asymptomatic infants.

For babies born to Hepatitis B positive mothers, serum antibody levels should be done at about nine months old to confirm seroconversion.

2. *Infant (< 12 months) has a primary caregiver (e.g. mother or father) that has acute or chronic HBV infection:*

- Continue with all doses of HBV vaccine as per the routine schedule if the first or second doses were already given

- Give 0.5 ml HBIG IM and first dose of HBV vaccine in separate sites if the infant has never been vaccinated against Hepatitis B, then continue with the routine HBV vaccination schedule

3. *Percutaneous or mucosal exposure to HBV infected blood, blood products or bodily fluids (e.g. needlestick injury, household contact such as razor or toothbrush, sexual contact with acutely infected person)*

a) If the exposed person has never been immunized against Hepatitis B:

- give a dose of HBIG (0.06 ml/kg for older children, adolescents and adults or 0.5 ml for infants) and a dose of HBV in contra-lateral anatomic sites as soon as possible following exposure**.**
- these injections should be followed by additional doses of Hepatitis B vaccine according to the routine schedule, unless the person has been infected with Hepatitis B from the exposure
- antibodies to Hepatitis B should be determined at the time of exposure to guide future decision-making
- if HBIG and HBV vaccine are given within 7 days of needle-stick exposure and within 14 days of sexual exposure, and followed up with the full series for HBV vaccine, 75% of Hepatitis B infections will be prevented (NEJM 2004).

b) If the exposed person has been previously immunized:

- give a booster dose of vaccine as soon as possible following exposure, unless they are known to have protective levels of antibody
- they should be tested to determine their anti-HBs antibody level, and given HBIG if it is less than 10 IU/L
- the need for follow-up vaccination with HBV vaccine should be determined by a physician on the basis of testing the anti-HBs titer 6 months following HBIG

4. *Household contacts and sexual partners of person with acute or chronic Hepatitis B infection*

- These persons will require the routine HBV vaccine series
- Note that sexual contacts of persons with chronic Hepatitis B do not require HBIG, but should be fully vaccinated against Hepatitis B. HBIG would be given in case of exposures listed above

Note that the exact dose of HBIG to be given must be determined by the clinician managing the patient.

3.7 *Haemophilius Influenzae* Type b Vaccine: Hib

The Hib vaccine is an inactivated vaccine that contains parts of the *H. influenzae* type b bacteria and protects against various diseases caused by the organism. It is available in 3 preparations:

1. a single vaccine preparation which is lyophilized (freeze-dried) and must be reconstituted with a diluent
2. a single liquid vaccine preparation that does not need to be reconstituted
3. part of a combination vaccine such as the Pentavalent (DTwP/HepB/Hib) vaccine

> Children who start a course of Hib vaccine on one manufacturer's product can have the course completed with another product, should the need arise.

Schedule

- The vaccine should be administered to infants at 6 weeks, 3 months and 6 months as part of the Pentavalent (DTwP/HepB/Hib) vaccine or a single vaccine preparation when Pentavalent vaccine is contraindicated
- The minimal interval between doses is 4 weeks
- In Jamaica, booster doses are not routinely given in the public sector after the primary series although it may be given privately
- Although Jamaica does not routinely immunize children over 1 year of age with Hib vaccine, children 1 to 4 years of age who have never been immunized against Hib may be given a single dose of Hib vaccine

> Children aged 1-4 years are at a lower risk of disease and therefore only one dose is needed. The incidence of invasive disease from Hib falls sharply after four years of age.

- Though routine immunization of older children and adults is not recommended, in some rare instances a doctor may recommend that clients in high-risk groups such as persons with functional or anatomic asplenia, or immunocompromised persons, need to be vaccinated

Storage

- The vaccine should be stored between +2°C and +8°C in a refrigerator or vaccine carrier
- Freezing damages the Hib vaccine

Method of Administration

- The standard dose is 0.5 ml
- The vaccine should be administered by intramuscular or deep subcutaneous injection
- For infants < 12 months old, inject vaccine into the anterolateral aspect of the thigh muscle (vastus lateralis), at the junction of the middle and upper third
- For children > 12 months up 48 months who were never previously immunized, inject the vaccine into the deltoid muscle
- For adults (in high risk groups as described above), Hib vaccine is injected into the deltoid muscle
- The vaccine should be given in a different limb from other vaccines given at the same time

Contraindications

Hib vaccine should not be given to persons:

- with moderate to severe acute illness, including fever > 38°C. Immunization should be postponed until the client is well
- With a history of anaphylaxis to a previous dose of Hib vaccine
- age < 6 weeks

Adverse Reactions

- These include swelling, redness, and pain at the injection site in 5-30% of vaccines. These usually resolve within 24 hours. Local reaction does not preclude further immunization against Hib
- Systemic reactions (fever, irritability) and severe reactions are rare

3.8 Pentavalent Vaccine: DTwP/HepB/Hib, Penta

The Pentavalent vaccine used in Jamaica is a combination of the following five (5) antigens:

1. Diphtheria toxoid
2. Tetanus toxoid
3. Inactivated whole cell *Bordetella pertussis*
4. Hepatitis B
5. *Haemophilus influenzae* Type b

The vaccine comes in a liquid form as a single dose vial. It is sometimes presented as two separate forms in single dose vials, with the Hib component in a freeze-dried solid form and the premixed diphtheria, pertussis, tetanus and hepatitis B components prepared in a liquid form which is used to reconstitute the freeze-dried Hib component.

Schedule

- The vaccine should be administered to infants at 6 weeks, 3 months, and 6 months of age
- Only infants under 1 year of age should receive Pentavalent
- The minimum interval between the first and second doses is 4 weeks
- The minimum interval between the first and third doses is 4 months because of the Hepatitis B component

Storage

- The vaccine should be stored in the refrigerator or vaccine carrier between +2°C and +8°C
- The Pentavalent vaccine is damaged by freezing
- Perform the shake test, as described in Volume 2, to check if the vaccine has been frozen

Method of Administration

- The standard dose is 0.5 ml
- The vaccine should be administered via intramuscular or deep cutaneous injection

- Inject the vaccine into the muscle in the outer part (anterior lateral aspect) of the thigh
- The vaccine can be administered subcutaneously to patients with thrombocytopaenia or bleeding disorders, but this should be done under supervision of a physician

Contraindications

The vaccine should not be given to persons with:

- moderate to severe acute illness, including fever > 38°C. Immunization should be postponed until the client is well
- history of anaphylaxis or severe reaction to a previous dose of Pentavalent vaccine or any of its components
- presence of a contraindication to any vaccine or other component of the vaccine

Adverse Reactions

- Reactions may be similar to those observed for other DTwP vaccines currently in use and usually last only a few days
- Refer to the preceding sections for adverse reactions which may occur with administration of individual vaccine components
- Common reactions include:
    - redness (>2 cm), swelling (>2 cm), and pain at the injection site within 48 hours
    - fever, unusual crying and irritability

3.9 Oral Polio Vaccine: OPV

OPV is a liquid that comes in a small bottle that works with a dropper and comes as a multi-dose preparation.

- *Bivalent OPV* (bOPV) protects against two types of poliovirus. It contains weakened live strains of poliovirus types 1and 3. This is the main type of OPV used for routine vaccination.

- *Monovalent OPV* (mOPV) protects against 1 type of poliovirus. It contains a weakened live strain of poliovirus type 1, 2 or 3.

Note that type 2-containing OPV vaccine (mOPV2) is used exclusively in outbreak response to type 2 poliovirus

Schedule

- The primary series for polio is given at 6 weeks, 3 months and 6 months. Both Inactivated Poliovirus Vaccine (IPV) and bOPV are given in the polio series as per the national immunization.
- Booster doses are given at 18 months (4th dose) and at 4 to 6 years of age (5th dose)
- The minimum interval between doses is 4 weeks

In keeping with the Global Polio Eradication Initiative's Polio Eradication and Endgame Strategic Plan 2013-2018, Jamaica switched from using trivalent OPV to bivalent OPV in the routine immunization programme in April 2016. This was a globally coordinated event where all manufacturers of tOPV ceased production prior to the switch and all tOPV was recalled after the switch and destroyed. Any use of tOPV after the switch will jeopardize polio eradication by generating circulating vaccine-derived polioviruses (cVDPV) from the type 2 component of the vaccine.

Storage

- OPV vaccine is easily damaged by heat
- They are not damaged by freezing and may also be placed in the freezer
- Unopened OPV vaccine vials should be stored in the refrigerator between +2°C and +8°C, at vaccination sites. For longterm storage OPV must be frozen (-25°C to -15°C); after thawing it can be stored for 6 months between +2°C and +8°C.
- Opened OPV vaccine vials should be placed on the top shelf of the main compartment of the refrigerator after use. They may be used up to 4 weeks after they have been opened as long as certain conditions are met (refer to the multi-dose open vial policy in Volume 2)

Method of Administration

- The standard dose is two drops in the mouth with the dropper that comes with the vaccine
- If the child spits the vaccine out, give another dose (two drops)

Contraindications

OPV vaccine should not be given to persons with:

- moderate to severe acute illness, including > 3 episodes of diarrhea per day, vomiting, or fever > 38°C. Immunization should be postponed until the client is well
- a history of anaphylaxis to a previous dose of OPV
- immunosuppression or close contact with an immuno-suppressed person

Inactivated poliovirus vaccine (IPV) should be used for immunosuppressed persons, including HIV positive individuals and their contacts, because of an increased risk of vaccine-associated paralytic polio (VAPP).

Note: OPV may be given to contacts of pregnant women.

Adverse Reactions

- OPV has minimal side effects.
- Rare cases of vaccine-associated paralytic poliomyelitis (VAPP) have been reported in recipients of OPV and in the contacts of recipients who are not fully immunized.
- The possibility of a very small risk of VAPP induced by OPV vaccine cannot be ignored but is insufficient to warrant a change in immunization policy.
- Persons who care for children recently vaccinated with OPV must wash hands thoroughly with soap and water, especially after handling stool, because the polio vaccine viruses are passed out in the stool for up to 6 weeks following vaccination.

3.10 Inactivated Poliomyelitis Vaccine: IPV

This vaccine contains polioviruses of all three types (types 1, 2 and 3) which have been inactivated by formaldehyde. Traces of formaldehyde, neomycin, streptomycin and polymyxin B may be present in the vaccine.

Schedule

- An IPV only schedule is given when OPV is contraindicated. IPV vaccine must be used for HIV-positive babies or babies born to HIV-positive mothers
- The primary series is given at 6 weeks, 3 months and 6 months
- Booster doses are given at 18 months (4th dose) and at 4 to 6 years of age (5th dose)
- The minimum interval between doses is 4 weeks
- For an IPV/OPV vaccine combined schedule:
    - 2 doses of IPV are given as a part of the primary series – at 6 weeks (1st dose) and 6 months (3rd dose)
    - OPV is given at 3 months (2nd dose) between the two IPV doses
    - OPV is given as booster doses at 18 months (4th Polio dose) and 4-6 years of age (5th Polio dose)

Storage

- IPV vaccine should be stored in the refrigerator at a temperature between +2° and +8°C
- It is easily damaged by heat and should not be frozen
- IPV vaccine should appear clear and colourless and should not have any particles, a cloudy appearance, or change in colour
- Multi-dose vials should be used within the time specified by the manufacturer (refer to the multi-dose open vial policy in Volume 2)

Method of Administration

- The standard dose is 0.5 ml
- IPV vaccine should be given as a subcutaneous or intramuscular injection, depending on the brand
- For infants less than 18 months old, IPV vaccine is given in the anterior lateral aspect of the thigh

- For children ≥18 months and adults, IPV vaccine is given in the deltoid region
- IPV vaccine may be given intradermally as a fractionated dose if the need arises

Contraindications

The vaccine should not be given to persons with:

- moderate to severe acute illness, including diarrhea, vomiting or fever > 38°C. Immunization should be postponed until the client is well
- history of anaphylaxis to a previous dose of IPV or any vaccine constituent. Persons with a history of anaphylactic reaction to neomycin, polymyxin B or streptomycin should not receive IPV vaccine
- pregnancy is not a contraindication to IPV vaccination. However, vaccination is usually delayed until after pregnancy, unless the risk of polio infection is imminent, because of theoretical risks. There is no evidence of adverse effects on the foetus

Adverse Reactions

- Minor local reactions such as pain and redness at site of injection may occur
- No serious adverse reactions have been documented
- Allergic reactions to the vaccine are very rare

3.10.1 Use of IPV instead of OPV

The most important advantage of IPV vaccine is that it is inactivated. It does not replicate inside the vaccine recipient and is not shed in his/her stool. IPV vaccine does not cause vaccine-associated paralysis or circulating vaccine derived poliovirus and is safe to use in HIV-positive and other immuno-deficient persons or in household contacts of those persons.

IPV vaccine produces less local gastrointestinal immunity than does OPV vaccine, so persons who receive IPV are more readily infected with wild poliovirus than OPV recipients. A person who receives IPV vaccine could become infected with wild poliovirus in an endemic area. The infected person would be protected from

paralytic polio but the wild virus being shed in the stool could spread and result in transmission to a contact.

3.11 Measles-Mumps-Rubella Vaccine: MMR

The MMR vaccine contains weakened forms of the live measles, mumps and rubella viruses. It comes in powder form which must be mixed with the diluent supplied by the manufacturer before it can be used it.

Schedule

- The vaccine should be administered at 12 months of age or as soon as possible thereafter
- A booster dose is given at 18 months of age
- The minimum interval between two doses is 4 weeks
- If doses of BCG, MMR, yellow fever and varicella vaccines are not given simultaneously, the vaccines should be separated by four weeks
- A waiting period is required between antibody containing blood products and administration of MMR. Consult the Family Health Unit or a physician to modify the child's schedule.

Storage

- The vaccine should be stored in the refrigerator at a temperature between +2° and +8°C. It may also be stored in the freezer (-25°C to -15°C)
- The diluent should stored in the refrigerator at the same temperature as the vaccine, between +2° and +8°C, and must not be frozen
- The diluent should be at the same temperature as the vaccine when mixing (between +2° and +8°C)
- The vaccine must be discarded within 6 hours of reconstitution or at the end of the session, whichever comes first

Method of Administration

- The standard dose is 0.5 ml

- The vaccine should be administered into the deep subcutaneous layer of the upper arm
- If alcohol is used to cleanse the skin, ensure it evaporates from the skin before injection as the alcohol may inactivate the vaccine

Contraindications

The vaccine should not be given to persons with:

- moderate to severe acute illness, including fever > 38°C. Immunization should be postponed until the client is well
- a history of anaphylaxis to a previous dose of MMR
- a history of anaphylaxis to any vaccine constituent. Persons with a history of anaphylactic reaction to neomycin, kanamycin, or gelatin should not receive MMR
- pregnancy
- immunosuppression

Note that:

- allergy to egg is no longer a contraindication to MMR
- asymptomatic HIV positive individuals, who are not severely immunosuppressed, may receive MMR

Adverse Reactions

- The following reactions tend to occur 5-12 days post-vaccination:
    - fever with or without rash
    - arthritis (most common in adult women)
- Anaphylaxis and other allergic reactions are rare
- Other rare reactions include:
    - febrile convulsions
    - parotid (cheek) swelling
    - decreased platelets (thrombocytopaenia) which may be associated with the rubella component
    - Mumps meningo-encephalitis

3.11.1 Measles Vaccine; Rubella Vaccine; Mumps Vaccine

- Single-antigen measles, mumps and rubella vaccines are no longer available
- Measles and Rubella vaccines are available in a combination (MR) vaccine
- Storage, administration, indications for use, contraindications, and adverse events are similar for these vaccines as for the combination MMR vaccine

3.12 Human Papillomavirus Vaccine: HPV

HPV vaccines are recombinant vaccines in liquid form. HPV vaccination prevents persistent HPV infection, related cervical lesions in HPV naïve women and other HPV-related conditions such as anal, vulval, vaginal, penile and head and neck cancers, genital warts and recurrent respiratory papillomatosis. Three vaccines have been licensed for use:

- the *bivalent* vaccine protects against 2 oncogenic genotypes: HPV types 16 and 18
- the *quadrivalent* vaccine protects against 4 genotypes (2 oncogenic and 2 non-oncogenic): HPV type 16, 18, 6 and 11
- the *nonavalent* vaccine protects against 9 genotypes (7 oncogenic and 2 non-oncogenic): HPV type 16, 18, 31, 33, 45, 52, 58, 6 and 11

The 3 vaccines give excellent protection against cervical and other cancers caused by HPV 16 and 18; these types cause at least 70% of cervical cancer cases, 85% of HPV-related head and neck cancers, and 87% of all anal cancers. The WHO recommends that HPV vaccination be included in national immunization programmes as a core strategy for primary prevention against cervical cancer.

> Cervical cancer screening (such as Pap smears) is recommended for women whether or not they have been vaccinated as the vaccines do not protect against all the cancer-causing genotypes.

Schedule

- In Jamaica, the HPV vaccine is recommended for females ages 9-26 years and males 9-14 years of age.
- For adolescents ages 9 to 14 years, 1 dose is given
- For persons 15 years and older, 2 doses are given 6 months apart
- For persons who are immunocompromised (e.g. HIV), a 3-dose schedule should be used regardless of age – the 2nd dose is given at least 4 weeks after the 1st dose, and the 3rd dose given at least 6 months after the 1st dose
- There is no maximum recommended interval between doses. However, an interval no greater than 12-15 months is suggested to complete the 2-dose and 3-dose schedules promptly
- The vaccine is ideally given before sexual debut, i.e., before risk of exposure to HPV germ, and when the immune response to the vaccine is strongest (ages 9 to 14 years)
- The vaccine may be given at the same time as other vaccines

Storage

The vaccine should be:

- stored in the refrigerator or vaccine carrier between +2°C and +8°C
- protected from exposure to freezing temperatures
- protected from light

Method of Administration

- The standard dose is 0.5ml
- The vaccine should be given by intramuscular injection in the deltoid area of the arm

Contraindications

- The vaccine should not be given to persons with:
  - life threatening allergies to yeast or any other component of the HPV vaccine
  - a history of a severe adverse reaction to a previous dose of HPV vaccine
  - severe febrile illness. Immunization should be postponed until the client is well

- The vaccine should not be given to pregnant women as a precautionary measure. If the person got pregnant after starting the series, withhold subsequent doses until after pregnancy
- HIV infection and minor infections such as a cold are not contraindications

Adverse Reactions

- Mild reactions include:
  - pain, redness, itching or swelling at the injection site
  - mild to moderate fever
  - headache
  - nausea
- Serious side effects are very rare and may occurs within minutes to a few hours after vaccination. They include:
  - severe allergic reaction
  - high fever

3.13 Other Available Vaccines

Vaccines have been developed to protect against other diseases, such as yellow fever, meningococcal diseases, chicken pox (varicella), the flu (influenza), pneumococcal diseases, hepatitis A, rotavirus, cholera, dengue, Ebola and COVID-19. While these vaccines are not yet a formal part of the MOHW's routine immunization schedule, yellow fever, influenza, pneumococcal and COVID-19 vaccines are provided by the MOHW for special populations. Persons with specific health problems or circumstances (e.g. health care workers, travelers, elderly, persons with chronic conditions, etc.) may be eligible to receive these vaccines. Many of these vaccines are also offered in the private sector.

3.13.1 Yellow Fever Vaccine: YF

The yellow fever vaccine contains a weakened form of the live yellow fever virus. This vaccine virus is made in chick embryos. The vaccine also contains neomycin and polymyxin antibiotics. It comes in powder form and must be mixed with the diluent supplied by the manufacturer before use.

Schedule

- The vaccine is recommended as part of the routine infant immunization schedule only in countries where the disease is endemic or there is a high risk of outbreaks
- In Jamaica, it is required for travel to high risk or endemic countries.
- The vaccines can be obtained through designated clinics which provide the International Certificate of Vaccination required for travel to yellow fever endemic countries. Other sites requesting the vaccine must contact the Family Health Unit, MOHW
- Only one dose is required for full immunization
- It should be given at least 10 days prior to travel
- Persons 12 months of age and older may receive the vaccine

Storage

- The vaccine and diluent should both be stored in the refrigerator at a temperature between +2°C and +8°C
- The vaccine is easily damaged by light and heat but not by freezing
- The diluent should not be allowed to freeze
- The diluent should be at the same temperature as the vaccine (+2°C to +8°C) when mixing
- Once reconstituted, the vaccine should be kept at a temperature of +2°C to +8°C and used within six hours

Method of Administration

- The standard dose is 0.5 ml
- The vaccine should be given by subcutaneous injection in the upper outer arm, in the deltoid muscle
- After reconstituting the vaccine, mix the vaccine and diluent together by gently swirling the vial before removing each dose; vigorous shaking is to be avoided as it causes the suspension to foam
- Discard the vaccine if particles or discolouration are present
- YF vaccine must be used within 6 hours of reconstitution

Contraindications

The vaccine should not be given to:

- children age <12 months because of the risk of encephalitis
- pregnant or nursing woman. If travel to a high-risk zone cannot be postponed, or there is an epidemic, it may be given
- Persons with:
    - moderate to severe acute illness, including fever > 38°C. Immunization should be postponed until the client is well
    - immunosuppression
    - HIV/AIDS
    - a history of anaphylaxis to a previous dose of yellow fever vaccine
    - a history of anaphylaxis to any vaccine constituent including neomycin, polymyxin, gelatin, egg or chicken

Note: When yellow fever vaccine is contraindicated, a traveler to an endemic area may require an official exemption letter from a Yellow Fever vaccination centre.

Precautions

Systemic adverse reactions are more likely in persons aged ≥65 years compared with younger persons, therefore:

- the physician should conduct a risk assessment involving an examination of the patient's health status and need for the vaccine prior to immunization
- the geriatric patient should be monitored for adverse effects for 10 days post-vaccination

Adverse Reactions

- Reactions are usually mild and occur 5-10 days post-vaccination, including headaches, muscle aches and low-grade fever
- Anaphylaxis and other allergic reactions are uncommon
- Encephalitis and multiple organ failure (sepsis-like syndrome) are very rare

3.13.2 Meningococcal Vaccine

Two types of inactivated vaccines protect against meningococcal meningitis:

1. *Capsular polysaccharide vaccines:* Capsular polysaccharide vaccines against meningococcal diseases were developed first but produce poor immune responses (immunogenicity) in children under 2 years of age. The vaccine contains the inactivated capsular polysaccharides of meningococcal bacteria and comes in freeze-dried powder form. These vaccines are administered as a single dose to persons ≥2 years old; most of these vaccines are given subcutaneously.
2. *Conjugate protein-polysaccharide vaccines:* Technology of linking (conjugating) polysaccharide antigen to a protein carrier was shown to improve immunogenicity of pneumococcal and Hib vaccines, and was therefore tried for meningococcal vaccine as well. Compared to polysaccharide vaccine, meningococcal conjugate vaccine (MCV) is more immunogenic in infants and induces an immunological memory which gives longer-lasting protection.

Meningococcal vaccines are available in Jamaica in the private sector. Both MPV and MCV vaccines protect against serogroups A, C, Y, and W-135 of the meningococcus bacteria.

Schedule

MCV vaccine:

- The MCV vaccine has been introduced into the routine childhood vaccination schedules of selected countries.
- A booster dose may be required in persons at high risk every 2-5 years (upon the advice of their physician)

MPV vaccine:

- The vaccine is not given routinely to children under 2 years of age because of poor immunogenicity
- A dose of the MPV vaccine can be given to persons in high-risk groups, who are over age 2, including:
    - persons with terminal complement component deficiencies, functional or anatomic asplenia
    - laboratory workers

  - travelers to endemic or epidemic areas
  - persons experiencing an outbreak in their community
- One booster 3–5 years after the primary dose may be given to persons considered to be at continued high risk of exposure

Storage

- Vaccine and diluent should be stored in the refrigerator at a temperature between +2° and +8°C, and must not be frozen
- Before the vaccine can be used it must be mixed with the diluent supplied by the manufacturer
- The diluent should be at the same temperature as the vaccine when mixing (+2° and +8°C)
- The vaccine should have a clear, colourless appearance once reconstituted
- Vials of reconstituted vaccine must be discarded at the end of each immunization session or at the end of six hours, whichever comes first.

Method of Administration

- The standard dose is 0.5 ml
- The vaccine is given by subcutaneous injection in the upper outer arm
- Inspect the vaccine prior to immunization; do not administer if particulate matter or discolouration are present

Contraindications

The vaccine should not be given to persons with:

- moderate to severe acute illness, including fever > 38°C. Immunization should be postponed until the client is well
- a history of anaphylaxis to a previous dose
- a history of anaphylaxis to a component of the vaccine constituent

Adverse Reactions

- Adverse reactions are generally mild and include headache, malaise or fever (in 2-5% of recipients)

- Soreness and redness at the injection site occur in 5-10% of patients and last 1-2 days
- Severe reactions, including anaphylaxis and other allergies, are rare

3.13.3 Varicella and Herpes Zoster Vaccines

The vaccine contains live attenuated varicella zoster virus (VZV), Oka strain, and comes in powder form. Before it can be used it must be mixed with the diluent supplied by the manufacturer. The diluent should be at the same temperature as the vaccine when mixing (between +2°C and +8°C). Combination with varicella and MMR vaccine is also available.

Vaccines against both varicella and herpes zoster differ in the number of plaque-forming viral units per vaccine dose and volume of the inoculum.

Schedule

Varicella vaccine:

- Children 12-18 months of age should receive one dose and no boosters
- Vaccination of a child who has had chicken pox is not harmful, but it is unnecessary
- Susceptible adolescents ≥13 years and adults should receive two doses, separated by 4 to 8 weeks
- Non-pregnant women of childbearing age, persons living or working in institutional settings (e.g. military, college and inmates in jail) or with children (e.g. teachers and daycare personnel), health care workers and close contacts of immunosuppressed persons should consider getting the vaccine
- If doses of BCG, MMR, yellow fever and varicella vaccines are not given simultaneously, the vaccines should be separated by four weeks.
- A waiting period is required between antibody containing blood products and administration of varicella vaccine; consult the Family Health Unit or a physician to modify the child's schedule

Herpes Zoster vaccine:

- Immunocompetent adults ages 50 years and older can receive the vaccine as a single dose

Storage

Varicella vaccine:

- Requirements vary according to the manufacturer. Some brands are very sensitive to heat and require storage at -15°C or colder. Newer brands, such as Varilrix, may be stored at +2°C to +8°C
- The diluent should be stored in the refrigerator at a temperature between +2° and +8°C, and must not be frozen
- The vaccine should be administered immediately after reconstitution to minimize loss of potency. Refer to the manufacturer's insert for the required time for discarding reconstituted vaccine

Method of Administration

Varicella vaccine:

- The standard dose is 0.5 ml administered into the subcutaneous layer of the upper outer arm, in the deltoid muscle

Herpes zoster vaccine:

- The standard dose is 0.65 ml administred via subcutaneous injection

Contraindications

The varicella vaccine should not be given to persons with:

- moderate to severe acute illness, including fever > 38°C. Immunization should be postponed until the client is well
- a history of anaphylaxis to a previous dose of varicella vaccine
- a history of anaphylaxis to any vaccine constituent. Persons with a history of anaphylactic reaction to neomycin or gelatin should not receive the vaccine
- immunosuppression. Note however that asymptomatic HIV positive individuals, who are not severely immunosuppressed, may receive varicella vaccine. Consult a physician for the correct immunization schedule for these persons

- pregnancy. Women should also avoid getting pregnant for 4 weeks after receiving varicella vaccine

Adverse Reactions

These include:

- local reactions in 19% of children such as redness, swelling and pain at the injection site
- fever
- a varicella-like rash localized to the injection site in 3% of children, which may occur within 2 weeks of vaccination; generalized rash may occur 2-3 weeks after vaccination
- Herpes zoster following varicella vaccination in healthy children; this is a rare occurrence (18 per 100,000 person-years of follow-up) and has been mild and without complication

3.13.4 Pneumococcal Vaccines

Two types of inactivated vaccines protect against pneumococcal disease:

1. Pneumococcal polysaccharide vaccines (PPV)
2. Pneumococcal conjugate vaccines (PCV)

Both vaccines come in a liquid form. One of the advantages of PCV over PPV is that it is immunogenic (i.e. produces an adequate immune response) in infants and children, even when they have HIV or sickle cell disease. PPV is not given to children under 2 years of age because it does not produce a good immune response, including protective antibody levels.

Schedule

PCV:

- This vaccine may be given to children under 2 years of age
- A 3-dose schedule is recommended, either
    - 2 doses in the primary series plus 1 booster dose (2p+1), or
    - 3 doses in the primary series plus no booster doses (3p+0)

- Primary series doses are given at 2, 4 and 6 months of age. The booster is given between 12 and 15 months of age
- The minimum interval between doses is 4 weeks in children <1 year and 8 weeks in children >1 year
- The vaccine may also be given to children 2-5 years of age with high risk medical conditions such as sickle cell disease, functional or anatomic asplenia, HIV infection, Down's syndrome, chronic illness or immunosuppression
- Two doses are given at least 8 weeks apart
- The vaccine is not recommended for persons over age six years
- Booster doses are given on the basis of the patient's medical condition according to a physician's advice

PPV:

- The vaccine should be given two weeks prior to elective splenectomy, planned chemotherapy or immunosuppressive therapy
- Adults 65 years of age or older may also be considered for vaccination
- The vaccine should be considered for persons over age 2 with a high risk of infection or complication from pneumococcus including persons with:
    - functional or anatomic asplenia
    - sickle cell disease
    - nephrotic syndrome or chronic renal failure
    - immunosuppression
    - chronic diseases (cardiovascular or pulmonary disease, diabetes, alcoholism, cirrhosis, or cerebrospinal fluid leaks)

Storage

Both types of vaccines

- should be stored in the refrigerator or vaccine carrier between +2°C and +8°C
- are damaged by freezing

Method of Administration

- The standard dose for both PPV and PCV is 0.5 ml
- PPV should be injected by intramuscular or subcutaneous injection into the deltoid muscle of the upper outer arm of persons over age 2 years
- For PCV:

- infants <18 months of age: inject vaccine into the muscle (vastus lateralis) of the antero-lateral thigh
- children ≥ 18 months-59 months: inject vaccine into the deltoid muscle of the upper arm

Contraindications

The vaccine should not be given to persons with:

- moderate to severe acute illness, including fever > 38°C. Immunization should be postponed until the client is well
- a history of anaphylaxis or severe allergic reaction to a previous dose of PPV or PCV or any of its components

Precautions

- Avoid giving PPV during pregnancy as its safety has not been adequately studied
- PCV is not recommended for persons over age six

Adverse Reactions

For PPV:

- swelling, redness, or pain at the injection site may occur in 30-50% of vaccinees, but usually resolve within 48 hours
- systemic reactions (fever, muscle soreness) are uncommon
- severe systemic reactions are rare

For PCV:

- local reaction at the injection site (pain, swelling, redness) occurs in 10-20% of vaccinees
- fever may occur
- no severe adverse events are known

3.13.5 Influenza Vaccine

The Influenza (flu) vaccine is a very safe and effective vaccine that provides protection against influenza infections caused by specific vaccine strains. Influenza vaccines can be:

a) *quadrivalent* or *trivalent*. The trivalent vaccine is used in Jamaica and protects against 3 different strains of the influenza virus: 2 types of Influenza A virus (H1N1 and H3N2); and 1 type of Influenza B virus
b) *live attenuated (weakened)* or *inactivated*. Live attenuated (weakened) virus vaccine is given by intranasal spray. Inactivated virus vaccines are used in Jamaica and a may contain whole virus, subvirion/split virus or purified surface antigens
c) *Southern Hemisphere* or *Northern Hemisphere*. The Northern Hemisphere formulation is usually given in Jamaica.

Vaccine virus is produced in live fertilized chicken eggs.

The vaccine virus composition is changed annually in anticipation of expected circulating strains of influenza virus.

Schedule

- The vaccine is usually given annually prior to the 'flu season' in the cooler months of the year. Optimally, vaccination should occur before the start of the flu season
- The vaccine is given to persons 6 months and over
- In Jamaica, priority groups for vaccination have been identified with the view to:
    - protecting at-risk individuals from infection and/or serious illness
    - maintaining the health of the workers in essential services
    - preventing or minimizing the spread of infection
- These priority groups are:
    1. health care workers
    2. pregnant women
    3. children over 6 months of age with chronic illnesses
    4. non-health frontline workers such as the police, army, correctional services, customs and immigration officers
    5. parliamentarians

6. institutionalized persons
7. the elderly (adults over 60 years) with chronic illnesses

Storage

- The vaccine should be stored in the refrigerator or vaccine carrier between +2°C and +8°C
- The vaccine should not be frozen or exposed to light or heat

Method of Administration

- The standard dose is:
  - 0.5ml for persons 3 years and over
  - 0.25 ml for children ages 6 to 12 months
- The inactivated vaccine is given by intramuscular injection
  - in the deltoid area of the arm for persons aged > 1 year of age
  - in the anterolateral aspect of the thigh for children 6-12 months of age
- One dose is required for persons 9 years and over
- For children < 8 years, if they have never received a previous dose of Influenza vaccine, the recommendation is 2 doses of vaccine given 4 weeks apart
- The live attenuated virus vaccine is divided into two portions per dose in the syringe. Half of the dose is sprayed into one nostril and the other half in the other nostril

Contraindications

- The vaccine should not be given to persons with a history of:
  - anaphylactic reaction to egg
  - anaphylaxis to a previous dose of Influenza vaccine
  - a history of Guillain-Barre Syndrome following previous vaccination with Influenza
  - known sensitivity/allergy to thimerosol (mercury)
- The live vaccine should not be given to pregnant women, immunocompromised persons or persons less than 5 years or over 49 years

Adverse Reactions

- Most are mild reactions, usually lasting 1-2 days, and include:
  - pain, redness and swelling at vaccination site
  - low-grade fever
  - muscle or joint pains
- The live vaccine may cause a mild flu-like illness or worsen respiratory disease such as asthma

3.13.6 Rotavirus Vaccine

There are currently two presentations of the Rotavirus vaccine produced by two different manufacturers. One trademarked *RotaTeq* from Merck and the other trade marked *Rotarix* from GlaxoSmithKline.

RotaTeq:

This is a live, oral, pentavalent vaccine using bovine strains. It comes in liquid formulation and prevents severe serotype specific Rotavirus GE and hospitalization in infants and children

Rotarix:

This is a live, oral, monovalent vaccine using human strain. It comes in lyophilized formulation, and is reconstituted with a diluent. The vaccine prevents severe serotype specific Rotavirus GE and hospitalization in infants and children

Schedule

- Both vaccines are given to infants within the first 6 months of life
- *RotaTeq* is given as a three-dose schedule at 2, 4 and 6 months
- *Rotarix* is given as a two-dose schedule at 2 and 4 months

Storage

- The vaccines are stored in the refrigerator or vaccine carrier between +2°C and +8°C
- Diluent and vaccine must be stored together for *Rotarix*
- Do not freeze or expose the vaccine to freezing temperatures
- Protect the vaccine from light

Method of Administration

- The volume per dose is 1 ml for *Rotarix* and 2 ml for *RotaTeq*
- The vaccine is given by mouth (orally)
- Rotarix is given by a syringe
- RotaTeq is given by a squeeze tube

Contraindications

- The vaccine should not be used with someone with hypersensitivity to any vaccine component
- Caution should be used in immunocompromised persons

Adverse Reactions

Reactions to the vaccine include:

- diarrhoea
- vomiting
- otitis media
- nasopharyngitis
- bronchospasm
- haematochezia (bloody stools)

3.14 Summary of Vaccines

Table 3.14.1 provides a summary of the storage, dosage, administration, reactions and contraindications.

Table 3.14. 1: Vaccines in Schedule with Temperature for Storage, Method of Administration, Adverse Events and Contraindications Associated with Immunization

Vaccine	Storage temperature	Dose	Route	Site	Common adverse reactions	Contraindications
Bacillus of Calmette and Guerin - BCG	+2°C to +8°C	0.05 ml for children <1yo; 0.1 ml for children ≥1yo	Intradermally (ID)	Upper right arm	-Swelling of lymph nodes in armpit -Draining sinus over lymph node -Abscess or ulcer over injection site -Keloid formation	-Acute illness including fever of > 38°C -Immunosuppression -Extensive skin burns -Active skin disease -Pregnancy -A positive tuberculin test
Pediatric Diptheria and Tetanus Toxoid - DT(P)	+2°C to +8°C	0.5 ml	Intramuscular (IM)	Infants < 18 mnths- anterolateral thigh Children > 18 months- Upper arm	-Swelling, pain and redness at the injection site -A small painless nodule at the inoculation site -Malaise, fever and headache -Abscess at the injection site	-Acute illness including fever of> 38°C -History of a severe allergic reaction to a previous dose of DT vaccine
Adult Diptheria and Tetanus Toxoid - DT(A), DT or Td	+2°C to +8°C	0.5 ml	Intramuscular (IM)	Upper arm	-Swelling, pain and redness at the injection site -A small painless nodule at the inoculation site -Malaise, fever and headache -Abscess at the injection site	-Acute illness including fever of> 38°C -History of a severe allergic reaction to a previous dose of DT vaccine

Table 3.14.1 (Continued)

Vaccine	Storage temperature	Dose	Route	Site	Common adverse reactions	Contraindications
Diphtheria-Tetanus-Whole cell Pertussis - DTwP	+2°C to +8°C	0.5 ml	Intramuscular (IM)	Infants < 18 mnths- anterolateral thigh Children > 18 mnths- Upper arm	-Fever -Swelling, pain and redness at the injection site -A small painless nodule at the inoculation site -Malaise, fever and headache -Abscess at the injection site	-History of febrile or afebrile convulsions without neurological clearance -Children over 7 years of age and adults (because of the wPertussis component)
Hepatitis B - Hep B	+2°C to +8°C	0.5 ml (10µg) 0.5ml (10µg) 1 ml (20µg) 2 ml (40µg)	Intramuscular (IM)	Infants < 18 mnths- anterolateral thigh Children ≥ 18 months and adolescents (up to 19 years of age)- upper arm Adults ≥ 20 years of age – upper arm Immuno-suppressed adults- upper arm	-Mild fever for 1 to 2 days -Soreness and redness at the injection site -Fatigue, headache, irritability	-Moderate to severe acute illness, including fever > 38°C -History of anaphylaxis after a previous dose of Hepatitis B vaccine -Allergy to yeast (Hepatitis B vaccine is developed in baker's yeast)
Hemophilus Influenzae Type b - Hib	+2°C to +8°C	0.5 ml	Intramuscular (IM) or deep subcutaneous (SC)	Infants < 18 mnths- anterolateral thigh Children ≥ 18 months and adults - upper arm	-Swelling, redness, and pain at the injection site -Fever, irritability	-Acute illness including fever of > 38°C -History of a severe allergic reaction to a previous dose of Hib vaccine
Pentavalent - DTwP/HepB/Hib	+2°C to +8°C	0.5 ml	Intramuscular (IM)	Anterolateral thigh	-Redness (>2 cm), swelling (>2 cm), and pain at the injection site within 48 hours -Fever -A small painless nodule at the inoculation site -Malaise, fever and headache -Abscess at the injection site	-Moderate to severe acute illness, including fever > 38°C -History of anaphylaxis or severe reaction to a previous dose of Pentavalent or any of its components -Presence of a contraindication to any component of the vaccine

Table 3.14.1 (Continued)

Vaccine	Storage temperature	Dose	Route	Site	Common adverse reactions	Contraindications
Bivalent Oral Polio - bOPV	+2°C to +8°C; OR -25 °C to -15°C	2 drops	Oral	Mouth	Side effects are rare	-Moderate to severe acute illness, including > 3 episodes of diarrhea per day, vomiting, or fever > 38°C -History of anaphylaxis to a previous dose of OPV -Immunosuppression or close contact with an immuno-suppressed person -HIV/AIDS
Inactivated Polio virus - IPV	+2°C to +8°C	0.5ml	Intramuscular (IM) or deep subcutaneous (SC)- dependent on brand	Infants < 18 mnths- anterolateral thigh Children ≥ 18 months and adults - upper arm	-Pain and redness at the site of the injection	-Moderate to severe acute illness, including diarrhea, vomiting or fever > 38°C -History of anaphylaxis to a previous dose of IPV or any vaccine constituent. -History of anaphylactic reaction to neomycin, polymyxin B or streptomycin
Measles, Mumps and Rubella - MMR	+2° to +8°C OR -25°C to -15°C	0.5ml	Deep subcutaneous (SC)	Upper arm	-Fever- with or without rash -Arthritis	-Moderate to severe acute illness, including fever > 38°C -History of anaphylaxis to a previous dose of MMR -History of anaphylaxis to any vaccine constituent (neomycin, kanamycin, or gelatin) -Pregnancy -Symptomatic HIV infection and asymptommatic infection with severe immune-suppression (CD4 percentage of <15%)
Human Papilloma Virus - HPV	+2°C to+8°C	0.5ml	Intramuscular (IM)	Upper outer arm	-Pain, redness, itching or swelling at the injection site -Mild to moderate fever -Syncope (fainting)	-Persons with life threatening allergies to yeast or any other component of the HPV vaccine -Severe adverse reaction to a previous dose of HPV vaccine -Pregnancy

Table 3.14.1 (Continued)

Vaccine	Storage temperature	Dose	Route	Site	Common adverse reactions	Contraindications
Yellow Fever (YF)	+2°C to +8°C	0.5ml	Subcutaneous (SC)	Upper outer arm	-Headaches -Muscle aches -Low-grade fever	-Age <12 months (because of the risk of encephalitis) -Pregnant or nursing woman (if travel to a high-risk zone cannot be postponed, or there is an epidemic, it may be given) -Moderate to severe acute illness, including fever > 38°C -Immunosuppression -HIV/AIDS -History of anaphylaxis to a previous dose of yellow fever vaccine -History of anaphylaxis to any vaccine constituent including neomycin, polymyxin, gelatin, egg, or chicken
Meningococcal Polysaccharide-MPV	+2°C to+8°C	0.5ml	Subcutaneous (SC)	Upper outer arm	-Headache -Malaise -Fever -Soreness and redness at the injection site occur	-Moderate to severe acute illness, including fever > 38°C -History of anaphylaxis to a previous dose of MPV -History of anaphylaxis to a component of MPV vaccine constituent
Varicella	+2°C to +8°C OR -15°C or colder (Dependent on brand)	0.5ml	Subcutaneous (SC)	Upper outer arm	-Redness, swelling and pain at the injection site -Fever	-Moderate to severe acute illness, including fever > 38°C -History of anaphylaxis to a previous dose of varicella vaccine -History of anaphylaxis to any vaccine constituent such as neomycin or gelatin -Symptomatic HIV infection and Asymptommatic infection with severe immune-suppression (CD4 percentage of <15%) -Pregnancy

Table 3.14.1 (Continued)

Vaccine	Storage temperature	Dose	Route	Site	Common adverse reactions	Contraindications
Pneumococcal Polysaccharide (PPV) or Pneumococcal Conjugate (PCV)	+2°C to+8°C	0.5ml	PPV- Subcutaneous (SC) or Intramuscular (IM) PCV- Intramuscular (IM)	Upper outer arm Infants < 18 mnths- anterolateral thigh Children ≥ 18 to 59 months- upper arm	-Fever (more likely for PCV) - Swelling, redness, or pain at the injection site	-Moderate to severe acute illness, including fever > 38°C -History of anaphylaxis or severe allergic reaction to a previous dose of PPV or PCV or any of its components
Influenza	+2°C to+8°C	0.5ml- ≥3 years 0.25ml - <3 years	Intramuscular (IM)- Inactivated Form Live attenuated	-Antero-lateral thigh -Upper outer arm Intranasal	-Pain, redness and swelling at vaccination site -Low grade fever -Muscle or joint pains -Mild flu-like illness or worsen respiratory disease such as Asthma (Live vaccine)	-Anaphylaxis to a previous dose of Influenza vaccine -History of Guillain-Barre Syndrome following previous vaccination with Influenza -Known sensitivity/allergy to Thimerosol (mercury) - Pregnant women, immunocompromised persons or persons less than 5 years or over 49 years (live attenuated form).
Rotavirus	+2°C to+8°C	1mL- *Rotarix* 2mL - *RotaTeq*	Oral	Mouth	-Diarrhoea -Vomiting -Otitis media -Nasopharyngitis -Bronchospasm -Haematochezia (bloody stools)	-Hypersensitivity to any vaccine component

Chapter 4: Vaccine Administration

4.1 Preparing for an Immunization Session

Prior to the immunization session, all vaccines and diluents that will be needed during the session should be removed from the refrigerator at the same time and loaded into the vaccine carrier. If the diluents are not kept in the refrigerator, they should be placed in the body of the refrigerator prior to the vaccination session. Appropriate loading of the vaccine carrier is discussed in Volume 2.

4.2 Registering, Assessing and Preparing the Client

4.2.1 Registering the Client

The immunization register, client health record and Child Health and Development Passport (CHDP)/immunization card provide a record of health services delivered at the clinic. These documents also help to identify missed opportunities for vaccination.

When a client arrives at a health centre or outreach site, the first thing that should be done is registration. Ensure that all the information necessary is available to fill out the immunization register and to locate the client in the future if necessary. This information includes:

- the child's name
- the child's date and place of birth
- the mother's name, telephone number, locating address and landmark

A sample of the information recorded in the immunization register is shown in Figure 4.2.1.1.

Month of Birth: July Year of Birth 2003

Medical Record Number	Child's Name	Sex	Date of Birth	Place of Birth	Mother's Name	Mother's Name Locating Address
2100	Joseph Williams	M	July 27, 2003	Montego Bay	Claudine Williams	222 Spring Street, Apt. 207 (blue house behind Baptist Church) Cell: 876-555-1331

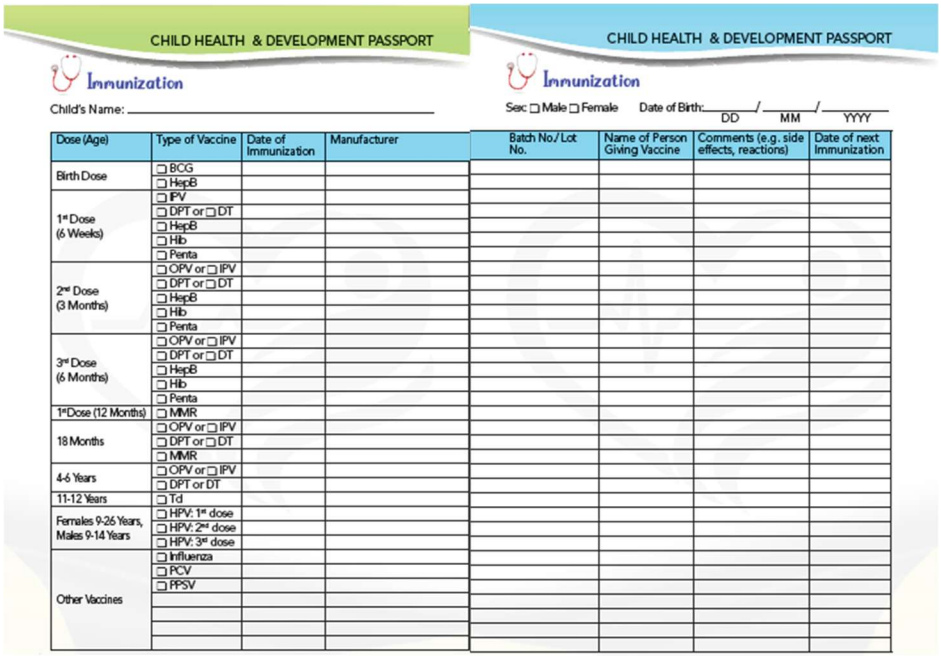
Table 4.2.1 1(a): Sample Immunization Register (Page 1)

BCG	DPT/DT			Polio			Hep B			Hib			MMR	Boosters				
														DPT /DT	OPV/ IPV	MMR	OPV / IPV	DPT/ DT
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd	1st	18 mths	18 mths	18 mths	4-6 yrs	4-6 yrs
July 28 2003	Sep. 15 2003	Oct. 30 2003	Feb. 1 2003	Sep. 15 2003	Oct. 30 2003	Feb. 1 2003	Sep. 15 2003	Oct. 30 2003	Feb. 1 2003	Sep. 15 2003	Oct. 30 2003	Feb. 1 2003	July 28 2004	Feb. 1 2004	Feb. 1 2004	Feb. 1 2004	Aug. 1 2007	Aug. 1 2007

Figure 4.2.1. 1(b): Sample Immunization Register (Page 2)

Request to see the client's CHDP/immunization card. If a client does not have an immunization card**,** one should be provided. Enter on it the person's name, address and birth date. More information is added when the client is screened. Do not write the date of an immunization until it has been given.

The immunization record in the CHDP is shown in Figures 4.2.1.2. The adult immunization card is shown in the Figure 4.2.1.3.



CHILD HEALTH & DEVELOPMENT PASSPORT

Immunization

Child's Name: _____

Dose (Age)	Type of Vaccine	Date of Immunization	Manufacturer
Birth Dose	❐ BCG		
	❐ HepB		
1st Dose (6 Weeks)	❐ IPV		
	❐ DPT or ❐ DT		
	❐ HepB		
	❐ Hib		
	❐ Penta		
2nd Dose (3 Months)	❐ OPV or ❐ IPV		
	❐ DPT or ❐ DT		
	❐ HepB		
	❐ Hib		
	❐ Penta		
3rd Dose (6 Months)	❐ OPV or ❐ IPV		
	❐ DPT or ❐ DT		
	❐ HepB		
	❐ Hib		
	❐ Penta		
1st Dose (12 Months)	❐ MMR		
18 Months	❐ OPV or ❐ IPV		
	❐ DPT or ❐ DT		
	❐ MMR		
4-6 Years	❐ OPV or ❐ IPV		
	❐ DPT or DT		
11-12 Years	❐ Td		
Females 9-26 Years, Males 9-14 Years	❐ HPV: 1st dose		
	❐ HPV: 2nd dose		
	❐ HPV: 3rd dose		
Other Vaccines	❐ Influenza		
	❐ PCV		
	❐ PPSV		

CHILD HEALTH & DEVELOPMENT PASSPORT

Immunization

Sex ❐ Male ❐ Female Date of Birth: ____/____/____ DD MM YYYY

Batch No./ Lot No.	Name of Person Giving Vaccine	Comments (e.g. side effects, reactions)	Date of next Immunization

Figure 4.2.1. 2: Child Health and Development Passport and Infant and Child Immunization Card

Keep
JAMAICA
Measle/Rubella
Free

Issued by:
April 2017

Ministry of Health
Kingston, Jamaica

MINISTRY OF HEALTH
JAMAICA

ADULT IMMUNIZATION CARD

Name: .....

Date of Birth: .....

Address (Home): .....

.....

Tel: .....

Next of Kin: .....

Please keep this record in a safe place

VACCINE		DATE GIVEN	SIGNATURE OF PERSON GIVING VACCINE
Measles/Mumps/Rubella (MMR)	1st		
	2nd		
Hepatitis B	1st		
	2nd		
	3rd		
Tetanus Toxoid TT Diphtheria / Tetanus (Adult) Td	1st		
	2nd		
	3rd		
	4th		
	5th		
	6th		
Others:			

Figure 4.2.1. 3: Adult Immunization Card

4.2.2 Assessing the Client

Each client's health and immunization status should be assessed prior to immunization.

Assessment of health status usually consists of a routine history and physical examination at well-child, family planning, or curative visits (refer to Family Health Manual).

The following questions should be part of the assessment of immunization status, and help to determine the need for immunization and the presence of any contraindications:

- *Is this the right time for an immunization?*
  Look at the client's immunization card and compare it to the routine immunization schedule.

- *Has the correct number of doses of each vaccine been given?*
  If he or she does not have an immunization card/Child Health and Development Passport, find out the client's age, what immunizations he or she has had, and where they were given. Verify this information with the health centre where the vaccine was given.

- *Has sufficient time passed since the last dose?*
  Doses of the same vaccine must be given at least four weeks apart. Hepatitis B is an exception. At least four months must pass between the first and third doses of Hepatitis B. This rule applies whether Hepatitis B vaccine is given as part of the Pentavalent vaccine or on its own.

- *Is this the right time to give a woman (15-44 years old) DT vaccine? How much time has passed since the last dose?*
  Refer to Tables 5.4.1.1 and 5.4.1.2, which outline the schedule for DT immunization of women in their child-bearing years.

- *Can I give different vaccines at the same time?*
  Generally, most vaccines can be co-administered, but they should be given in different anatomic sites when this happens. Note that some combinations have not been examined in clinical trials. Also, newly introduced vaccines should not be co-administered with older vaccines because causal association with ESAVIs must first be evaluated.

Remember:
Do not give more than one dose of the same vaccine at one time.
Do not mix different vaccines in one syringe before injection (unless directed).
Use a different syringe and needle for each vaccine and for each injection.

- *Should I give a booster dose?*
  Always check the immunization schedule to know when booster doses are to be given. Boosters are a required part of the immunization schedule and may be needed by adults and children alike who have not completed their full series of immunizations.

- *Is there a contraindication to immunization?*
  There are true few contraindications to immunization. These are listed in Table 2.9.1. It is safe to immunize children and women even if they have minor illnesses, including colds, diarrhoea, mild fever, allergy and asthma.

Table 4.2.2.1 lists additional questions for screening for contraindications:

Table 4.2.2. 1: Screening Questions for Contraindications to Vaccination

Question	**Screens for:**
How are you/is your child feeling today?	Moderate or acute illness
Are you/Is your child allergic to any food or medication?	Severe allergy to a vaccine component
Was there any problem the last time you/your child was immunized?	Severe adverse reaction to vaccination Allergy to a vaccine or vaccine component
Do you/Does your child have a problem with your/their immune system?	Contraindication to live attenuated vaccines
Does anyone in your house have a problem with their immune system?	Contraindication to OPV
Did you/your child receive blood products (transfusion immunoglobulin) in the past year?	Contraindication to live attenuated vaccines
Are you trying to become pregnant or are you pregnant now?	Contraindication to MMR, Varicella, Influenza, BCG

If a client comes to the health centre for reasons other than immunization, such as a dental visit, ensure that you ask to see his or her immunization card. Assess the client's need for immunization and vaccinate accordingly before he or she leaves the health centre. If an assessment is not performed carefully, an opportunity to immunize may be missed.

4.2.3 Preparing the Client

When the assessment is completed, discuss with the patient and/or parent the 5 essential messages about immunization:

1. Vaccines that are required today
2. Possible side effects
    - If several vaccines are being given at once, explain the side effects of each
    - Explain how important it is to remain at the clinic for at least 30 minutes following vaccination
3. What to do if a side effect occurs
    - Describe how side effects can be treated and when to seek help from a health professional
4. Future immunizations that are needed, and when they should return to the clinic
5. The date, time and place of the next appointment

4.3 Tips for Effective Communication

Effective communication entails the delivery of clear messages that can be understood. Health care workers not only give messages to clients/parents, but also receive messages from them. In both cases, communication takes place only when the messages are understood.

To make sure that communication with the client/parent is effective:

- Find out what the client/parent already knows, and use phrases that he or she understands

- Do not rush
- Show that you are listening to what the person says or indicates through body language
- Find out whether persons have any particular concerns about immunizations and answer these questions straight away
- Provide positive reinforcement. For example, when people make return visits praise them for the immunizations they have already received
- Make sure that the person understands what was said by asking open-ended questions that require answers other than "yes" or "no." For example:
  - *How long will you wait at the clinic after the immunization before leaving?*
  - *What will you do if your baby gets a fever or is irritable?*
  - *What will you do if your baby looks very sick?*
  - *When will you bring your child in for the next immunization?*

4.4 Injection Equipment

Disposable syringes and auto-disable (AD) needles are used to give injectable vaccines. AD needles with syringes for fixed dose immunization have the following features:

- a self-locking mechanism that allows only one use; this is called a reuse prevention (RUP) feature
- a fixed needle (usually 23G x 25 mm, but various sizes are manufactured)
- a specific scale mark showing only the quantity to be administered

A sterile packed needle and syringe must be used for each injection and disposed of immediately after use. Do not reuse needles and syringes because that places the general public at high risk of disease. It is important to know the parts of a needle and syringe in order to handle them safely and avoid contamination. The parts of the needle and syringe are shown in Figure 4.4.1

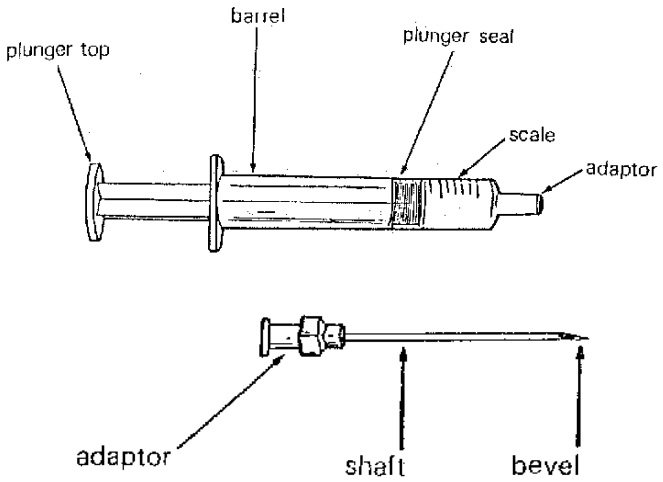


Figure 4.4. 1: Parts of a needle and syringe[7]

4.5 Handling Syringes and Needles Safely

To avoid contamination when holding a syringe to give an injection, do not touch parts that come into contact with the vaccine or the patient.

Do not touch:

- the shaft, bevel or adaptor of the needle
- the adaptor, plunger seal or plunger shaft of the syringe

If any of these parts is touched by accident, discard the syringe and needle and get new sterile ones.

The barrel and the plunger top may be handled when holding the syringe.

4.6 Types and Sizes of Syringes and Needles

Different sizes of auto-disable (AD) and conventional syringes and needles are recommended for different antigens and uses. Table 4.6.1 describes the various

[7] Sources: Immunization in Practice: A Practical Guide for Health Staff, updated 2015

types of syringes and needle sizes recommended for each antigen offered in the EPI, as well as their respective doses and routes of administration

Table 4.6. 1: Types and Sizes of syringes and needles for various vaccines[8]

Type of Syringes and Needle Size	Antigen	Dose, Route of Administration
0.05cc (AD) 26G x 3/8" 0.1cc (AD) 27G x 3/8"	BCG	0.05 ml Intradermal (children < 1 year) 0.1 ml Intradermal (children ≥ 1 year)
0.1 cc (AD) 27G x 3/8"	IPV (Inactivated Polio) Fractional Dose	0.1 ml Intradermal
0.5cc (AD) 22G x 1 1/2"	dT Adult Influenza Adult [(a)] Pneumococcal Polysaccharide (PPV)	0.5 ml Intramuscular
0.5cc (AD) 23G x 1"	Hepatitis B Paed (children < 1 year) H. influenzae type b (Hib) Pentavalent (DPT Hep B Hib) DPT DT Paed Pneumococcal Conjugate (PCV) HPV (Human Papillomavirus) Meningogoccal Conjugate IPV (Inactivated Polio) Influenza Paed (≥3 years) [(b)]	0.5 ml Intramuscular
0.5cc (AD) 25G x 5/8"	Yellow Fever MMR (Measles-Mumps-Rubella) Varicella	0.5ml Subcutaneous
1cc (Conventional) 22G x 1 1/2"	Hepatitis B Adult	1.0 ml Intramuscular
1cc (Conventional) 23G x 1"	* Influenza Paed (6-35 months) [(c)]	0.25 ml Intramuscular
(a) Older than 9 years: 1 dose of 0.5ml per year (b) 3 to 8 years: a dose of 0.5ml (with vaccination history) every year (c) 6 to 35 months: Two (2) doses of 0.25ml. Intervals of 1 month		

4.7 Mixing Vaccines

Most vaccines come in vials, however, there are instances where they are packaged in ampoules. A vial is a glass bottle with a rubber stopper held in place by a metal cap. The centre of the metal cap is pre-cut so that it can easily be removed. Vials and ampoules are shown in Figures 4.7.1 and 4.7.2 respectively.

[8] Adapted from the modified WHO Guide for needle size, vaccine, dose and route of administration

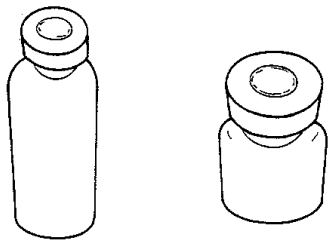


Figure 4.7. 1: Vials

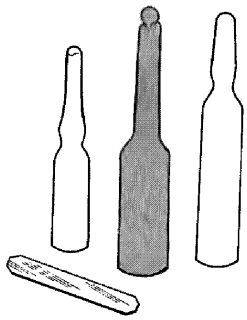


Figure 4.7. 2: Ampoules and Metal file

BCG, MMR and Hib vaccines are dry-powder preparations that must be mixed with a fluid (diluent) before they can be used. This process is known as 'reconstitution'. Yellow Fever vaccine is mixed in a similar manner as the MMR vaccine.

> Important:
>
> Once reconstituted vaccines have been mixed with diluent, they can only be used for six hours. Do not mix the vaccine until clients have arrived and you are ready to vaccinate them.

The following are recommended steps to take when mixing vaccines:

1. Wash your hands with clean water and soap
2. Read the label on the ampoule or vial to be sure that:
   - the correct diluent and vaccine based on the manufacturer's instructions have been selected for mixing
   - the expiry dates for the vaccine and diluent have not passed

- the vaccine vial monitor (if present) has not changed colour

3. Inspect the ampoule or vial for cracks
4. Flick the vial or ampoule to make sure all the vaccine powder is at the bottom (as illustrated in Figure 4.7.3). For a vial, remove the cover

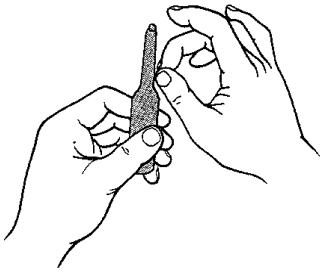


Figure 4.7. 3: Flicking a Vaccine Ampoule

5. To open the ampoule, break off the pointed glass top
6. Hold the ampoule in a piece of gauze or clean cloth when breaking the top off to guard against glass splinters (as illustrated in Figure 4.7.4). For a vial, open it by lifting the centre of the metal cap and bending it back

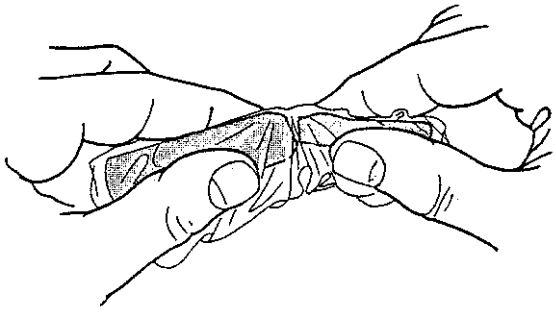


Figure 4.7. 4: Breaking off the Neck of an Ampoule

7. Draw up all the diluent in the ampoule into a sterile mixing (3-5 ml) syringe with a sterile mixing (20-22 gauge) needle. Figure 4.7.5 illustrates how to pull up fluid from an ampoule

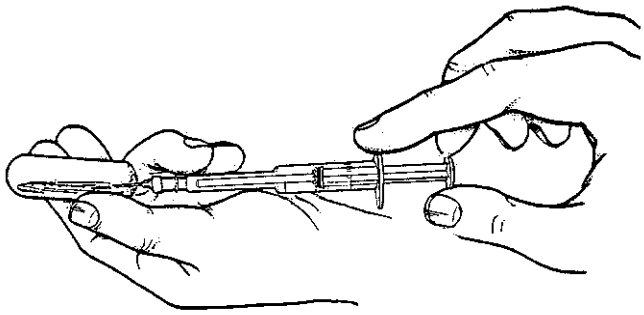


Figure 4.7. 5: Taking fluid from an ampoule

8. Insert the mixing needle into the vaccine vial or ampoule. Hold the plunger end of the mixing syringe between your index and middle fingers and push the plunger in with your thumb. This empties the diluent into the vaccine

9. To mix the diluent and vaccine, draw them slowly up into the syringe and inject them slowly back into the ampoule or vial. Repeat this several times. They may also be mixed by gently swirling the vial

10. Wrap the mixed vaccine in gauze or paper to protect it from dirt and sunlight

11. Place the mixed vaccine in a cup or gallipot in the vaccine carrier, so it does not come in direct contact with ice packs

12. Dispose of the empty diluent ampoule in a sharps container (biohazard container)

Dispose of all mixed vaccine within the appropriate time interval.

4.8 Giving Immunizations

1. Wash your hands before and after immunizing each child. Practicing hand hygiene removes germs and bacteria and helps to prevent contamination.

Note however that, even after thorough washing, some germs remain on the hands. As such, touch syringes and needles as little as possible

2. Check vial labels on any vaccine or diluent before use. Be sure that the correct vaccine and diluent are being used. If the label has come off or the expiry date has passed, record the batch and lot numbers and return them to your supervisor for disposal

3. Before an injection, clean the patient's skin with a cotton swab and water. A small amount of soap may be used (if needed), but make sure that all soap is washed off the skin prior to injecting vaccine.

> In the past, alcohol and a cotton swab were used to clean the skin before administration of vaccine. Because of the potential for interaction between alcohol and vaccines, this practice is no longer recommended. For example, alcohol destroys MMR vaccine. If alcohol is used, ensure that the skin is completely dry prior to injection of vaccine and do not apply an alcohol-soaked swab to the vaccination site following injection.

4. When ready to give an injection, locate the appropriate sterile syringe and needle (as shown in Table 4.6.1) and draw up the vaccine as follows:
   - Gently swirl the vial to ensure a homogeneous consistency
   - Push the needle through the rubber stopper into the vaccine vial
   - Inject air into the vial by pushing in the plunger; note however that this maneuvre may disable AD syringes before injections are given, therefore refer to manufacturer instruction for these syringes
   - Draw the vaccine out of the vial by pulling back the plunger

> Never pre-fill multiple syringes and store them in the vaccine carrier. Too many errors can occur when vaccines are pulled up in advance and left in the vaccine carrier. Therefore, always pull-up vaccines just prior to injecting.

5. Point the bevel of the needle upwards and press in the plunger to get rid of air bubbles and excess vaccine. Read the scale on the barrel of the syringe to make sure that the correct amount of vaccine is in the syringe. The vaccine injection is now ready for administration

6. Position the client as appropriate for the specific vaccine

7. Restrain the child appropriately to help limit strain on the child's limbs and prevent tissue damage. Appropriate restraint also protects the caregiver and vaccinator from accidental needle sticks

8. Inject the vaccine

For vaccines to work, they have to be administered at the preferred site and with the most effective technique. Choosing a needle of the appropriate length and gauge ensures that vaccine is deposited in the correct tissue layer. Vaccines can enter the body through different routes:

- Intradermal – between the layers of the skin (dermis)
- Intramuscular – into the muscle
- Subcutaneous – under the skin
- Oral – into the mouth

Figure 4.8.1 shows the parenteral routes for immunization.

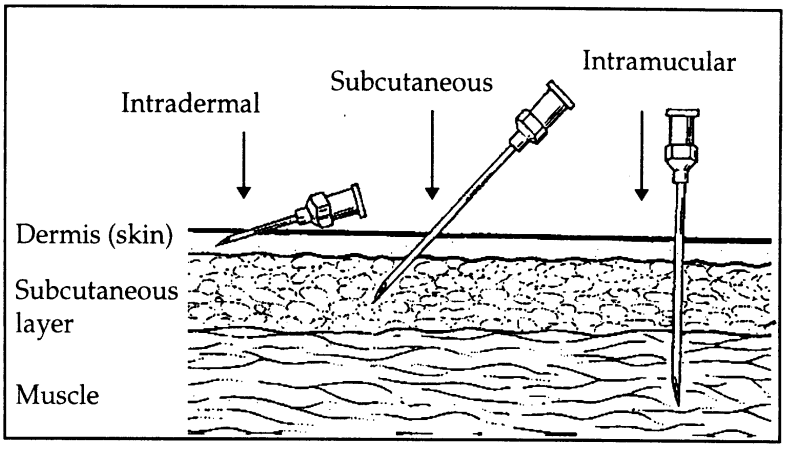


Figure 4.8. 1: Parenteral Routes of Vaccination

Immunizations should be given…

- to the right patient
- with the right vaccine and diluent (when applicable)
- at the right time (including correct age and interval, as well as before the product expiration date/time)
- with the right dosage
- via the right route
- using the correct needle gauge and length and technique
- at the right site
- with the right documentation after immunization

4.9 Multiple Immunizations

If multiple vaccines are administered at a single visit, administration of each preparation at a different anatomic site is desirable. For infants and younger children, if more than two vaccines are injected in a single limb, the thigh is the preferred site because of the greater muscle mass. For older children and adults, the deltoid muscle can be used for more than one IM injection. The injection sites should be separated by one inch or more, if possible, so that any local reaction can be differentiated.

Use a separate limb for most reactive vaccines (e.g. TT-containing and PCV vaccines).

A summary of the injection sites and needle lengths by age for subcutaneous and intramuscular injections is provided in Table 4.9.1

Table 4.9. 1: Summary of Injection Sites and Needles Sizes by Age

Subcutaneous (SC) injections: use a 23-25G needle. Choose the injection site that is appropriate for the person's age and body mass		
Age	**Needle Length**	**Injection Site**
Infant (1-12 months)	5/8"	Fatty tissue over anterolateral thigh muscle
Children 12 months or older, adolescents and adults	5/8"	Fatty tissue over anterolateral thigh muscle or triceps
Intramuscular (IM) injections: use a 22-25G needle. Choose the injection site that is appropriate for the person's age and body mass		
Age	**Needle Length**	**Injection Site**
Newborns (1st 28 days)	5/8"	Anterolateral thigh muscle
Infants (1-12 months)	1"	Anterolateral thigh muscle
Toddlers (1-2 years)	1-1 ¼"	Anterolateral thigh muscle
	5/8-1"	Deltoid muscle of arm
Children (3-10 years)	5/8-1" *	Deltoid muscle of arm
	1-1 ¼"	Anterolateral thigh muscle
Adolescents and teens (11-18 years)	5/8-1" *	Deltoid muscle of arm
	1-1 ½"	Anterolateral thigh muscle
Adults 19 years or older:		
- Females or male <130 lbs	5/8-1" *	Deltoid muscle of arm
- Female or male 130-152 lbs	1"	Deltoid muscle of arm
- Female 153-200 lbs - Male 153-260 lbs	1-1 ½"	Deltoid muscle of arm
- Female 200+ lbs - Male 260+ lbs	1 ½"	Deltoid muscle of arm

*A 5/8" needle may be used for patients weighing less than 130 lbs (<60kg) for IM injection in the deltoid muscle only if the skin is stretched tight, the subcutaneous tissue is not bunched and the injection is made at a 90-degree angle.

Always refer to the package insert included with each vaccine for complete administration information.

The route and site of administration for each of the EPI vaccines is shown in Table 4.9.2. Administration techniques are discussed in detail in the following pages.

Table 4.9. 2: Summary of Childhood Vaccine Dosing, Administration Route and Needle Size

Vaccine	Dose/Administration Route and Area	Needles Size
BCG	0.05ml intradermal in the right arm's upper third deltoid region	26G x3/8 inch
OPV	2 drops orally	N/A
Hep B	0.5 ml deep intramuscular in the thigh's external anterolateral middle third.	23G x 1 inch
Pentavalent (DPT + HepB + Hib)	0.5 ml deep intramuscular in the thigh's external anterolateral middle third.	23G x 1 inch
IPV	0.5 ml deep intramuscular in the thigh's external anterolateral middle third.	23G x 1 inch
Yellow Fever	0.5 ml subcutaneous in the deltoid muscle area of the right or left arm.	25G x 5/8 inch
MMR	0.5 ml subcutaneous in the deltoid muscle area of the right or left arm.	25G x 5/8 inch
Adult DT	0.5 ml intramuscular in the deltoid muscle area of the right or left arm.	22G x 1 ½ inch
DPT	0.5 ml deep intramuscular in the thigh's external anterolateral middle third or in the deltoid area of the arm	23G x 1 inch
Paediatric DT	0.5 ml intramuscular in the deltoid muscle area of the right or left arm.	23G x 1 inch

4.10 How to Give an Intradermal Immunization: BCG

BCG vaccine is the only vaccine given solely by intradermal injection. The site of injection is the right upper arm, preferably below the deltoid insertion. Injecting the vaccine in the same place for each child makes it easy to find the BCG scar later.

To measure and inject BCG accurately, the immunization officer should:

- use a special BCG syringe (0.05 ml or 0.1 ml), and a special BCG needle (26 or 27 gauge x 3/8 inch length)

- ask the caregiver to free the child's right arm from his/her clothing, seat the child on caregiver's lap, and hold the child firmly. This is known as the 'cuddle position'
- hold the child's arm with the left hand so that:
  - the officer's left hand is under the child's arm
  - the officer's thumb and fingers reach around the child's arm and stretch the skin tight
- hold the syringe in the right hand, with the bevel of the needle facing up towards the immunization officer
- hold the syringe by the barrel and avoid touching the plunger
- lay the syringe and needle almost flat along the child's arm with the needle in the direaction of the child's shoulder. Figure 4.10.1 illustrates how to position the child's arm and hold the syringe.

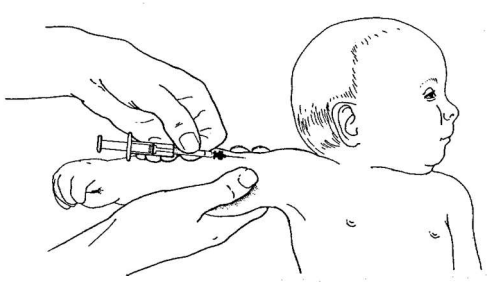


Figure 4.10. 1: Position of Syringe and Needle

- insert the tip of the needle just under the skin – insert only the bevel and slowly advance the needle
- keep the needle flat along the arm, so that it goes into the top layer of skin only
- keep the bevel facing upward. Figure 4.10.2 illustrates the positioning of the needle in the skin
- avoid pushing the needle too far and avoid pointing the needle down or it will go under the skin
- place the left thumb on the syringe near the needle to hold the needle in position, but avoid touching the needle
- hold the plunger top between the index and middle fingers of the right hand and press the plunger top in with the right thumb
- inject the vaccine and remove the needle

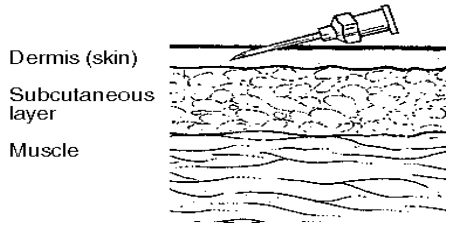


Figure 4.10. 2: BCG Needle Position (Intradermal)

If the BCG vaccine has been injected correctly, a clear, flat-topped swelling on the skin, like a mosquito bite, will be seen. The swollen skin may look pale with small pits (an orange peel appearance).

If BCG is injected under the skin, an abscess or enlarged glands may result.

When an intradermal injection is given correctly, the plunger is hard to push. If the vaccine goes in easily, the needle may have been injected too deeply. In this event:

- stop injecting immediately, correct the position of the needle and give the remainder of the dose but no more
- count the child as being injected if the whole dose has already gone under the skin. Do not repeat the dose
- ask the parent to return with the child if any side effects, such as abscesses or enlarged glands, appear

4.11 How to Give a Subcutaneous Immunization

MMR and Yellow Fever (YF) vaccines are administered subcutaneously. The preferred site for subcutaneous injection is the upper outer arm based on its accessibility and good vaccine uptake. A subcutaneous injection should be given into healthy tissue that is away from bony prominences and free of large blood vessels or nerves.

To inject MMR and YF correctly:

- use a sterile 0.5ml syringe and 25 gauge x 5/8 inch length needle

- ask the caregiver to free the child's right or left arm from his/her clothing, seat the child on the caregiver's lap, and hold the child firmly. This is known as the 'cuddle position'. If the injection is to be made into the child's left arm, he or she should sit on the caregiver's lap as follows:
    - the caregiver's left arm should be around the child, supporting her or his head and holding the left shoulder
    - the child's right arm should be tucked around the caregiver's body
    - the caregiver's right arm should hold the child's legs out of the way, and the caregiver's right hand should hold the child's left hand. Figure 4.11.1 illustrates the positioning of a child for subcutaneous injection

Figure 4.11. 1: Holding Child for Subcutaneous Immunization

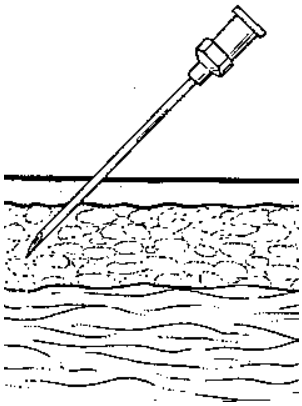


Figure 4.11. 2: Needle Position for Subcutaneous Immunization

- hold the child's arm from underneath, with fingers reaching around the arm and gently pinching up the skin
- push the needle into the pinched-up skin at a 45° angle so that it goes below the dermal layer of the skin, but not into the muscle. Figure 4.11.2 shows the correct position of the needle under the skin for a subcutaneous injection
- support the end of the syringe with your thumb and finger to control the needle while pushing it in. Avoid touching the needle itself. Figure 4.11.3 illustrates how the child's arm and syringe should be held
- press the plunger with the thumb to inject the vaccine
- withdraw the needle and press the site with a clean, dry cotton swab

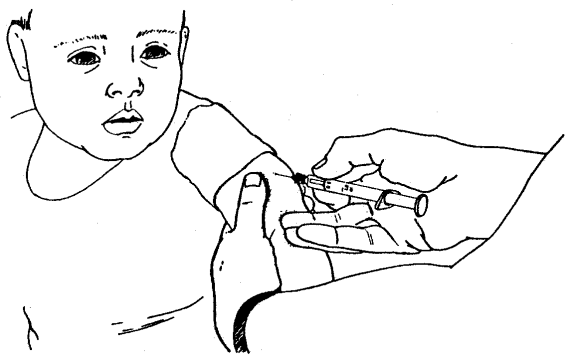


Figure 4.11. 3: Giving Vaccine Subcutaneously

4.12 How to Give an Intramuscular Immunization

For children less than 18 months old, the preferred site for intramuscular injection is the antero-lateral aspect of the thigh between the middle and upper thirds (as shown in Figure 4.12.1). The vastus lateralis muscle in the thigh provides the largest muscular mass. In thigh injections, the needle should be angled towards the patella (knee cap).

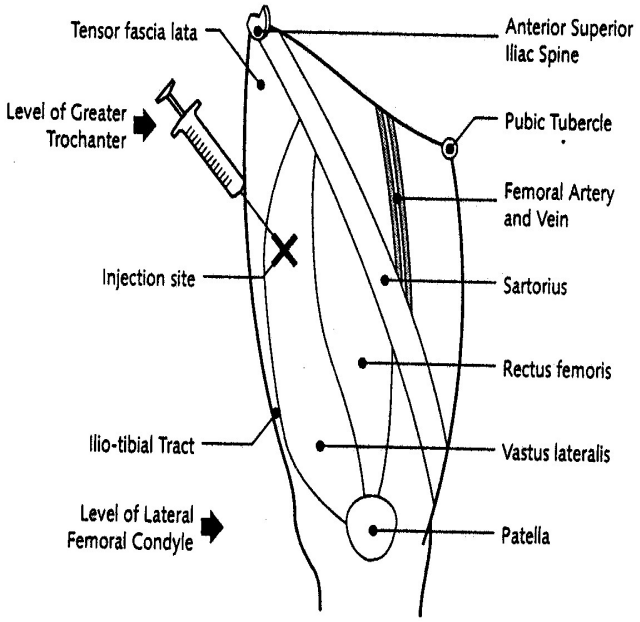


Figure 4.12. 1: IM injection Site in Antero-lateral Thigh (Vastus Lateralis)[9]

In children 18 months of age and older, and in adults, the deltoid muscle has achieved sufficient size to offer a convenient site for intramuscular injection. The deltoid muscle is located in the lateral aspect of the upper arm (as shown in Figure 4.12.2). The injection area is a small triangle pointing downward from a line extending along the lower edge of the acromion process to the midpoint of the lateral aspect of the upper arm. The injection site is in the centre of the triangle. For deltoid injections the needle should be angled towards the acromion.

[9] Source: The Australian Immunization Handbook, 7th Edition

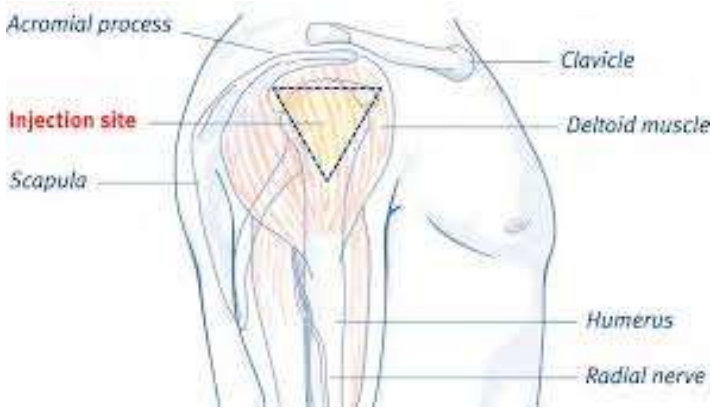


Figure 4.12. 2: IM Injection Site in Upper Arm (Deltoid Muscle)[10]

More superficial injections of toxoid vaccines result in greater rates of local reaction (e.g. sterile abscess) than deeper ones. Careful use of a longer needle will cause less damage than a short needle.

> Gluteal vaccinations are not recommended**.** Use of the buttock for vaccine administration is to be avoided because of risks of abscess formation, damage to the sciatic nerve, and effects on vaccine efficacy.

Pentavalent (DPT/HepB/Hib), DT, DPT, Hepatitis B and Hib vaccines are given by intramuscular injection. The following steps are recommended for the administration of IM vaccines:

- Select the appropriate needle, syringe and administration site based on the client's age
- To position a child:
  - ask the caregiver to free the child's leg or arm from his/her clothing, seat the child on the caregiver's lap, and hold the child firmly. This is known as the 'cuddle position'
  - allow the child to be seated in the caregiver's lap

[10] Source: Queenland Clinical Practice Procedures: Drug Administration/Intramuscular. Accessed. July 2020. https://www.ambulance.qld.gov.au/docs/clinical/cpp/CPP_Intramuscular.pdf

- if the injection is to be made into the child's thigh:
    - the caregiver's arm should be around the child, supporting the head and shoulder
    - the child's inside arm should be tucked around the parent's body
    - the caregiver's other arm and hand should hold the child's legs firmly. Figure 4.12.3 illustrates hold the child should be held for IM injection in the thigh

Figure 4.12. 3: Holding Child for IM Injection

- if the injection is to be made into the child's deltoid:
    - the caregiver's arm should be around the child, supporting the head and shoulder
    - the child's inside arm should be tucked around the caregiver's body
    - the caregiver's other arm should hold the child's legs out of the way, while the caregiver's hand holds the child's hand

- Stretch the skin of the thigh or upper arm flat between your finger and thumb.
- Quickly push the needle straight down through the skin between your finger and thumb. Go deep into the muscle. Figure 4.12.4 shows the correct position of the needle in the muscle
- Press the plunger with your thumb to inject the vaccine
- Withdraw the needle and press the site with a piece of clean, dry cotton

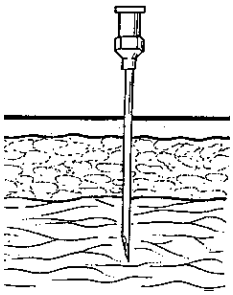


Figure 4.12. 4: Needle Position for IM Injection[11]

4.13 How to Give Oral Immunization: OPV

Oral Poliovirus Vaccine (OPV) comes in either a plastic dropper bottle or a glass vial with the dropper in a separate plastic bag. To administer OPV:

- Open the OPV container
  - To open a dropper bottle, remove the cap and break off the plastic closure
  - To open a glass vial, remove the metal cap and rubber stopper
  - Then, cut open the plastic bag containing the dropper and fit the dropper on the open vial (as illustrated in Figure 4.13.1)

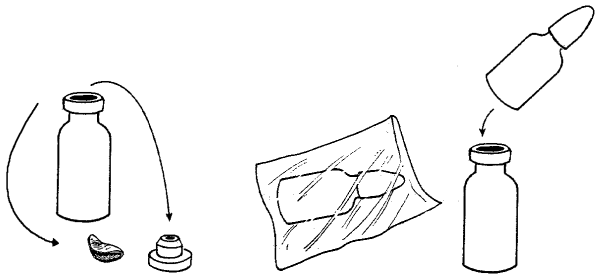


Figure 4.13. 1: Opening a Glass Vial

- Ask the caregiver to hold the child firmly, with the child lying on her or his back or in sitting position
- Open the child's mouth by squeezing the cheeks gently between your fingers. This makes the child's lips point outward

[11] Source: Immunization Handbook, Ministry of Health, New Zealand,1996

- Hold the dropper over the child's mouth at an angle of 45°. Let the correct dose of vaccine fall from the dropper on to the child's tongue
- If the child spits the vaccine out, give another dose. Figure 4.13.2 shows how OPV is given

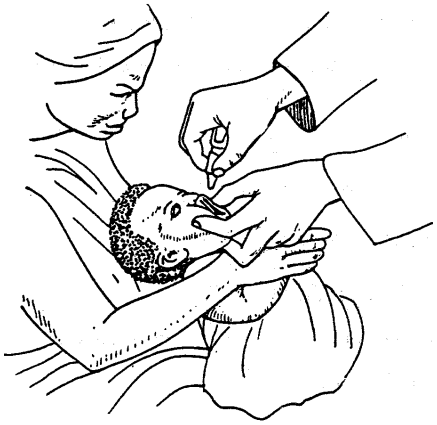


Figure 4.13. 2: Giving OPV, showing the Dropper at an Angle

> Remember:
> OPV is not usually given to HIV-exposed infants. Use IPV instead.
> OPV is also the most heat sensitive of the EPI vaccines.

4.14 Disposal of Syringes and Needles After Immunization

After immunization:

- to avoid needle-stick injuries, do not recap the needle or separate the syringe and needle after vaccination
- safely dispose of all used needles, syringes, vials and ampoules
- immediately after use, syringes, needles and empty vaccine vials/ampoules must be placed in a puncture-proof container (disposal box, sharps container, biohazard container)

Keep containers as close as possible to where injections are given. Containers should be waterproof and tamper-proof, and needles should not be able to pierce them. Figure 4.14.1 shows how to assemble and use a ready-made safety box.

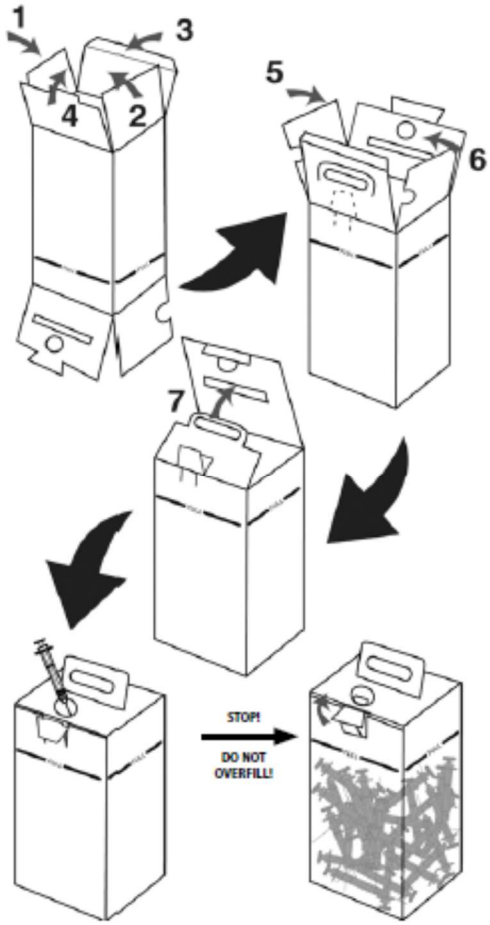


Figure 4.14. 1: Puncture-proof Safety Box Assembly and Use

If needle boxes are unavailable, use containers made of thick plastic or metal cans that have narrow necks to prevent syringes and needles from being taken out. Figure 4.14.2 shows a hand-made sharps disposal box.

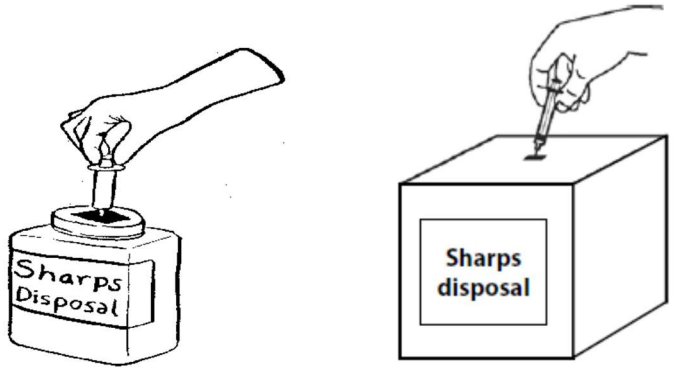


Figure 4.14. 2: Handmade Disposal Box

Contaminated sharps should not be transferred from container to container. When a disposal box is three-quarters full, it should be sent for incineration (burning). If only burning is done, the remains of the needles and disposal box should be buried after burning. Bury them deeply in a pit latrine, controlled landfill or a similar location where people do not have access to them. If used needles and syringes are collected from health centres by the parish supervisor, he/she is then responsible for disposing of them safely.

At the end of the immunization session:

- record the date of each vaccine given on the immunization card/CHDP, and sign for each vaccine given
- record the following information in the client's medical record, for each vaccine given:
    - type of vaccine
    - dose
    - injection site
    - lot or batch number
    - date vaccine given
- record the date of each vaccine given in the immunization tracking register
- ask the caregiver or client to stay at the clinic for at least 30 minutes following vaccination
- while thanking the caregiver or client for coming, remind her or him about:
    - the date and time of the next immunization
    - where to attend for the next immunization
    - the number of immunization visits remaining
    - the side effects that may occur
    - how to deal with these side-effects

4.15 Preventing Injuries & Infections when Administering Vaccines

Always use Standard Precautions when handling injection equipment, to reduce the risk of injuries and infections among health care workers. Standard Precautions are simple practices of infection prevention and control which reduce the risk of transmission of blood borne infections. They should be applied throughout the immunization programme. Refer to the *Guidelines for the Prevention of Accidental Exposure to Body Fluids* issued by the National HIV-STI Programme of the Ministry of Health and Wellness. The immunization programme advocates close adherence to these guidelines, which includes the following precautions:

1. Carefully handle and dispose of 'sharps'

Transmission of blood-borne diseases such as Hepatitis B, C, and HIV can occur in health care settings when the skin is punctured with contaminated needles or 'sharps'. Such needle-stick injuries frequently occur when needles are recapped, improperly handled or disposed of, or inappropriately discarded.

- ✓ To prevent these injuries, avoid recapping needles whenever possible
- ✓ Puncture-resistant disposal containers must be available and readily accessible for the disposal of 'sharps'. Other puncture-proof containers such as a thick plastic bottle can be used if the prescribed biohazard container is not available
- ✓ It is important to wear heavy-duty gloves when transporting 'sharps' containers
- ✓ Sharps containers should not be emptied. They should be burned in a closed incinerator, when they are ¾ full, at a high enough temperature to melt the needles

Added precautions to prevent 'sharp' injuries include having an adequate light source when treating clients, locating sharps containers directly at the point of use, never discarding 'sharps' in general waste, and keeping 'sharps' out of the reach of children. Whenever possible, needle holders should be used when suturing.

2. Wash hands with soap and water before and after all procedures

3. Use protective barriers such as gowns, aprons, masks and goggles for direct contact with blood and other body fluids. Health care workers with

recent grazes or skin defects should cover them with an impermeable dressing prior to contact with a client

4. Safely dispose of waste contaminated with blood or body fluids
    - Syringes and needles are considered as “high risk equipment” because they have penetrated the body. They should be disposed of immediately after use

5. Properly disinfect instruments and other contaminated equipment
    - Spills involving blood or other bodily secretions on work surfaces should be cleaned with bleach (diluted 1 to 9 parts water) and the area thoroughly washed with hot soap and water

6. Properly handle soiled linen
    - Contaminated linen is adequately treated by a routine hot wash cycle (60-70°C) using ordinary bleach concentration
    - All soiled linen should be handled as little as possible, bagged at the point of collection and not sorted or rinsed in patient care areas. If possible, linen with large amounts of body fluid should be transported in leak proof bags. If leak proof bags are not available, the linen should be folded with the soiled parts inside and handled carefully, with gloves

4.16 Accidental Sharps Injury or Exposure to Blood, Blood Products or Bodily Fluids

Following a ‘sharps’ injury, immediate first aid should be given:

- Flush the site of contamination thoroughly with large amounts of running water
    - Needle sticks and cuts should be washed with large amounts of water
    - Splashes to the nose, mouth or skin should be flushed with water
    - Eyes should be irrigated with clean water or saline
- If the site is bleeding, allow it to bleed briefly
- Antiseptic solutions (bleach, alcohol, Savlon) can have a caustic effect and have not been proven to be effective. They are therefore not recommended for use

The type of exposure and the actions taken should be recorded and the appropriate authorities (especially the immediate supervisor) should be notified promptly.

- In hospital, report the incident to the infection control nurse or designate on each shift
- At the health centre, report the incident to the nurse in charge, who should report to the parish Public Health Nurse and parish Medical Officer of Health
- At the lab, report the incident to the Chief Medical Technologist or designated individual

An exposure report form (see Appendix G) should be completed including information about the type of injury, any witnesses to the injury and the name of the client, if known. Completed forms should be submitted to the parish Medical Officer of Health.

Assess the risk of acquiring Hepatitis B, Hepatitis C and HIV. The risk of infection varies with the type of exposure and factors such as:

- the amount of blood involved in the exposure
- the HIV, Hepatitis B and Hepatitis C status of the patient's blood at the time of exposure
- the severity of the injury e.g. scalpel or large bore needle injury increases risk
- the anatomical site at which sharp was used e.g. use in artery or vein poses greater risk than use in muscle or mucous membrane.

Table 4.16.1 outlines the recommended prophylaxis following possible occupational exposure to HIV.

Table 4.16. 1: Recommended Prophylaxis following Possible Occupational Exposure to Known and Unknown HIV Positive Source[12]

Type of Exposure	Risk	Source	Antiretroviral	Suggested Regimen
Percutaneous	High risk	Know HIV positive	May be recommended	TLD (TDF+3TC + DTG)
	Low risk	Unknown serostatus	Should be offered	TLD (TDF+3TC + DTG) (Duration 4 weeks)
Mucous membranes; Non-intact skin	Large volume	Know HIV positive	May ne recommended	TLD (TDF+3TC + DTG)
	Small volume (few drops)	Unknown serostatus	Should be offered	TLD (TDF+3TC + DTG) (Duration 4 weeks)

*Alternatives for ART choices

- TDF/3TC alternative ABC/3TC
- DTG alternative ATV/r

NOTE

- Prophylaxis should be offered ideally within hours of exposure; however clinical benefit remains up to 72 hours.
- Begin prophylaxis if source patient is HIV positive or of unknown HIV status as recommended - perform HIV serology on source patient and if result is negative stop prophylaxis. If HIV screening is refused by source patient, consider as unknown HIV status and treat as recommended.
- Recommended dose for TLD (Tenofovir+Lamivudine+Dolutegravir) is 300mg/300mg/50mg one tablet PO once per day for four weeks

[12] Source: MOHW Jamaica. Clinical Management of HIV Disease: Guidelines for Medical Practitioners. 2020

- Recommended alternative to TLD for PEP is TDF/3TC (Tenofovir+Lamivudine) 300mg/300mg one tablet PO once per day plus ATV/r (Atazanavir/Ritonavir) 300mg/100mg one tablet PO once per day for four weeks
- Conduct baseline HIV serology on exposed patient and repeat after three months
- Pregnant women should be counselled on the possible side effects of TLD use in pregnancy and provide written consent. If the client does not wish to/or is unable to consent, then the TDF/3TC+ATV/r alternative should be used for PEP

Once PEP has been offered, there should be:

- Adequate follow-up, as previously outlined
- Ensuring and maintenance of confidentiality
- On-going support as required
- Appropriate referrals where necessary

Refer to the *Clinical Management of HIV Disease Guidelines for Medical Practitioners 2020* for more information.

Chapter 5: Adult & Older Child Immunization

5.1 Introduction

Today fewer children die each year from vaccine-preventable diseases than adults. This is attributable to the tremendous achievement of childhood immunization programmes. Efforts are now required to achieve an equivalent success with adult morbidity and mortality.

Vaccines are an important step in protecting adults and older children against serious, sometime deadly diseases for the following reasons:

- Even if persons were vaccinated during infancy or early childhood, the protection for some vaccines can wear off with time
- The viruses or bacteria that the vaccine protects against may change with time, so that the individual's resistance may not be as strong
- As one gets older, one may be at increased risk for vaccine preventable diseases due to age, job, hobbies, travel or health conditions

The routine vaccination programme established for children under the age of seven years is protected by the Public Health Act Immunization Regulation (Amended 2013). The MOHW has also made provisions for the administration of selected vaccines to adults and older children in specified target groups as follows:

- women of childbearing age
- adults during special campaigns or who require certain vaccines such as DT, MMR, Polio, Hep B under special circumstances
- people with wounds which require administration of DT
- contacts of person infected with Hepatitis B
- health care workers
- travelers
- adolescents

BCG, Hib, and Pertussis are not given to older children and adults. The specific age limit for children varies according to the vaccine (refer to Chapter 4 on Vaccines).

Table 5.1.1 shows the vaccines provided by the MOHW for adults and older children in specified target groups. Table 5.1.2 summarizes the recommended vaccines for special groups.

Table 5.1. 1: Vaccines provided by MOHW for adults and older children in specified target groups

Vaccine	Target groups
HPV	Females 9-26 years and males 9-14 years of age
Seasonal influenza (inactivated)	Health care workers, pregnancy women, children and elderly with chronic illnesses, non-health frontline workers, parliamentarians, institutionalized persons
DT	Pregnant women, special high-risk populations, e.g. farmers, diabetics, elderly, carpenters and those with similar occupational hazards for tetanus
Hep B	Persons at high risk of Hep B infection (e.g. contacts of cases, person in high risk occupations), adolescents with HIV that were not previously vaccinated in childhood
MMR	Adults and older children that are not fully vaccinated
Polio	Persons traveling to endemic countries that require booster doses
Yellow Fever	Persons traveling to endemic countries

When a vaccine is given to an adult or older child for any reason, it must be recorded in the Adult & Older Child Immunization Register, the client's health record, and the client's immunization card.

Table 5.1. 2: Recommended Vaccines for Special Groups

Special group	Recommended Vaccine	Remarks
Health care workers	Flu, Hep B, DT, MMR	See MOHW Infection Prevention and Control Manual
Pregnant women	DT, Flu	
Special occupations: Emergency responders and other frontline workers (fire, armed forces); sanitation workers; fisher folk	Flu, Hep B, DT	
Adults with chronic conditions:		
Cardiovascular disease	Flu	
Diabetes mellitus	Flu, DT, Hep B	
Liver disease	Flu, DT, Hep B, MMR	
Renal disease	Flu, DT, Hep B, MMR	
HIV	CD4≥200: Flu, DT, Hep B, MMR CD4<200: Flu, DT, Hep B	Regarding Hep B: only HbsAb and HbsAg negative individuals should be vaccinated; adolescents living with HIV who were not immunized against Hep B should be immunized.
Other immunocompromised	Flu, DT	
International travelers	Yellow fever, OPV*	
Immigrants and refugees	DT, MMR, OPV	See MOHW's: Action Plan for the Medical and Health Management of Refugees / Displaced Persons / Illegal Immigrants

*OPV booster recommended if travelling to an endemic country

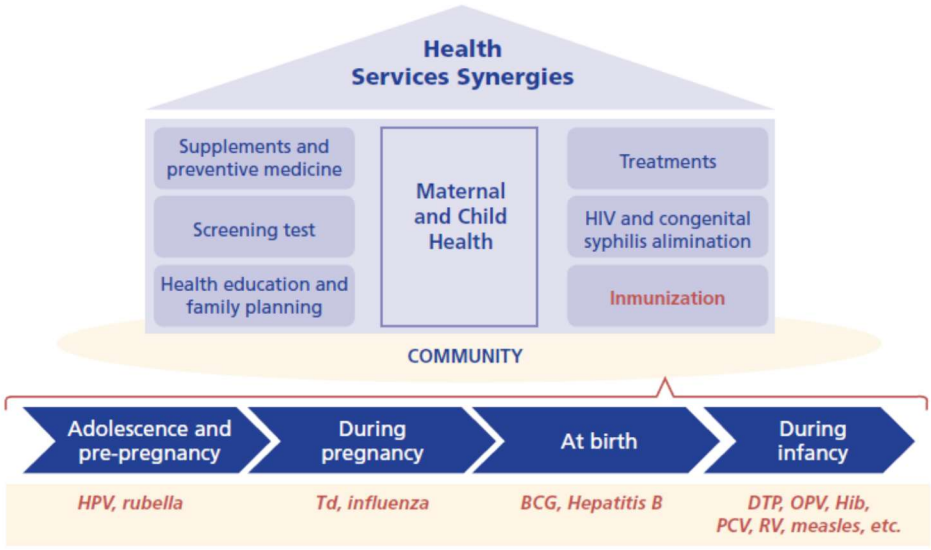
5.2 Vaccination with DT (Adult) and Prevention of Tetanus Following Injury

Table 3.4.1 provides guidance on when to vaccinate with DT and when to give Tetanus Immune Globulin (TIG) in the case of injury. After an injury, it is very important that all wounds are adequately cleaned, and that foreign material and dead tissue are removed from the wound. Treatment decisions are based on the type of wound and the patient's immunization history. If vaccines are needed, they should be given as soon as possible following injury. DT and TIG may be given at the same time as long as they are injected into different limbs, using separate syringes.

5.3 Maternal and Neonatal Immunization

Maternal and neonatal immunization refers immunization to given prior to pregnancy, during pregnancy, and during the post-partum period, for the purpose of decreasing transmission of diseases from the mother to the foetus and newborn. Maternal immunization is intended to provide protection not only to the mother, but also to the foetus and newborn by allowing transfer of high concentrations of protective antibodies from the mother to the child until active immunization of the infant can take place.

Figure 5.3.1 illustrates how maternal immunization is aligned with the wider immunization programme and how it is integrated into the continuum of maternal, neonatal, child and adolescent care.



HPV: Human papiloma virus; Td: Tetanus toxoid and diphtheria toxoid; BCG: Bacillus Calmette-Guérin vaccine; DTP: Combined vaccine against diphtheria, tetanus and pertussis; OPV: Oral polio vaccine; Hib: Vaccine against *Heomophilus influenzae* type b; PCV: Pneumococcal conjugate vaccine; RV: Rotavirus vaccine.

Figure 5.3. 1: Integration of Maternal Immunization with Other Health Services[13]

The WHO highly recommends maternal immunization for preventing neonatal tetanus and influenza.

Tetanus is particularly common in newborn infants and their mothers when they have not been adequately vaccinated. Neonatal tetanus is on the verge of elimination worldwide and can be prevented by immunizing women of reproductive age with tetanus-containing vaccine, either prior to or during pregnancy.

Pregnant women are at increased risk of influenza illness and its complications, and so are their infants. The negative impact of influenza infection on pregnant women and newborns is well documented. Influenza vaccination is recommended at any stage of pregnancy to protect both mother and infant.

Recommendations for maternal vaccination in Jamaica are summarized in Table 5.3.1

[13] PAHO/WHO. Maternal and neonatal immunization field guide for Latin America and the Caribbean. 2017

Table 5.3. 1: Recommended maternal immunization schedule[14]

	Vaccine	Pre-pregnancy	Pregnancy	Post-partum
Vaccines recommended during pregnancy	Tetanus/ diphtheria	Yes (ideal time)	Yes, 2 doses if not previously vaccinated	Yes, to complete the schedule
	Inactivated influenza		Yes (ideal time)	Yes, if she was not vaccinated during pregnancy, to protect the newborn
Vaccines recommended during pregnancy in special situations only	Hepatitis B		Yes, if she did not complete the schedule and if under a high-risk situation (e.g. >1 sexual partner during previous 6 months, STD, injection drug user, partner +ve for HBsAg	Yes, to complete the schedule (3 doses)
	Yellow fever		Yes, prior to travel to endemic areas under current outbreak, with prior risk/ benefit analysis	
	IPV		Yes, prior to travel to endemic areas under current outbreak	
	OPV		Yes, prior to travel to endemic areas under current outbreak	
Vaccines NOT recommended in pregnancy	Measles, mumps, rubella	Yes (ideal time)	NO	Yes, if not vaccinated prior to pre-pregnancy
	HPV	Yes (ideal time)	NO	To complete the series if started prior to pregnancy

[14] PAHO/WHO. Maternal and neonatal immunization field guide for Latin America and the Caribbean. 2017

5.4 Vaccinating Women of Childbearing Age

When a woman of childbearing age or a pregnant woman comes for health services to the health facility:

- discuss her previous immunization history
- examine her immunization record, maternal record and health centre record
- review the tracking register for the year she was born
- decide how many doses of DT and/or MMR needs

5.4.1 Maternal Tetanus Vaccination

If a woman has received one or more doses of DPT/DT in the past and has not complete the recommended immunization schedule, refer to Table 5.4.1.1 for the catch-up schedule.

There are 3 tetanus toxoid-containing vaccines available for pregnant women:

1. Tetanus toxoid (TT)
2. Diphtheria and tetanus toxoids (Td or DT): provided by MOHW
3. Diphtheria and tetanus toxoids + acellular pertussis (Tdap)

Table 5.4.1. 1: 'Catch-up' Immunization Schedule for Women who have received One or More Doses of DPT/DT prior to Current Pregnancy[15,16]

Number of doses DPT/DT received prior to current pregnancy	Requirements for current pregnancy	Follow-up doses required after current pregnancy
1	DT2: at least 4 weeks after 1st dose DT3: at least 6 months after 2nd dose	2 doses: - DT4: at least 1 year after DT3 - DT5: at least 1 year after DT4
2	DT3: at least 6 months after the 2nd dose	2 doses: - DT4: at least 1 year after DT3 - DT5: at least 1 year after DT4
3	DT4: at least 1 year after 3rd dose	DT5: at least 1 year after DT4
4	DT5: at least 1 year after 4th dose	None
5 or more	None	None

For a woman who has never received DPT/DT or whose immunization history is unknown, refer to Table 5.4.1.2 for the recommended immunization schedule. This client requires five doses of DT for protection through her childbearing years.[17]

[15] WHO. Standards for maternal and neonatal care: maternal immunization against tetanus. 2006. http://www.who.int/reproductivehealth/publications/maternal_perinatal_health/immunization_tetanus.pdf
[16] PAHO/WHO. Maternal and neonatal immunization field guide for Latin America and the Caribbean. 2017
[17] WHO. Recommendation on tetanus toxoid vaccination for pregnant women.10 March 2018. Accessed at https://extranet.who.int/rhl/topics/preconception-pregnancy-childbirth-and-postpartum-care/antenatal-care/who-recommendation-tetanus-toxoid-vaccination-pregnant-women

Table 5.4.1. 2: Recommended DT Immunization Schedule for Previously Unvaccinated Pregnant Women and Women of Childbearing Age, and Efficacy of Vaccination[18]

Dose	Schedule	Percentage protection	Duration of protection
DT1	At 1st contact or as early as possible during pregnancy	--	--
DT2	At least 4 weeks after 1st dose	80%	3 years
DT3	6-12 months after 2nd dose or during subsequent pregnancy	85%	5 years
DT4	1-5 years after 3rd dose or during subsequent pregnancy	99%	10 years
DT5	1-10 years after 4th dose or during subsequent pregnancy	99%	Probably lifelong

5.4.2 MMR Vaccination

Recommendations for MMR vaccination for women of childbearing age are provided in Table 5.4.2.1.

Table 5.4.2. 1: MMR Schedule for Women of Childbearing Age (15-44 years)

Vaccine History	Pregnancy Status	At present contact
No history of MMR OR Unknown history	Not pregnant	Give 2 doses of MMR separated by ≥ 4 weeks
History of either: 1 dose of MMR OR 1 dose measles	Not pregnant	Give 1 dose of MMR
No history of MMR OR Unknown	Pregnant	DO NOT give MMR until postpartum
Known history of 2 doses of MMR OR 1 dose measles and 1 dose MMR	Not pregnant/pregnant	DO NOT give MMR

[18] PAHO/WHO. Maternal and neonatal immunization field guide for Latin America and the Caribbean. 2017

5.5 Immunization Recommendations for Health Care Workers

Health care workers are at risk of exposure to serious VPDs, especially those HCWs that work in direct contact with patients and handle materials that may transmit infection. In addition to adherence to universal precautions for infection prevent and control (IPC), vaccination of HCW is an essential component of IPC programmes in the workplace. Vaccines safeguard the health of workers by:

- reducing the number of susceptible persons in health facilities
- decreasing the risk of transmission of vaccine-preventable diseases to patients, other co-workers, and their families

Health care workers requiring vaccines are physicians, nurses, dental professionals, medical and nursing students, laboratory and other technicians, pharmacists, community health aides, hospital volunteers, housekeeping staff and administrative staff who come in direct contact with patients or potentially infectious material from patients. HCWs should be immunized against hepatitis B, tetanus, diphtheria, influenza, measles, mumps and rubella infections.

Varicella zoster vaccine is recommended for HCWs who have never had chicken pox or shingles (i.e. varicella zoster virus). Recommendations for immunization of HCWs is provided in Table 5.5.1.

Table 5.5. 1: Immunization Recommendation for All Healthcare Workers[19]

All health personnel should have documented evidence of the following vaccinations	▪ Primary Schedule: o BCG x 1, o OPV and DPT/DT x 3 doses, o MMR or Measles and Rubella ▪ Booster dose(s) of OPV and DPT/DT ▪ Hepatitis B x 3 doses
If no documentation of vaccination exists, then the following should be given	▪ DT and OPV x 3 doses ▪ MMR x 1 dose ▪ Hepatitis B x 3 doses*
Boosters	▪ Should be given at 10 yearly intervals i.e. DT and OPV
Yellow fever	▪ For staff working with or handling material from suspected cases ▪ If travelling to Yellow Fever Endemic Areas then Yellow Fever Vaccine is needed

5.6 Influenza Vaccination

The objectives for influenza vaccination in Jamaica are to:

1. protect at risk individuals from infection and /or serious illness
2. maintain the health of workers in essential services
3. prevent or minimize the spread of infection

In Jamaica, the recommended priority groups for influenza vaccination are:

- health care workers, inclusive of all those in the MONIA areas (Maternity Ward, Obstetric Ward, Neonatal Ward, Intensive Care Unit and Accident & Emergency/Casualty Department)
- non-health frontline workers inclusive of police (JCF), correctional officers (DCS), Passport Immigration & Citizenship Agency (PICA) personnel and Jamaica Defence Force (JDF) personnel
- individuals who are institutionalized or in state care (inclusive of inmates in correctional facilities, residents in infirmaries/golden age homes/homeless shelters and children's homes/places of safety)
- pregnant women (all trimesters)
- children with chronic illnesses
- adults 60 years and older with chronic illnesses

[19] MOHW Health Facilities Infection Control – Policies and Procedures Manual, 2014

Vaccination of these groups should be on an annual basis.

5.7 HPV Vaccination

HPV vaccination in Jamaica is a part of the coordinated and comprehensive approach to cervical cancer prevention and control, and prevention of other HPV-related conditions.

Further details on HPV vaccination are provided in Section 3.12.

5.8 COVID-19 Vaccination

The novel Coronavirus (SARS-CoV-2) originated in Wuhan, China, in 2019, spreading across the entire world in 2020, causing the COVID-19 pandemic. This necessitated the imposition of widespread public health measures such as hand washing and sanitization, mask-wearing, quarantine and isolation, and mass vaccination, as part of the response.

The COVID-19 vaccine was developed and introduced under WHO Emergency Use Authorization as a key additional strategic to control the pandemic and decrease morbidity and mortality. Towards the end of 2023, global population-level immunity was significantly high, due to widespread use of the vaccine along with infection-induced immunity. While the SARS-CoV-2 virus continues to circulate, there has been a significant reduction in rates of hospitalizations, intensive care admissions and deaths across all age groups. Nonetheless, certain subgroups (especially eldery persons with comorbidities, pregnant women and persons with weakened immune systems) continue to be at greater risk of severe disease and mortality and account for most of the ongoing COVID-19-related mortality. Vaccination is therefore recommended for these groups, along with health and other frontine workers.[20]

[20] WHO roadmap on uses of COVID-19 vaccines in the context of Omicron and high population immunity. 10 November 2023

Chapter 6: Monitoring & Evaluation

6.1 Introduction

The overall goal of the Expanded Programme on Immunization is to prevent death and illness from vaccine-preventable diseases by protecting susceptible persons through vaccination, achieved through implementation of an effective immunization programme. This is achieved by attaining:

- high vaccination coverage rates
- low incidence of vaccine preventable diseases
- high levels of cold chain intergrity and performance
- high levels of vaccine safety
- high quality vaccination service delivery
- adequate vaccination supplies

The purpose of monitoring and evaluation is to improve the programme and enhance the effectiveness of activities in meeting the programme goals.

Monitoring is defined as the systematic and continuous process of examining data, procedures and practices in order to assess progress in achieving programme goals, identify problems and develop solutions for implementation. It is done on an ongoing basis (daily, monthly, quarterly, annually).

Evaluation is defined as a set of procedures that are used to obtain information regarding the fulfillment of objectives, activities, costs, results and impact in order to correct or modify programme activities. It is based on qualitative and quantitative methods, and implemented periodically (less frequent than monitoring).

6.2 Tools Used to Monitor and Evaluate the EPI

In Jamaica, several tools and systems are used to monitor and evaluate the EPI. Table 6.2.1 describes the purpose of EPI tool and the main programmatic goals that each tool is linked to.

Table 6.2. 1: EPI Goals and Tools*

	Programme Goal	Tool	Purpose
1	*High vaccination rates*	Immunization Register (child; adult & older child)	• Identifies children who are due for vaccination • Provides data on vaccines given • Monitors missed opportunities
		Immunization Tally Sheet/ Book	• Collates the number of doses of vaccines administered during immunization sessions
		Child Health & Development Passport (CHDP)/ Immunization Card	• Allows individual-based approach for parents/ guardians, teachers and health care workers to monitor vaccination status and the progress towards full immunization for each client
		Combined Monthly Immunization Report Form	• Captures and communicates vaccines administered at vaccination sites and facilitates calculation of coverage rates by age cohort and/or target population
		Immunization Monitoring Chart	• Monitors cumulative progress toward coverage targets on a monthly basis
		EPI Database	• Captures, calculates and reports doses of vaccines given and coverage rates per antigen by age group • Enables reporting and analysis of coverage data at all levels

	Programme Goal	Tool	Purpose
2	*Low incidence of vaccine-preventable diseases*	Surveillance System • Disease notification forms • Case investigation forms • Surveillance bulletins/ Database	• Reports cases/deaths due to vaccine-preventable diseases • Provides data on cases as a measure of programme impact • Investigates and follows-up on cases and contacts
3	*High-level cold chain performance*	Audit tools: • Refrigerator temperature record • Cold chain checklist	• Monitors the integrity of the cold chain
4	*High-level vaccine safety*	Adverse Events Reporting System: • Report form for Adverse Events following Immunization • Adverse Events Register • ESAVI database	• Monitors vaccination safety and identifies cases of ESAVIs • Enables follow-up and investigation of ESAVIs
5	*High quality vaccination service delivery*	Supervisor's Checklist	• Monitors quality of vaccination service delivery and other programme activities
6	*Adequate vaccination supplies*	Vaccine Inventory Logbook	• Monitors weekly vaccine supplies (received, dispatched, balance) at local stores
		Web-based Vaccination Supplies Stock Management (wVSSM) System software	• Monitors vaccine supplies (received, dispatched, balance) in real time at all levels of the supply chain

*Samples of selected monitoring tools and charts are available in the Appendix C.

6.3 Monitoring Vaccination Coverage and Drop-out Rates

Coverage and dropout rates are used as indicators to providing information regarding the:

- accessibility, availability and acceptability of immunization services
- proportion of target population vaccinated
- proportion of target population not vaccinated, and contributing factors
- quality of services delivered
- efficiency of resource use

6.3.1 Calculating Immunization Coverage

Vaccination coverage rate is defined as follows:

% Vaccination Coverage Rate

$$= \frac{\text{Number of persons vaccinated in target population for a specified year}}{\text{Total number of persons in target population during a specified year}} \times 100$$

It is important to evaluate the percentage of the target population that has been vaccinated to determine vaccination coverage, and to intervene appropriately. The number of persons vaccinated in the target population is based on parish reports (public and private) of vaccines administered to the target populations.

Table 6.3.1.1 provides guidance on the target populations for each antigen.

Table 6.3.1. 1: Target Populations for Antigens

	Target population	Estimated from	Antigen
1	0-11 months	The number of registered or estimated live births minus infant deaths in one year	Primary schedule: BCG, Polio, DPT, HepB, Hib
2	12-23 months	The 0-11 months target population from the previous year	MMR 1 and 2, DPT4, Polio4
3	4-6 years	The average of the 4, 5 and 6 year-old age cohorts; the appropriate 0-11 months target populations from previous years are used, e.g.: Target populations for - Children 4 years old, 2023 = 0-11 months target population for 2019 - Children 5 years old, 2023 = 0-11 months target population for 2019 - Children 6 years old, 2023 = 0-11 months target population for 2019	DPT5, Polio5
4	Pregnant women	The 0-11 months target population is used as a proxy	Tetanus

6.3.2 Calculating Drop-out Rates

It is also important to count the number of children who have “dropped out” of the immunization programme, as they represent missed opportunities for vaccination. A “dropout” is a person who started the vaccination schedule but has missed or not completed the required doses. For example, a child who receives DTP1 but has not returned for the scheduled dose of DTP3 is a dropout. Dropout rates are measured by comparing the number of infants who started receiving immunizations, to those who received all needed doses.

Table 6.3.2.1 shows how to calculate the various dropout rates monitored in EPI.

Table 6.3.2. 1: Estimating Drop-out Rates

Antigens	Calculate drop-out number	Calculate drop-out rate
BCG and DPT3	# doses of BCG - # doses of DPT3	# doses of BCG - # doses of DPT3 / # doses of BCG x 100
BCG and MMR	# doses of BCG - # doses of MMR	# doses of BCG - # doses of MMR / # doses of BCG x 100
DTP1 and DTP3	#doses of DTP1 - # doses of DTP3	# doses of DTP1 - # doses of DTP3 / # doses of DTP3 x 100
DTP1 and MMR	# doses of DTP1 - # doses of MMR	# doses of DTP1- # doses of MMR / # doses of MMR x 100

- minus

6.3.3 Analysis of Local Drop-out and Coverage Rates

Local coverage and dropout rates should be used to analyse whether or not there are gaps in service utilization and/or access. Figure 6.3.3.1 shows the algorithm for interpretation of dropout and coverage rates. Table 6.3.3.1 shows the four scenarios that can be derived from dropout and coverage analysis.

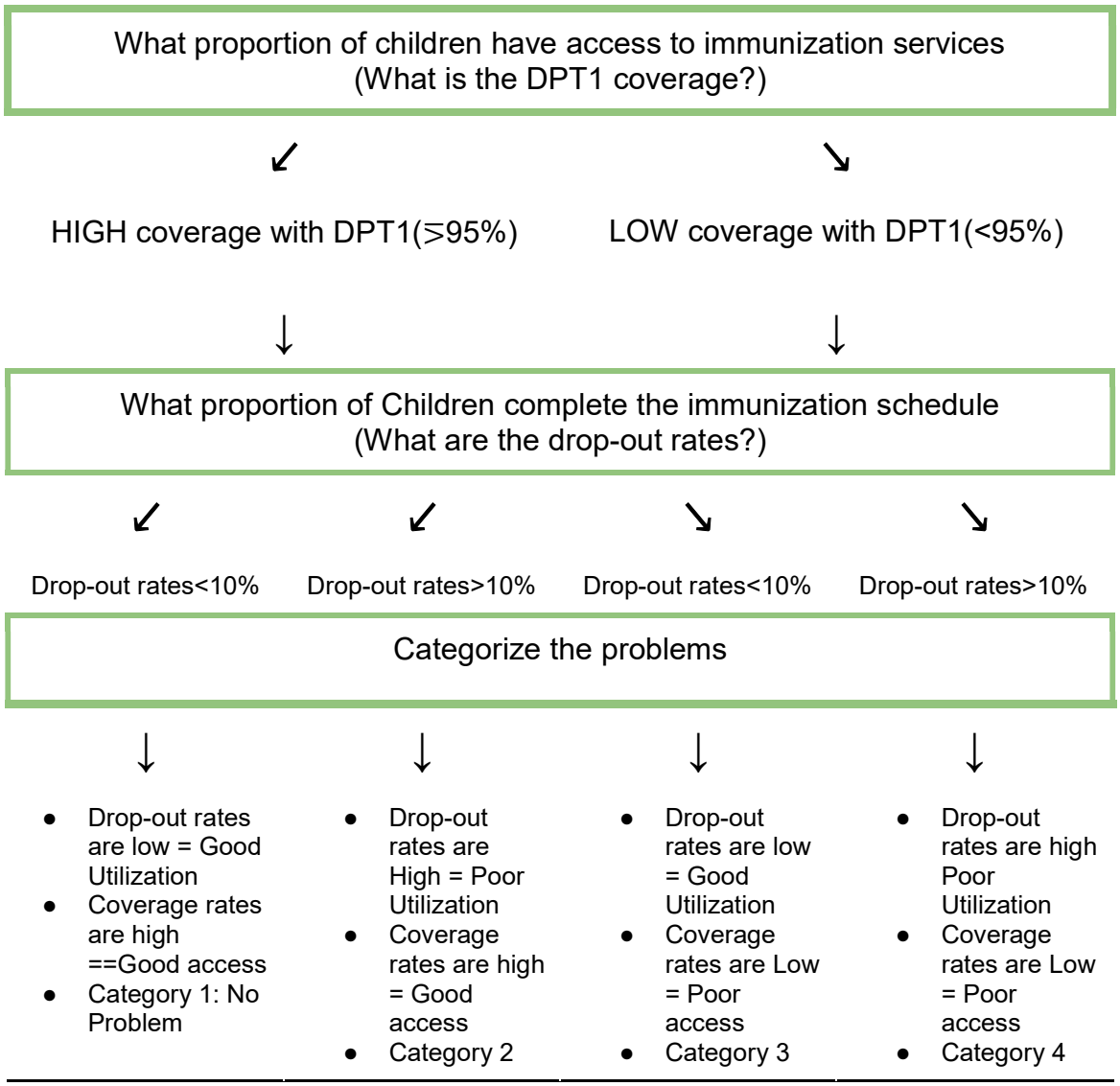


Figure 6.3.3. 1: Algorithm for Interpretation of Drop-out Rates

Table 6.3.3.1: The Four (4) Situations/Scenarios that can be Interpreted from Drop-out Rates and DPT1 Coverage

➢ 1: No problem	Drop-out rates are low = good utilization DPT1 Coverage is high = good access
➢ 2: Problem	Drop-out rates are high = poor utilization DPT1 Coverage is high = good access
➢ 3: Problem	Drop-out rates are low = good utilization DPT1 Coverage is low = poor access
➢ 4: Problem	Drop-out rates are high = poor utilization DPT1 Coverage is low = poor access

Category key: 1 - high coverage, low dropout; 2 - high coverage, high dropout; 3 - low coverage, low dropout; 4 - low coverage, high dropout

6.4 Reporting Antenatal Tetanus Coverage

Antenatal Immunization Data is reported on the MOHW's Combined Monthly Immunization Report Form, as shown in Figure 6.4.1. A pregnant woman who has previously received five or six doses of tetanus-containing vaccine (as part of DPT, DT or Pentavalent-DPT/Hib/HepB) should be counted and recorded in the final row of the report as 'previous full immunization'.

Doses of tetanus-containing vaccine (as part of DT) given to women who are not previously fully immunized should be recorded according to the number of the dose (1st, 2nd, etc.) and the gestational age at which it is given.

A N T E N A T A L I M M U N I Z A T I O N							**COMMENTS / REMARKS**
	WEEKS OF PREGNANCY						
TETANUS (DT)	**DOSE**	**0 – 15**	**16– 23**	**24– 31**	**32 & OVER**	***TOTAL***	
	1st						
	2nd						
	3rd						
	4th						
	5th						
	6th						
	Boosters						
Previous Full Immunization							

Figure 6.4. 1: Combined Monthly Immunization Report Form: section for antenatal immunization

Tetanus coverage in antenatal clients is calculated as follows:

$$\text{Antenatal Tetanus Coverage} = \frac{\#\text{ women who have received previous full immunization status} + \#\text{ women who received } 2^{nd}, 3^{rd}, 4^{th}, 5^{th} \text{ or } 6^{th} \text{ doses of DT during this pregnancy}}{\text{Target population}} \times 100$$

6.5 Local EPI Monitoring and Microplanning

There are five key steps in monitoring the EPI at the local level:

1. Compilation of population and immunization coverage for the area
2. Analysis of data to
    a) Determine the main problems associated with low coverage in the health service area
    b) Determine access or utilization problems
    c) Determine the causes behind these problems: supply, staffing, service (delivery and demand), IEC (information, education and communication)
    d) Decide on what solutions need to be implemented to address the causes identified
    e) Decide on what resources are needed (existing or additional)
3. Prioritization of issues according to geographical areas
4. Planning of priority activities for the year, including outreach (developing a workplan)
5. Monitoring the impact of the workplan

All workers at the health facility should be involved in EPI monitoring, especially those who participate in routine immunization activities. Each facility should have a workplan (microplan) for outreach activities with defined tasks for each EPI health care worker, with the aim of increasing immunization coverage in the health service area.

EPI officers for each facility should monitor their EPI coverage on a monthly basis using the Coverage Monitoring Chart provided (shown in Appendix C). This chart should be visibly displayed in the Public Health Nurse's office and the progress of the coverage discussed monthly. A chart should be used for each antigen given by vaccination.

> Do not record coverage for the combination vaccine of DTP/HepB/Hib as coverage for "pentavalent" vaccine, but rather separate and report them by the individual antigens.

Likewise, similar charts should be maintained at the parish, regional and national levels and efforts made to ensure steady progress towards coverage rates of 100% for all antigens.

Special attention must be paid to accuracy of data collection and collation for coverage and must include information from all sources, private and public.

An analysis of the coverage and the drop-out rates should be done at least quarterly. The template provided in Table 6.5.1 can be used to develop a work plan to address the problems identified. Implementation of activities should be assigned specific timeframes and responsible personnel.

Monitor appointment books and tracking registers daily/weekly in order to identify drop-outs early. Once clients have missed their appointments for immunization, they must be entered on drop-out lists, then efforts should be made to locate these drop-outs and complete the immunization series according to the schedule.

Close monitoring and maintenance of the cold chain is critical to preserve efficacy of the vaccine. The temperature should be monitored daily using the standard temperature record.

Table 6.5. 1: Work Plan Template to Address Increased Drop-out Rates

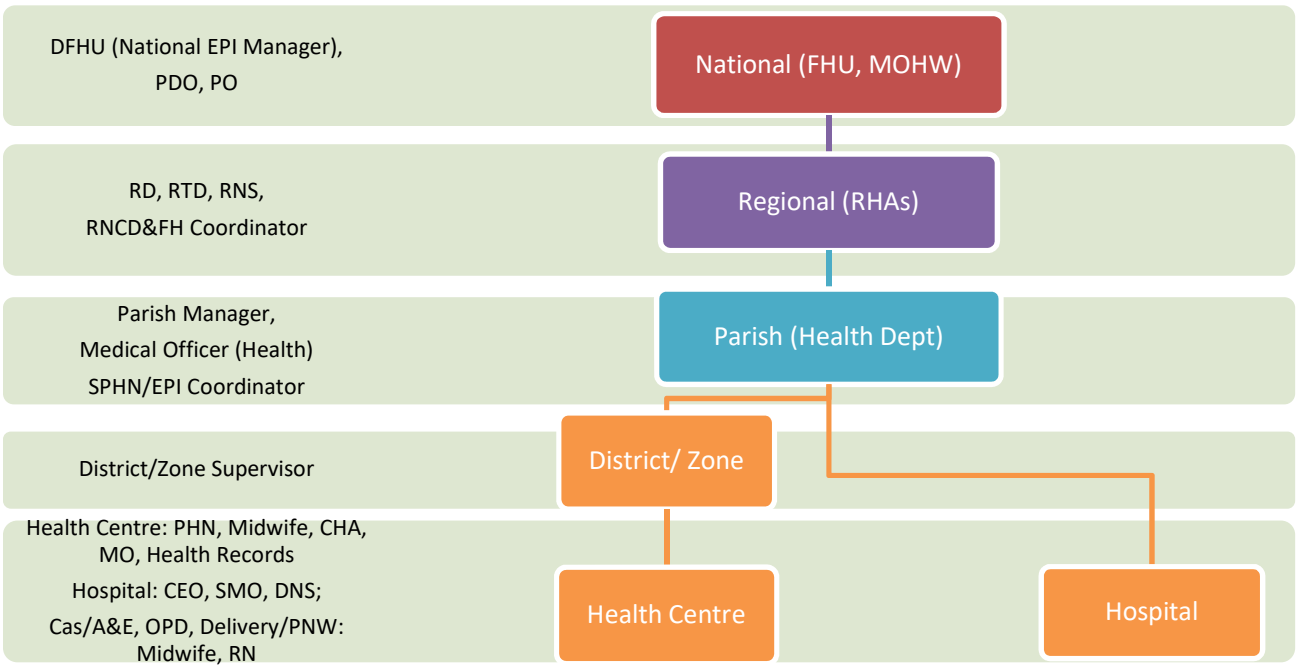
	CAUSES of problems	SOLUTIONS with existing resources	SOLUTIONS with extra resources
Supply quality			
Supply quantity			
Staffing quality			
Staffing quantity			
Service quality and demand			
Service quantity and demand			

Chapter 7: Programme Management & Community Outreach

7.1 Programme Management

The policy, goal, objectives and strategies of the immunization programme are outlined in Chapter 1 and all members of the health team should familiarize themselves with these.

Programme management for the immunization programme is done at five levels, from the national level at the Ministry of Health and Wellness to the service delivery level (health centres and outreach), as shown is shown in Figure 7.1.1. All members of the health team have a role to play in ensuring the efficient and effective implementation of the EPI towards achievement of the goal and objectives set for the programme.



DFHU – Director, Family Health Unit; PDO – Programme Development Officer; PO – Programme Officer; RD – Regional Director; RTD – Regional Technical Director; RNS – Regional Nursing Supervisor; RNCD&FH – Regional Non-communicable Disease & Family Health Coordinator; SPHN – Senior Public Health Nurse; PHN – Public Health Nurse; CHA – Community Health Aide; MO – Medical Officer; CEO – Chief Executive Officer; SMO – Senior Medical Officer; DNS – Director of Nursing Services; Cas – Casualty; A&E – Accident & Emergency; OPD – Outpatient Department; PNW – Postnatal Ward; RN – Registered Nurse; RHA – Regional Health Authority

Figure 7.1. 1: Levels of EPI Implementation and Management

7.1.1 Ministry of Health and Wellness

The direction for the EPI is provided by the Director of the Family Health Unit (FHU), who is the designated National EPI Manager. The FHU, through its director and technical officers (Programme Development Officer and Programme Officer), is responsible for the following activities:

- Development of standards, guidelines, norms
- Establishment of policy, goals, objectives and strategies
- Preparation of the national budget for the EPI
- Forecasting and procurement of vaccines and supplies (needles, syringes, safety boxes, cold chain equipment, immunization cards and Child Health and Development Passports, etc.) for the immunization programme
- Establishment of intra- and inter-sectoral collaboration and coordination of interagency EPI meetings
- Ongoing liaison with professional associations (e.g. Paediatric Association of Jamaica), Ministry of Education and Youth, as well as the Early Childhood Commission with respect to the Immunization Regulations and their roles and responsibilities in supporting the EPI
- Data collection, collation, analysis and dissemination of EPI coverage at national, regional and parish levels
- Annual liaison with the Registrar General's Department and the Statistical Institute of Jamaica regarding the target populations for vaccinations
- Ongoing liaison with United Nations agencies, such as the Pan American Health Organization (PAHO) and United Nations Children's Fund (UNICEF)
- Provision of other logistical support to the health regions and parishes
- Monitoring and coordinating the management of stock at national stores for vaccines and supplies
- Provision of guidance and support for stock management at parish stores
- Periodic monitoring and audits of service provision
- Public education on all areas related to immunization
- Coordination and implementation of training of health and education staff on immunization
- On-going provision of advice and guidance to the regions and parishes on immunization
- Monitoring and follow-up of the investigation of reports of vaccine-preventable diseases and ESAVIs in collaboration with the National Surveillance Unit and Standards and Regulations Division
- Convening of meetings with parents or clients to resolve serious concerns regarding the immunization programme

- Provision of country data on immunization to the international community
- Representing the Ministry of Health and Wellness at local, regional and international meetings/conferences related to immunization/EPI and making relevant presentations
- Coordination of the development, provision and administration of technological solutions for the EPI, e.g., electronic information systems to enhance the management and coordination of the EPI at all levels

7.1.2 Regional Health Authorities

The Regional Health Authority, through the Regional Technical Director (Regional EPI Manager) and the Regional Nursing Supervisor (Regional EPI Coordinator), has the responsibility of overseeing the immunization programme in each of the parishes that comprise the health region. The Regional Medical Epidemiologist, and Regional Epidemiologist or Regional Surveillance Officer, play a vital role in surveillance for the programme and investigation of reports of vaccine-preventable diseases and ESAVIs.

The Regional Health Authority must demonstrate the priority of the immunization programme by implementing the following activities:

- Orientation of new staff to the EPI with emphasis on the policy, goal, objectives and strategies
- Supervision of programme implementation through health centre visits and audits using the standardized tools provided
- Monitoring of the programme achievements through monthly, quarterly and annual collection, collation and analysis of the coverage data
- On-going training of health staff in the EPI and the sharing/dissemination of information received from the Family Health or Surveillance Units related to the immunization programme
- Monitoring of the cold chain at parish and health centre levels
- Provision of cold chain equipment
- Provision of budgetary and logistical support to the parishes including provision of transportation
- Provision of generators to the Health Departments for alternate power supply to ensure the integrity of the cold chain
- Public education on all areas related to immunization
- Coordination and implementation of training of health and education staff on immunization

- On-going provision of advice and guidance to the region and parishes on immunization
- On-going liaison with regional representatives of medical or health associations, education officers, school principals, early childhood institution operators and private practitioners
- Monitoring and implementation of investigations of reports of vaccine-preventable diseases and ESAVIs
- Convening meetings with parents or patients to resolve concerns regarding the immunization programme

7.1.3 Parish Health Departments

At the parish level, the immunization programme should be managed by the Medical Officer of Health (Parish EPI Manager) and supervised by the Senior Public Health Nurse (Parish EPI Coordinator) to whom this responsibility is assigned. The parish must ensure service delivery in keeping with the policy, goal, objectives and strategies outlined by the MOHW. The Parish Manager must provide the financial, administrative and logistical support to the programme.

Programme management activities to be implemented at the parish level include the following:

- Orientation of new staff to the EPI with emphasis on the policy, goal, objectives and strategies
- Supervision of programme implementation through health centre visits and audits using the tools provided
- Monitoring of the programme achievements through monthly, quarterly and annual collection, collation and analysis of the coverage data
- Compilation of coverage data from all vaccination sites in the parish inclusive of private health providers
- Ongoing training of health staff in EPI and the sharing/dissemination of information received from the Family Health or Surveillance Units related to the immunization programme
- Monitoring of the cold chain at parish and health centre levels
- Provision of cold chain equipment
- Provision of budgetary and logistical support including transportation
- Provision of generators to the Health Department and largest health centres (if required) for alternate power supply to ensure the integrity of the cold chain
- Public education on all areas related to immunization

- Coordination and implementation of training of health and education staff on immunization
- Ongoing provision of advice and guidance to the health centre staff on immunization
- Ongoing liaison with local representatives of medical/health associations, the education officers, school principals, early childhood institution operators and private practitioners with respect to the Immunization Regulations and their roles and responsibilities in supporting the EPI
- Timely collection of vaccines and supplies from the central stores while ensuring the integrity of the cold chain
- Monitoring and coordinating the management of vaccination supplies stock at parish stores and all health facilities in the vaccine supply chain
- Monitoring and implementation of investigations of reports of vaccine preventable diseases and ESAVIs
- Timely reporting of coverage data to the RHAs and FHU
- Timely reporting of ESAVIs to the Surveillance Unit/ Family Health Unit
- Convening meetings with parents or patients to resolve concerns regarding the immunization programme

7.1.4 Health Centres

At the health centre level, the Public Health Nurse (PHN) is in charge of the management of the immunization programme. The PHN is assisted and supported in service delivery by the Midwife and when necessary, by other members of the health team such as the Medical Officer, Registered Nurse, Family Nurse Practitioner and Health Records Officer. Surveillance for the EPI and the investigation of ESAVIs is also the responsibility of the PHN.

The Community Health Aide (CHA) has the responsibility of liaising with the community to identify clients in the population in need of vaccination especially immunization drop-outs. CHAs should also be sufficiently knowledgeable on various aspects of the immunization programme in order to educate caregivers and other persons in the community, as well as answer any concerns which may be raised. When in doubt, they must refer the person to the Midwife or the PHN.

At the health centre, the following programme management activities must be carried out:

- Daily vaccination in keeping with the open vial policy

- Avoidance of missed opportunities for vaccination
- Request for immunization cards/CHDPs for children at each visit to the health centre
- Ongoing education of parents and caregivers
- Adequate and timely documentation of vaccinations given that are recorded in the medical records, tracking register and immunization card/CHDP
- Daily, weekly and monthly tallying of vaccinations given by antigen and dose number
- Verification of accuracy and completeness of coverage data monthly
- Adequate and timely documentation of ESAVIs in medical records and Adverse Events Register
- Timely and complete management and investigation of ESAVIs
- Timely reporting of ESAVIs to the Parish Health Department
- Weekly review of the tracking register and appointment book to identify drop-outs
- Home visiting to locate and vaccinate drop-outs
- Periodic community outreach immunization sessions as required
- Adherence to the EPI guidelines on safe vaccination practices (ensure correct vaccine, dose, needle size, technique and vaccination site)
- Daily monitoring of the cold chain using the refrigerator temperature monitoring chart
- Liaison with schools to ensure compliance with the Immunization Regulation

7.2 Community Outreach

An outreach clinic is where services from a health facility are taken to the community within the catchment area, then the health team returns to the health facility the same day when the session is completed. For successful outreach sessions, they should be held at a time and place where the community has easy access and are available to participate.

Community outreach immunization sessions should be planned periodically as a strategy for improving vaccination coverage in the target population. However, these sessions must be carefully planned and executed to ensure maximum effectiveness.

Strategies for the outreach sessions in communities include:

- house-to-house vaccination
- vaccination in schools
- vaccination at community centres

- vaccination at health fairs

7.2.1 Execution of Outreach Sessions

The following steps are required to execute an outreach clinic:

1. Plan outreach based on the level and clustering of drop-outs in a community or for annual mop-up sessions
2. Determine the number of children that can/should be immunized in one session
3. Consult with community leaders and clients about suitable dates and times, as they will help mobilize the community
4. Discuss plans for mobile/outreach clinics with the members of the District Health Management Team / EPI Programme Coordinator/ Zone Management Team
5. Inform mothers which days to expect the team, and the time session will start
6. Be reliable and punctual
7. Ensure that vaccines are kept at the required temperature
8. Before the immunization session starts, remove the vaccines needed from the storage vaccine carrier/ igloo and place them in the “active use” vaccine carrier. The volume will be determined by the number of children that are expected to be vaccinated during the session. Ice packs lining the active use vaccine carrier should be replaced before they completely melt
9. During the session ensure that the potency of the vaccine is maintained by monitoring the thermometer in the vaccine carrier. A spare vaccine carrier with icepacks for replacement should be on hand

Supplies needed for outreach vaccination include:

- vaccines and syringes
- educational material (e.g. flyers, pamphlets, posters)
- hand sanitizer and/or water and soap for hand hygiene
- chair and table
- trays
- safety box
- containers for used vials
- ESAVI kit with drugs to manage allergic reactions
- stationery (pen, pencil)
- monitoring tools: vaccination register, tally sheets, extra immunization cards, calendar

Refer to Appendix D for the complete list of supplies. Remember that information must be recorded on/in immunization cards/CHDP, patient's medical record, tracking registers and EPI report form.

7.2.2 Completing an Outreach Session

1. At the end of the outreach session:
   - note the temperature inside the vaccine carrier to ensure the cold chain was maintained throughout the session
   - pack unopened vaccines and open vials for which multi-dose vial policy is applicable
   - put empty vials and vials to be discarded in a separate container to be carried back to facility for proper disposal
2. Upon leaving the outreach site:

- ensure that the site is left tidy
- do not leave behind anything that might be a health risk to the community
- do not to leave any syringes and needles at the site. Collect safety boxes containing sharps and take the safety boxes back to the facility
- do not to leave any empty or glass vials at the site
- return tables, chairs and other equipment to the owners
- thank the local people who have helped to organise the session and remind them when you will return

3. At the facility:

- return vaccines to the refrigerator
- pack vaccines in the refrigerator as per open vial policy
- check and record the temperature
- put ice packs into the freezer
- update immunization tally sheet and EPI reporting forms as required

7.3 Managing Drop-out Clients

- Utilize a team approach for identifying and managing drop-out lists, data analysis and response efforts – Community Health Aide, Midwife, Public Health Nurse, Medical Records Officer, Public Health Inspector, Medical Officer, Family Nurse Practitioner.
- Begin identifying drop-out clients by line listing all missed appointments for vaccination at the end of each clinic, or at the latest, at the end of the week
- Identify under-immunized children through review of tracking registers and community surveys
- Locate them through phone calls or home visits
- Give appointments to attend the health centre for vaccination at the next clinic session
- Conduct home visits/house-to-house vaccination sessions if there is no response after two weeks
- Plan vaccine sessions in the community:
    - If there are less than 20-30 drop-outs in a community, then house-to-house vaccine sessions should be conducted
    - If more than 30 children are identified, adequate notice should be given and community outreach conducted
- For maximum yield, conduct outreach sessions in the evenings or on week-ends when the likelihood of finding persons at home or in the community is highest
- Record all outcomes in the tracking register, including the following:
    - located and vaccinated
    - already vaccinated at another site
    - deceased
    - migrated
    - unable to locate
    - other outcomes (e.g. located and refused vaccination)

7.4 Management of Vaccine Refusals or Hesitancy

"Vaccine hesitancy" is a relatively new term used in research over the past few years to describe anyone who is doubtful about vaccinations or who chooses to delay or refuse immunizations even when they are readily available. Reasons expressed by parents/clients vary widely but can be classified into four overarching categories: religious reasons; personal beliefs or philosophical reasons; safety concerns; and a desire for more information from health care providers.

The Public Health (Immunization) Regulations 1986 (Amended 2013) provides that it is the duty of every parent/guardian to have their child immunized. The only exemption provided under the Regulation is where a public immunization officer or medical doctor certifies that the child shows signs of a contraindication or is not physically fit to be certified. Further, a child may not be admitted to or continue to attend school unless the child is immunized or provides evidence of exemption in accordance with the Regulation. Importantly it is an offence if anyone contravenes any provisions of the Regulations.

The following steps should be taken in the case of vaccine hesitancy or refusal:

1. Identify the specific reason for vaccine refusal (use motivational interviewing techniques to elicit information)
2. Clearly outline the benefits and risks of immunization to the individual, community and country
3. Provide information on the safety, benefits and efficacy of vaccines
4. Address any other concerns expressed e.g. pain of immunization
5. If there is continued refusal, report the matter to the Medical Officer (Health) and Child Protection and Family Services Agency (CPFSA, formerly called the Child Development Agency)
6. Serve an Immunization Notice on the parents (refer to the sample Immunization Notice in Appendix E)
7. Submit a report indicating demographics of the child, reason for refusal and actions taken
8. The Medical Officer (Health) should initiate prosecution proceedings in the Resident Magistrates Court

7.5 Prosecution Procedures

Prosecution is initiated by laying the information, which will contain:

- name and occupation of officer initiating prosecution
- section of the Act or Regulation which was breached
- date the information was laid
- date of the offence (refusal or hesitance)
- name and address of the offender
- brief statement of events which led to the breach/prosecution
- request for the offender to be summoned to court

Go directly to the Clerk of Court for the parish and advise him/her of the situation in order for the information to be completed.

OR

Seek the assistance of the Legal Services Department of the Ministry of Health and Wellness in order for the information to be completed and forwarded to the Clerk of Court for the parish.

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Appendix A: Public Health (Immunization) Regulations, 1986

Regulations (Under section 14)

THE PUBLIC HEALTH ACT

REGULATIONS
(*under section 14*)

THE PUBLIC HEALTH (IMMUNIZATION) REGULATIONS, 1986

(*Made by the Minister on the 7th day of August, 1986.*)

L.N. 156/86
84/2010
2C/2013

[*1st September, 1986.*]

Citation.

1. These Regulations may be cited as the Public Health (Immunization) Regulations, 1986.

Interpretation.

2. In these Regulations, unless the context otherwise requires—

"child" means a person who is, or in the case of a person whose age is uncertain, appears to be, less than seven years of age;

"contra-indications" means any symptom which indicates that it is likely to be injurious to the health for a person to be immunized;

"immunization" means the process of developing in a person antibodies for protection against diphtheria, pertussis, poliomyelitis, tetanus, tuberculosis, measles or any other disease prescribed by the Minister, by the administering of any immunizing agent approved for the purpose by the Medical Officer (Health) and includes vaccinations and innoculations;

"parent" includes the guardian or person in charge of or having custody of a child;

"public immunization officer" means any Medical Officer or any other person authorized by the Medical Officer (Health) to perform immunizations;

"school" includes day nurseries, day-care centres and basic schools.

3.—(1) Immunization may be performed by a public immunization officer or by a medical practitioner.

(2) Immunization performed by a public immunization officer for the purpose of these Regulations and any examination or certificate issued in connection therewith, shall be free of charge.

[The inclusion of this page is authorized by L.N. 51A/2017]

4. Every public immunization officer and every medical practitioner shall use only such immunization agent as approved by the Medical Officer (Health).

5.—(1) It shall be the duty of every parent of any child to have the child immunized.

(2) Subject to paragraph (3), the parent of every child within the Island shall cause such child—

(*a*) to be immunized within one year of the child's birth or soon thereafter; and

(*b*) to be re-immunized at such times as may be specified by the Minister or any Medical Officer authorized by him in that behalf, in respect of any disease.

(3) Paragraph (2) shall not apply to any child in respect of whom there are contra-indications or if the child is not physically fit to be immunized, and a certificate has been issued by a public immunization officer or a medical practitioner in the form set out as Form A in the Schedule and is in effect.

Schedule Form A

6.—(1) In any case where a public immunization officer or a medical practitioner is of opinion that a child examined by him for immunization shows signs of contra-indications or is not physically fit to be immunized, he shall issue a certificate to this effect and deliver it to the parent of the child.

(2) A certificate that a child is not physically fit to be immunized shall remain in force for three months, but shall be renewable for a like period from time to time until such time as the public immunization officer or the medical practitioner considers that the child is physically fit to be immunized.

7. A certificate of immunization, together with the particulars set out in Form B in the Schedule, shall be issued by the public immunization officer or the medical practitioner who performed the immunization to any child who is fully immunized.

Form B

8. Any public immunization officer or medical practitioner who immunizes any child for the purpose of these Regulations, shall keep a record of the immunization which shall include the date the child was seen, the immunizing agent used and any other relevant information.

9.—(1) Subject to paragraph (2), the person authorized to admit pupils to any school shall not admit any child, or if already admitted, shall not permit any child to continue attending any such school, unless such child or his parent produces, after having been requested to do so, a certificate of immunization issued by a public immunization officer or a medical practitioner for the child.

(2) If a child or his parent produces a certificate of contra-indications or a certificate that the child is not physically fit to be immunized, signed by a public immunization officer or medical practitioner, a certificate of immunization is not required for the purpose of paragraph (1):

Provided that where there is an expiry date on the certificate, the child shall be requested to produce a fresh certificate on its expiration, and on failure to produce a certificate, the child shall not be admitted to the school until a certificate is produced.

10. Any person who contravenes or fails to comply with any provision of these Regulations commits an offence and is liable on summary conviction in a Resident Magistrate's Court to a fine not exceeding one million dollars, and in default of payment thereof to imprisonment for a term not exceeding twelve months.

Jamaica Gazette Supplement: Public Health (Immunization) (Amendment) Regulations, 2013

No. 2C

THE PUBLIC HEALTH ACT

THE PUBLIC HEALTH (IMMUNIZATION) (AMENDMENT) REGULATIONS, 2013

In exercise of the power conferred upon the Minister by section 14 of the Public Health Act, and of every other power hereunto enabling, the following Regulations are hereby made:—

1. These Regulations may be cited as the Public Health (Immunization) (Amendment) Regulations, 2013, and shall be read and construed as one with the Public Health (Immunization) Regulations, 1986 (hereinafter referred to as the "principal Regulations") and all amendments thereto.

2. The principal Regulations are amended by deleting regulation 10 and substituting therefor the following—

"10. Any person who contravenes or fails to comply with any provision of these Regulations commits an offence and is liable on summary conviction in a Resident Magistrate's Court to a fine not exceeding one million dollars, and in default of payment thereof to imprisonment for a term not exceeding twelve months.".

Dated this 9th day of January, 2013.

DR. FENTON FERGUSON
Minister of Health.

Schedule, Form A: Certificate of Medical Contra-Indications, Unfitness for Immunization

THE PUBLIC HEALTH (IMMUNIZATION) REGULATIONS, 1986

SCHEDULE

FORM A (Regulation 5 (3))

THE PUBLIC HEALTH ACT

Certificate of Medical Contra-Indications
Unfitness for Immunization

I hereby certify that in respect of.....

(age .....) of .....

.....

there are medical contra-indications relative to immunization generally/

immunization against ...../
is physically unfit*, and accordingly, he/she* should not be immunized.

This certificate shall be valid until .....*

Dated: .....

.....
*Public Immunization Officer/Medical Practitioner**

*Delete as appropriate.

Excerpt from Immunization Regulation (1986) (Amended 2013)

- All children under the age of 7 years must be adequately immunized before entry to school. “School” includes day nurseries, day-care centres and basic schools.

- All children should be immunized within 1 year of birth or soon thereafter. Booster shots are needed from time to time.

- Persons authorized to admit students at any school shall not admit any child, or if already admitted, shall not permit any child to continue attending any such school, unless a certificate of immunization (in the Child Health & Development Passport / Immunization Card) issued by the health department or the child’s medical doctor is produced.

- Only persons with a “Certificate of Medical Contra-Indications, Unfitness for Immunization” issued by the Ministry of Health & Wellness are exempt.

- Any person who does not comply with these regulations, shall be guilty of an offence, and shall be liable in a Resident Magistrate’s court to a fine not exceeding $1 million or imprisonment for a term not exceeding 12 months. These charges apply for each child not adequately vaccinated.

Appendix B: Jamaica's Immunization Schedule

Immunization Schedule for Children

National Immunization Schedule

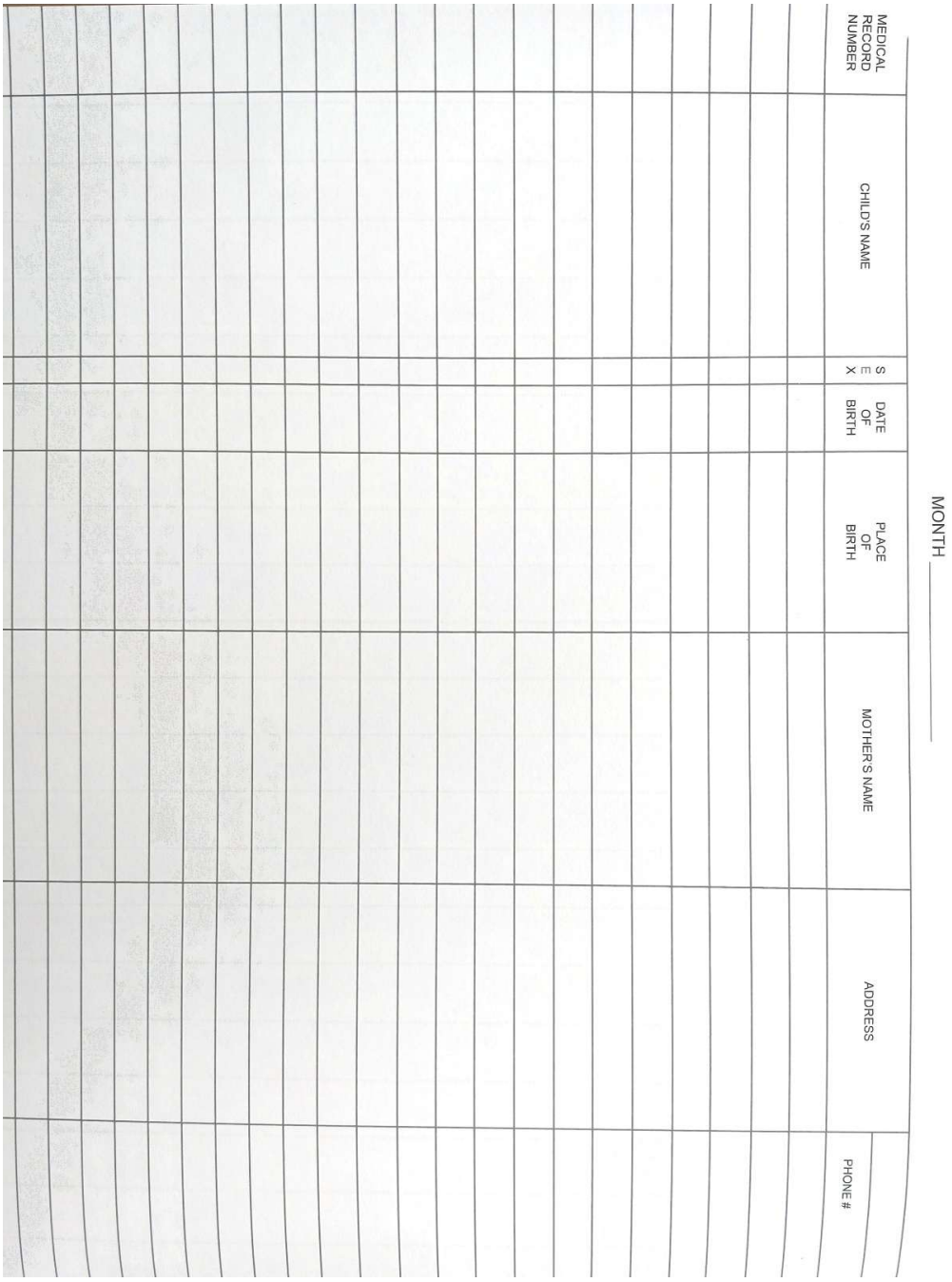
Diseases	Recommended ages vaccines should be given								
	Birth	6 weeks	3 months	6 months	12 months	18 months	4-6 years	11-12 years	9-26 years
Tuberculosis (TB)	BCG								
Poliomyelitis		Polio	Polio	Polio		Polio	Polio		
Diphtheria, Pertussis (Whooping Cough), Tetanus		Penta, DPT or DT	Penta, DPT or DT	Penta, DPT or DT		DPT or DT	DPT or DT	DT	
Haemophilus Influenzae Type B		Penta or Hib	Penta or Hib	Penta or Hib					
Hepatitis B	Hep B	Penta or Hep B	Penta or Hep B	Penta or Hep B					
Measles, Mumps, Rubella					MMR	MMR			
Human Papillomavirus (HPV)									HPV*
	Above vaccines necessary for entry to nursery and basic school								
	Above vaccines necessary for entry to primary school								

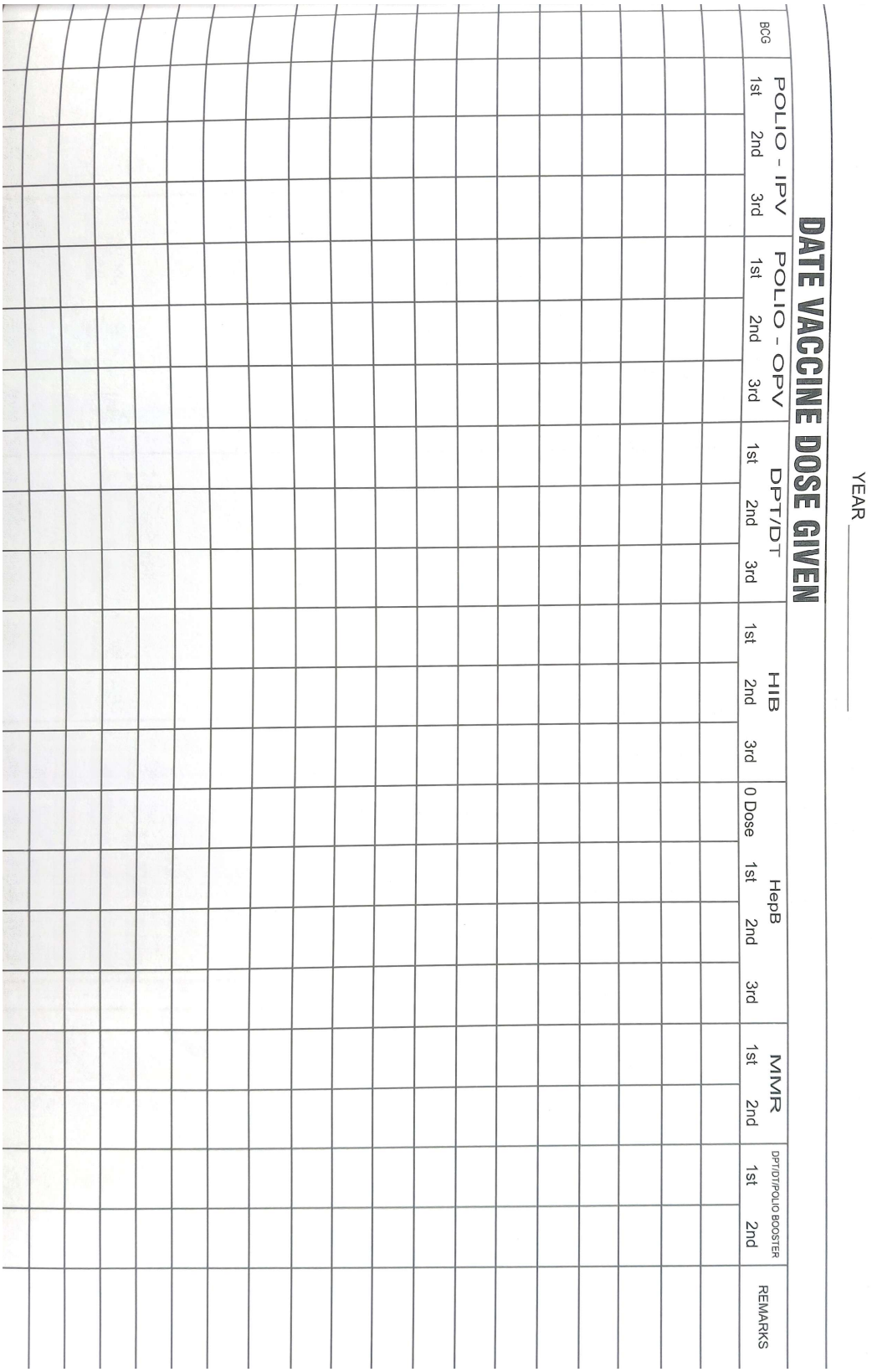
*Females 9-26 years; Males 9-14 years

Appendix C: EPI Monitoring Tools

Coverage Monitoring Tools

Child Immunization Register

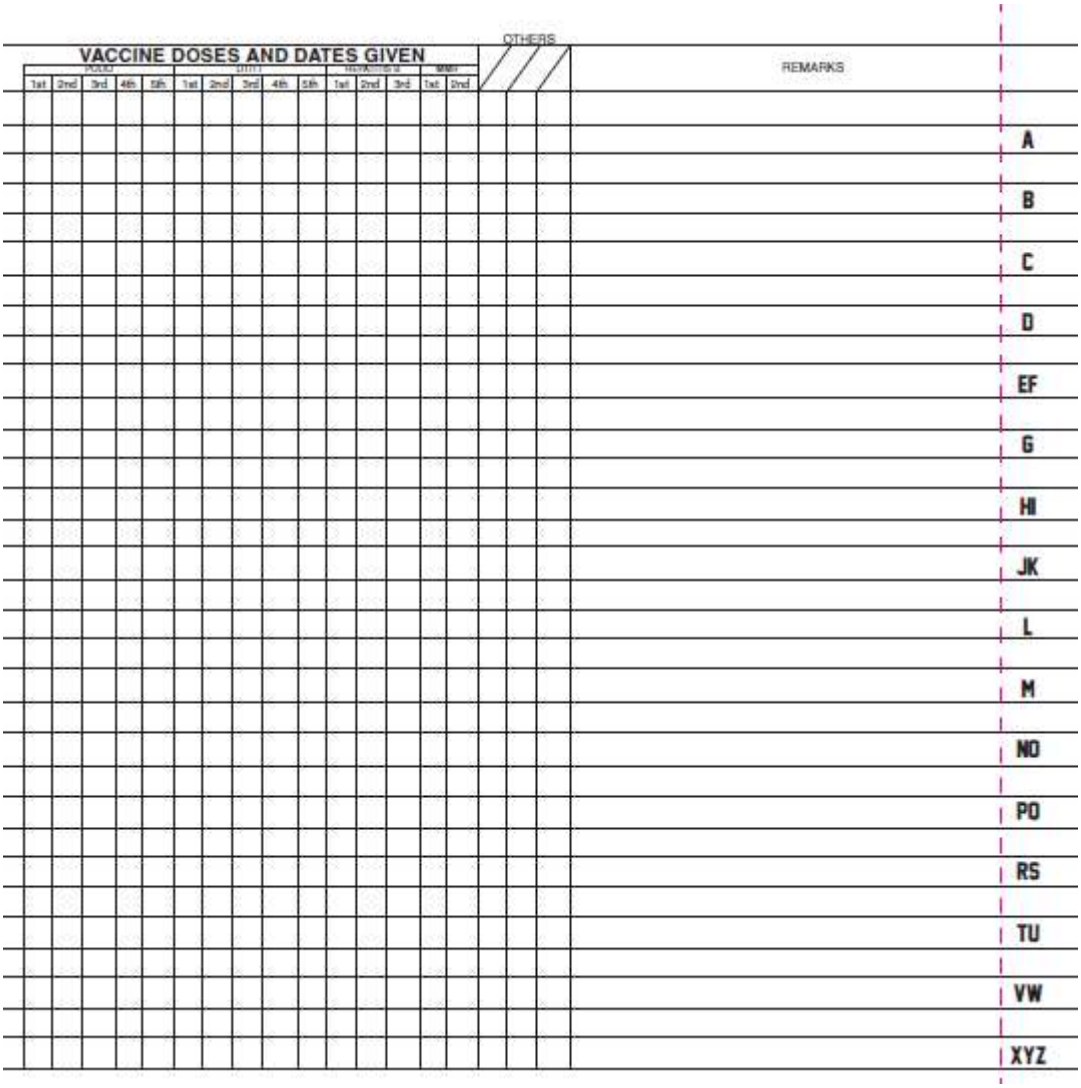



YEAR
DATE VACCINE DOSE GIVEN
BCG
POLIO - IPV
1st
2nd
3rd
POLIO - OPV
1st
2nd
3rd
DPT/DT
1st
2nd
3rd
HIB
1st
2nd
3rd
HepB
0 Dose
1st
2nd
3rd
MMR
1st
2nd
DPT/DT/POLIO BOOSTER
1st
2nd
REMARKS

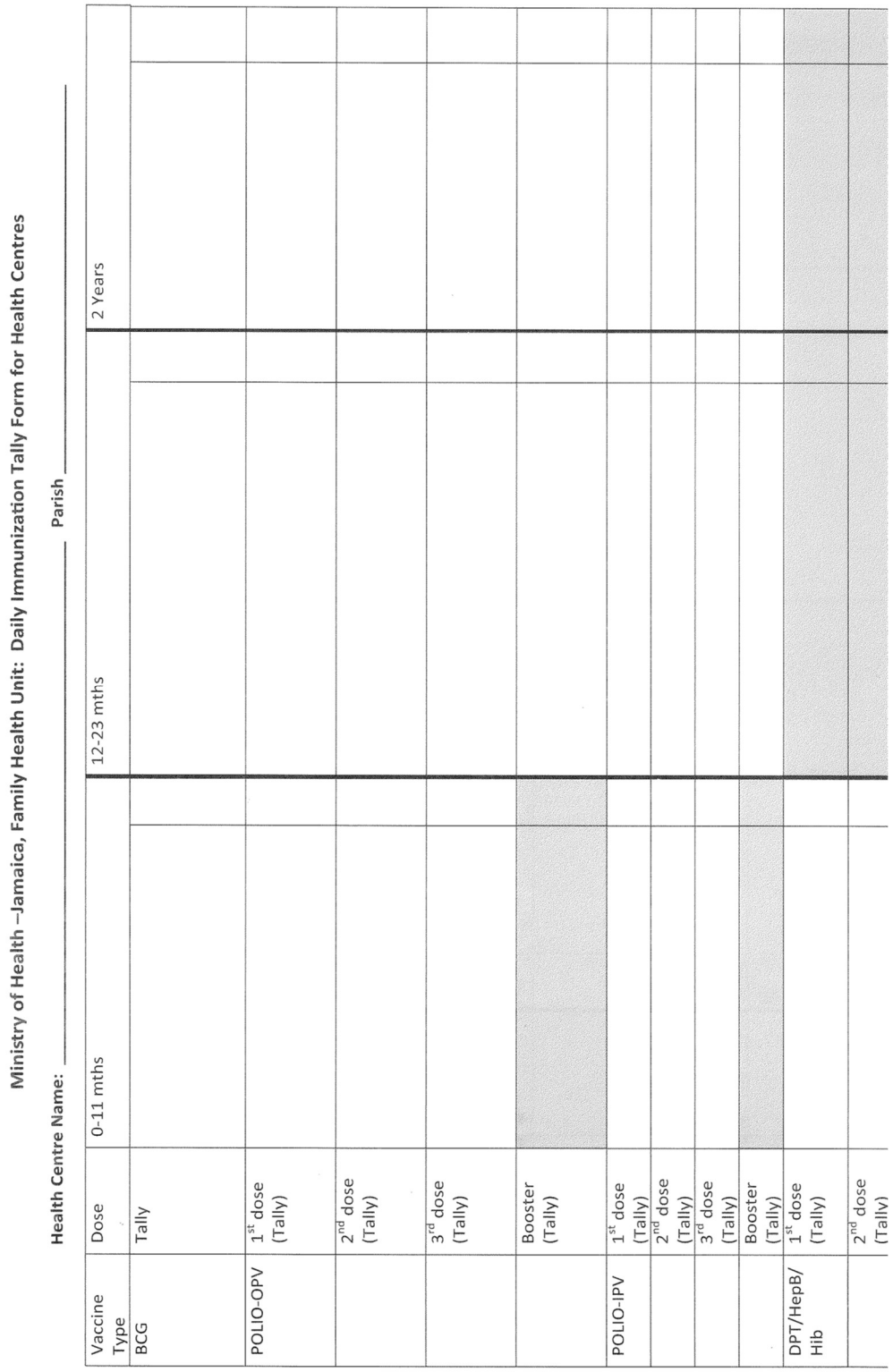
Adult and Older Child Immunization Register

ADULT AND OLDER CHILD IMMUNIZATION REGISTER

Medical Record Number	Name	Sex	Date of Birth	Address	Next of Kin	Contact Phone Number	


VACCINE DOSES AND DATES GIVEN
OTHERS
REMARKS
A
B
C
D
EF
G
HI
JK
L
M
NO
PQ
RS
TU
VW
XYZ

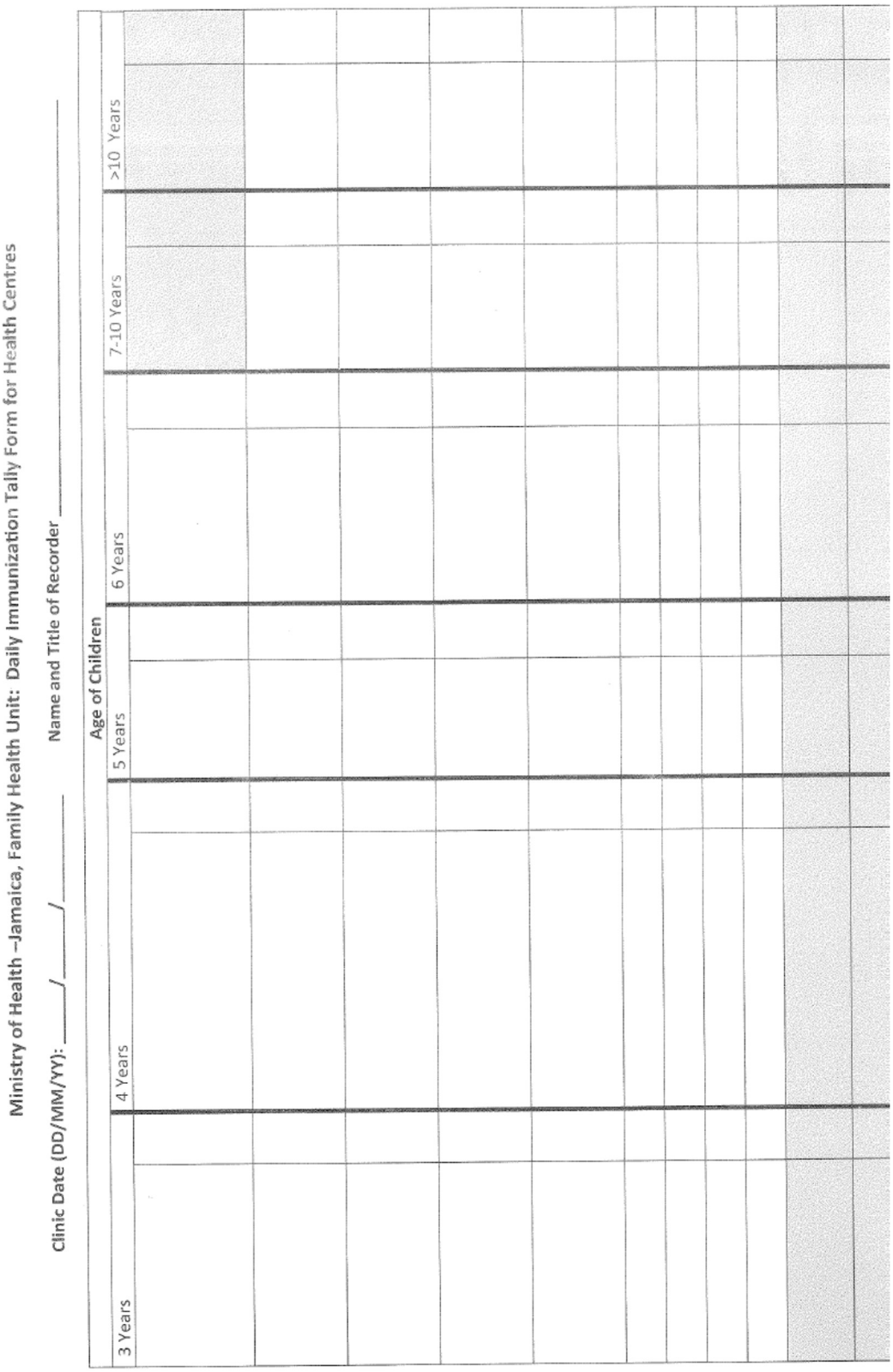
Child Immunization Tally Sheet



Ministry of Health –Jamaica, Family Health Unit: Daily Immunization Tally Form for Health Centres

Health Centre Name: _____ **Parish** _____

Vaccine Type	Dose	0-11 mths		12-23 mths		2 Years	
BCG	Tally						
POLIO-OPV	1st dose (Tally)						
	2nd dose (Tally)						
	3rd dose (Tally)						
	Booster (Tally)						
POLIO-IPV	1st dose (Tally)						
	2nd dose (Tally)						
	3rd dose (Tally)						
	Booster (Tally)						
DPT/HepB/ Hib	1st dose (Tally)						
	2nd dose (Tally)						



Ministry of Health –Jamaica, Family Health Unit: Daily Immunization Tally Form for Health Centres

Clinic Date (DD/MM/YY): ____/____/____ Name and Title of Recorder _____

Age of Children

3 Years | 4 Years | 5 Years | 6 Years | 7-10 Years | >10 Years

HPV Vaccination Tally Sheet

Ministry of Health and Wellness – Family Health Unit
Daily Tally Form for Human Papillomavirus (HPV) Vaccination

Date (dd/mm/yy): _____ /_____ /_____ **Name and Title of Recorder:** _____

Parish: _____ **District:** _____ **Health Centre:** _____

Service Delivery Strategy (check one): ☐ public health facility ☐ private health facility ☐ outreach ☐ school

Name of service delivery site: _____

If school, grade level(s): _____ **Total # of eligible girls:** _____ **Total # of eligible boys:** _____

Age	HPV 1st dose (HPV1)		HPV 2nd dose (HPV2)		HPV 3rd dose (HPV3)		Total		
	Female	Male	Female	Male	Female	Male	Female	Male	Total
9 yrs									
10 yrs									
11 yrs									
12 yrs									
13 yrs									
14 yrs									
15-26 yrs									
> 26 yrs									

Comments: _____

Updated January 2024

HPV Vaccination Monthly Report

MINISTRY OF HEALTH AND WELLNESS – FAMILY HEALTH UNIT
COMBINED MONTHLY IMMUNIZATION REPORT FORM

Addendum to Monthly Reporting Form (HPV Vaccination)

Parish: _____ District: _____ Health Centre/Site: _____

Month _____ Year _____

Vaccine Type	Dose	Age (years)								Total	Adverse Reactions
		9	10	11	12	13	14	15-26	>26		
HPV - females	1st										
	2nd										
	3rd										
HPV - males	1st										
	2nd										
	3rd										
HPV - total	1st										
	2nd										
	3rd										

Comments/Remarks
Total # eligible for HPV vaccine : females_____ males_____

Vaccine Supply		
Used This Month		No. of doses in stock
No. of Vials	Batch No.	

MINISTRY OF HEALTH–JAMAICA
FAMILY HEALTH UNIT
COMBINED MONTHLY IMMUNIZATION REPORT FORM

Addendum to Monthly Reporting Form (Influenza)

Parish: _____ District: _____ Health Centre: _____

Month _____ Year _____

TOTAL VACCINES GIVEN

Vaccine Type	Dose	Children*			Adults*		**HCWs	Preg. Women	Total	Adverse Reactions
		6 – 35 months	3 – 9 years	10 – 17 years	18 – 59 years	60+ years				
Influenza	1st									
	2nd									

**Total number of eligible HCWs: _____

NB: Doses reported for HCWs and Preg Women are not to be counted in doses given for Adults or Children. Categories are mutually exclusive.

*Specified Target Groups for Children and Adults:

Non-Health Frontline Workers		Institutionalized Children			Institutionalized Adults		Children with Chronic Disease			Adults with Chronic Disease	
JCF			1st Dose	2nd Dose	18-59 yrs			1st Dose	2nd Dose	18-59 yrs	
JDF		6-35 mths					6-35 mths				
DCS		3-9 yrs			60+ yrs		3-9 yrs			60+ yrs	
Other		10-17 yrs					10-17 yrs				

Comments/Remarks

Vaccine Supply		
Used This Month		No. of doses in stock
No. of Vials	Batch No.	

Combined Monthly Immunization Report Form

MINISTRY OF HEALTH AND WELLNESS – JAMAICA
FAMILY HEALTH UNIT
COMBINED MONTHLY IMMUNIZATION REPORT FORM

Vaccination Site _____ **District**_____ **Parish** _____

Month _____ **Year** _____

VACCINE TYPE	DOSE	AGE										Total Doses	Adverse Reactions
		0-11 Mths	12-23 Mths	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 - 10 Yrs	> 10 Yrs	Post-Natal		
BCG													
POLIO - OPV	1st												
	2nd												
	3rd												
	Booster 1												
	Booster 2												
POLIO - IPV	1st												
	2nd												
	3rd												
	Booster 1												
	Booster 2												
DPT/ Hep.B/Hib (Pentavalent)	1st												
	2nd												
	3rd												
DPT	1st												
	2nd												
	3rd												
	Booster 1												
	Booster 2												
DT (Paed.)	1st												
	2nd												
	3rd												
	Booster 1												
	Booster 2												
DTaP / Tdap	1st												
	2nd												
	3rd												
	Booster 1												
	Booster 2												
Hib.	1st												
	2nd												
	3rd												
	Booster												
HEPATITIS B	1st												
	2nd												
	3rd												

HEPATITIS B Birth Dose	Number of live births	Doses given < 24 hours	Doses given ≥ 24 hours	Neonatal deaths	Transferred out	Severely ill	

MMR	DOSES	0-11 Mths	12-23 Mths	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 - 10 Yrs	> 10 Yrs	Post-Natal	Total Doses	Adverse Reactions
	1st												
	2nd												
DT (Adult)	1st												
	2nd												
	3rd												
	Booster												

Updated October 2024, Family Health Unit, MOHW

VACCINE TYPE	DOSE	AGE										Total Doses	Adverse Reactions
		0 - 11 Mths	12 - 23 Mths	2 Yrs	3 Yrs	4 Yrs	5 Yrs	6 Yrs	7 - 10 Yrs	> 10 Yrs	Post-Natal		
PNEUMO-PPSV	1st												
	2nd												
PNEUMO-PCV	1st												
	2nd												
	3rd												
	4th												
VARICELLA	1st												
	2nd												
ROTA	1st												
	2nd												
	3rd												
YF	1st												

INFLUENZA	Dose	6-35 months	3-9 years	10-17 years	18-64 years	65+ years	HCWs	Preg. Women	Total Doses	Adverse Reactions
	1st									
	2nd									

INFLUENZA – Special Groups (excludes Preg. Women & HCWs)	Dose	Non-Health Frontline Workers				Institutionalized Persons					Persons with Chronic Disease				
		JCF	JDF	DCS	Other	6-35 mths	3-9 yrs	10-17 yrs	18-60 yrs	60+ yrs	6-35 mths	3-9 yrs	10-17 yrs	18-60 yrs	60+ yrs
	1st														
	2nd														

HPV – General Population		9 yrs	10 yrs	11 yrs	12 yrs	13 yrs	14 yrs	15-26 yrs	> 26 yrs	Total Doses	Adverse Reactions
Females	1st										
	2nd										
	3rd										
Males	1st										
	2nd										
	3rd										
Total	1st										
	2nd										
	3rd										

HPV – Immunocompromised		9 yrs	10 yrs	11 yrs	12 yrs	13 yrs	14 yrs	15-26 yrs	> 26 yrs	Total Doses	Adverse Reactions
Females	1st										
	2nd										
	3rd										
Males	1st										
	2nd										
	3rd										
Total	1st										
	2nd										
	3rd										

ANTENATAL IMMUNIZATION

	DOSE	WEEKS OF PREGNANCY				
		0 – 15	16 – 23	24 – 31	≥ 32	TOTAL
TETANUS (DT)	1st					
	2nd					
	3rd					
	4th					
	5th					
	6th					
	Booster					
Previous Full Immunization						

COMMENTS / REMARKS

Number of babies in the tracking register due for third doses: _____

Number of babies in the tracking register due for MMR1 doses: _____

Number of babies in the tracking register due for MMR2 doses: _____

VACCINE TYPE	VACCINE SUPPLY			
	USED THIS MONTH			IN STOCK
	DOSES PER VIAL	NO. OF VIALS	BATCH NO.	NO. OF DOSES
BCG				
POLIO - Oral				
POLIO - Inactivated				
DPT/Hep.B/Hib (Pentavalent)				
DPT				
DT (Adult)				
DT (Paed.)				
Hib				
HEPATITIS B Recombinant (Paed)				
HEPATITIS B Recombinant (Adult)- 1 dose				
HEPATITIS B Recombinant (Adult)- 10 dose				
MMR- 1 dose				
MMR- 5 dose				
PNEUMO-PCV				
PNEUMO-PPSV23				
Human Papillomavirus (1 dose)				
Yellow Fever				
Seasonal Influenza Trivalent (Adult)				
Seasonal Influenza Trivalent (Paed)				
COVID-19 (Type: _____)				
PPD (Mantoux Test)				

Completed by: _____ Title: _____ Date: _____

Reviewed by: _____ Title: _____ Date: _____

INSTRUCTIONS

VACCINATION SITE

1. Use this form to report all immunization activity for the month to the Parish Health Office.
2. Submit the report to the Parish Health Officer by the 5th working day following the month being reported.
3. Submit the original and retain one copy.

PARISH HEALTH OFFICE

1. Collate the parish data and enter on the National Expanded Programme on Immunization (EPI) Database by the 10th day of each month.
2. DO NOT LEAVE BLANK SPACES. If data is not available, show "N/A" in the box. If no immunizations were done in a particular category, put "0" in the box.
3. Remember the completed immunization doses on this form must agree with those reported to the MCSR which is sent to the Planning and Evaluation Branch.
4. If necessary, use the "Remarks" section below to report on Expanded Programme on Immunization (EPI) activities, problems cold chain breakdowns, out dated vaccines, supplies shortages, equipment failures, and other relevant information.

VACCINATION SITE: Submit the completed Original Form to Parish Health Office.
PARISH HEALTH OFFICES: Retain the completed Original Form.

Updated October 2024, Family Health Unit, MOHW

Monthly Coverage Monitoring Chart

CAREC /STAT-EPI-80-1

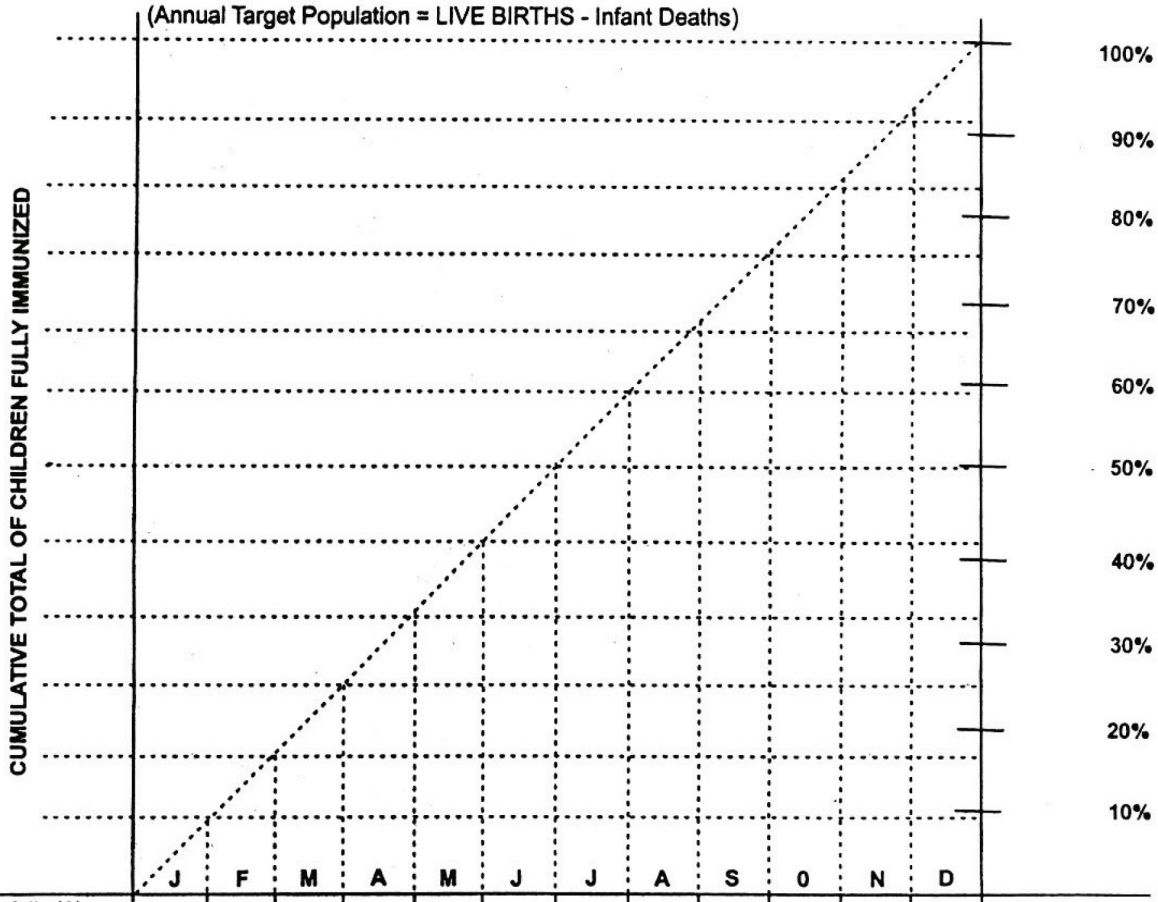
COUNTRY _____ YEAR _____

FULL IMMUNIZATION OF CHILDREN AGED UNDER ONE YEAR

TYPE OF IMMUNIZATION _____ (DPT, POLIO, MMR, Hep-B, Hib OR BCG)

(FULL IMMUNIZATION = ____ DOSES)

Estimated Live Births ..... ____ (a)
Estimated Infants Deaths ..... ____ (b)
Estimated Target Population ..... ____ (a)-(b)

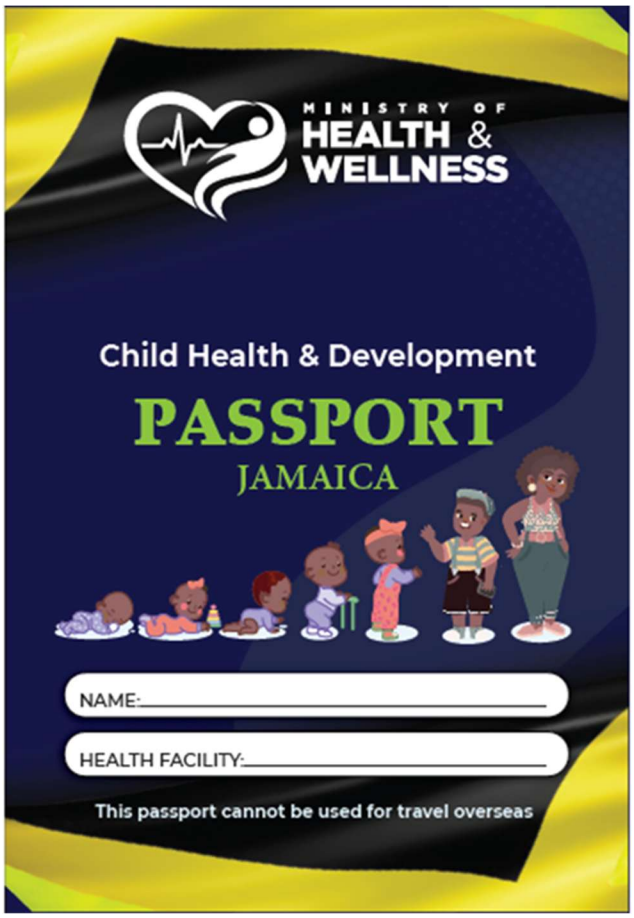


No. fully (A) immunized during month													No. in Mth.
													Cum. for Yr.
No. fully (B) immunized during month													No. in Mth.
													Cum. for Yr.

1. **Enter in boxes "A" the preliminary data of the number of children fully immunized during that month, and the cumulative total for the year.**
2. **Plot monthly progress on the graph by marking "X" for the cumulative total at the end of each month and join with a solid line**
3. **Enter in boxes "B" the final data when all reports have been received. Draw a similar graph using an [x] to represent the final cumulative totals for each month.**

Immunization Cards/Records

Children (Child Health and Development Passport)



CHILD HEALTH & DEVELOPMENT PASSPORT

Immunization

Child's Name: _____

Dose (Age)	Type of Vaccine	Date of Immunization	Manufacturer
Birth Dose	☐ BCG		
	☐ HepB		
1st Dose (6 Weeks)	☐ IPV		
	☐ DPT or ☐ DT		
	☐ HepB		
	☐ Hib		
	☐ Penta		
2nd Dose (3 Months)	☐ OPV or ☐ IPV		
	☐ DPT or ☐ DT		
	☐ HepB		
	☐ Hib		
	☐ Penta		
3rd Dose (6 Months)	☐ OPV or ☐ IPV		
	☐ DPT or ☐ DT		
	☐ HepB		
	☐ Hib		
	☐ Penta		
1st Dose (12 Months)	☐ MMR		
18 Months	☐ OPV or ☐ IPV		
	☐ DPT or ☐ DT		
	☐ MMR		
4-6 Years	☐ OPV or ☐ IPV		
	☐ DPT or DT		
11-12 Years	☐ Td		
Females 9-26 Years, Males 9-14 Years	☐ HPV: 1st dose		
	☐ HPV: 2nd dose		
	☐ HPV: 3rd dose		
Other Vaccines	☐ Influenza		
	☐ PCV		
	☐ PPSV		

CHILD HEALTH & DEVELOPMENT PASSPORT

Immunization

Sex: ☐ Male ☐ Female Date of Birth: ____/____/____ DD MM YYYY

Batch No./ Lot No.	Name of Person Giving Vaccine	Comments (e.g. side effects, reactions)	Date of next Immunization

Adults and Older Children

Keep
JAMAICA
Measle/Rubella
Free

Issued by:
April 2017

Ministry of Health
Kingston, Jamaica

MINISTRY OF HEALTH
JAMAICA

ADULT IMMUNIZATION CARD

Name: .....

Date of Birth: .....

Address (Home): .....

.....

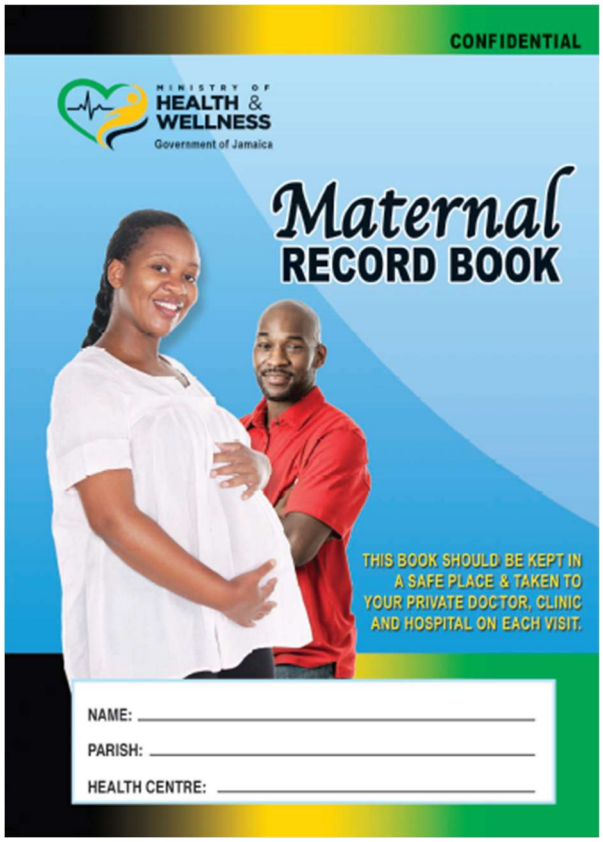
Tel: .....

Next of Kin: .....

Please keep this record in a safe place

VACCINE		DATE GIVEN	SIGNATURE OF PERSON GIVING VACCINE
Measles/Mumps/Rubella (MMR)	1st		
	2nd		
Hepatitis B	1st		
	2nd		
	3rd		
Tetanus Toxoid TT Diphtheria / Tetanus (Adult) Td	1st		
	2nd		
	3rd		
	4th		
	5th		
	6th		
Others:			

Maternal Record Booklet



Maternal **RECORD BOOK**

NAME: _____

AGE: _____ DATE OF BIRTH _____

ADDRESS: _____

NEAREST LANDMARK: _____

TEL. (Home): _____ (Cell): _____

NEXT OF KIN: _____

ADDRESS: _____

TEL. (Home): _____ (Cell): _____

BLOOD GROUP: _____ Rhesus Factor: _____ Height: _____

BOOKING INVESTIGATION:

	RESULTS	DATE	MANAGEMENT	DATE
Hb				
Sickle				
Syphilis Screen				
HIV				
Other				

IMMUNIZATION:	1st	2nd	3rd	4th	5th	6th
DT (A) - Date						
MMR - Date						
FLU - Date						

Audit Tools

Expanded Programme on Immunization Checklist for Supervisor's Use: Recording and Reporting

MINISTRY OF HEALTH

EXPANDED PROGRAMME ON IMMUNIZATION (E.P.I)
Checklist for Supervisor's Use
Recording and Reporting

Name of Health Centre .....

Address .....

Name of Person in charge .....

Supervisor's Name .....Position.....

Supervisor's Signature.....Date.....

No	OBSERVATIONS	No. of Points ✔Check one Column only		
		Yes	No	NK
1	Is a record kept for each child who attends the health centre ?	10	0	0
2	Does it provide (a) Name of child (b) Mother/Guardians Name & Address (c) Date of child's birth (d) Gender (e) Dates immunization received ?	1 1 1 1 1	0 0 0 0 0	0 0 0 0 0
3	Can any child's record for your health centre area be found in the health centre within a period of ten minutes ?	10	0	0
4	Is the child's record clean and legible ?	2	0	0
5	Does each parent or guardian know that the immunization record card is to be kept safely for the child ?	8	0	0
6	Is the parent or guardian provided with an immunization record card ?	2	0	0
7	*Do at least 50% of the parents or guardians bring the cards when they visit the immunization ?	2	0	0
8	Is the immunization card produced by parent or guardians clean and legible ?	2	0	0

* Do a check if immunization clinic is in session

Ministry of Health, Jamaica
June 1999

No	OBSERVATIONS	No. of Points ✔Check one Column only		
		Yes	No	NK
9	Is the immunization record card a reasonable size about 23 x 10 centimetre (9" x 4") when folded so that all basic , useful & relevant information can be written in the space provided ?	1	0	0
10	Is the immunization record card made from durable cardboard or other material that can used for 10 years at least under normal conditions ?	1	0	0
11	Can the record of immunizations for each child be completed within a period of 3 minutes by the health worker ?	1	0	0
12	Does the recording system provide for those who come first to be served first through an orderly and easily followed routine ?	2	0	0
13	Are there (a) specific immunization days ? (b) specific centre hours ?	5 5	0 0	0 0
14	Is the annual target population for immunization estimated and recorded ? Target population is.....	10	0	0
15	Is the monthly target population to be immunized and those actually immunized being monitored monthly on a graph or chart ?	4	0	0
16	Is the immunization report so designed that coverage can be calculated against target population and expressed as percentage ?	4	0	0
17	Are monthly reports from the health centre sent in within a period of two weeks after the end of each month to the central authority ?	10	0	0
18	Are duplicate copies of all reports sent to the central authority kept available at the health centre ?	2	0	0
19	Is the format for the monthly report standardized for routine reporting ?	2	0	0
20	Are there sufficient supplies of the monthly reporting forms in the health centre for at least 2 months ?	2	0	0
21	Does the monthly reporting form provide for ;- (a) Number of children immunized? (b) At what ages immunized ? (c.) Number of doses given ? (d) type of vaccine used ? (e) batch numbers of vaccines? (f) Quantity of vaccines used ? (g) Balance of vaccines in stock ?	1 1 1 1 1 1 1 1	0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0
Add points checked in "YES" column to obtain total =				

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June 1999

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CHECKLIST
RECORDING AND REPORTING

NK = Not Known

= The greater the total number of points checked in the "YES" column, the more effective the Health Centre is in recording and reporting immunizations.

		Points
Excellent	=	91 - 100
Very good	=	81 - 90
Good	=	71 - 80
Fair	=	50 - 70
Unsatisfactory	=	<50

Remarks

.....

.....

.....

.....

.....

Ministry of Health, Jamaica

June 1999

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Appendix D: Checklist for Outreach Immunization Sessions

Item	Number	Rational
Venue		
Clean private area	-	To promote confidence and compliance
Table	1	-
Chairs	3	-
Vaccine carriers lined with ice pack	Minimum of 2	Maintain viability of the vaccines
Vaccines and diluent	As needed	For immunization
Thermometer	1 for each vaccine carrier	To monitor vaccine temperature
Plastic Carrier with the following	-	For ease of transporting items
Container with dry cotton	1	To clean skin
Container with alcohol-soaked swabs	1	To clean skin as necessary
Alcohol	1 bottle	Reserve
Syringes	Assorted sizes as needed	For injection and reconstitution of vaccines
Needles	Assorted sizes as needed	For injection and pulling up vaccines
Hand towel	1 roll	Cleaning table and hand hygiene
Liquid soap	1 bottle	Hand hygiene

Item	Number	Rational
Water	2	Drinking and hand hygiene
Hand sanitizers	1 bottle	Hand Hygiene
Kidney dishes	2	Syringes
Artery forceps	2	To mobilize swabs, remove vial stopper
Lined tray	1	Store syringes before use
Emergency drugs		Resuscitation
Adrenalin		Resuscitation
Hydrocortisone		Resuscitation
Emergency response check list		Resuscitation
Water for injection		Resuscitation
Benadryl		Resuscitation
Panadol		To treat fever
Other items		
Sharps container	1	Sharp disposal
Garbage bags	3	Refuse disposal
Immunization cards	As needed	Replacement cards
Immunization outreach reporting forms; tracking register	As needed	Recording and reporting

(Adapted from the Western Regional Health Authority)

Appendix E: Sample Immunization Notice

IMMUNIZATION NOTICE

The Expanded Programme on Immunization has long been recognized one of the best successes in health, saving the lives of millions of children all over the world. Vaccinations have prevented deaths from very serious diseases such as measles, polio and lock-jaw (tetanus).

Under Jamaica's Public Health Law - Immunization Regulations (1986) (Amended 2013), every parent/guardian has the responsibility to have his/her child/ward fully immunized by their first birthday, or as soon as possible thereafter. Booster vaccines will be given after the first birthday as needed.

No child should be admitted to school or allowed to continue attending school unless the parent/guardian produces a Certificate of Immunization.

Health centre records in the parish of _____ show that your child/ward: _____ age _____ has not attended any of our facilities for vaccination as scheduled. You are therefore asked to report to the _____ Health Centre within two (2) weeks from_____ (date) to commence/resume vaccination, or present records showing that your child/ward has been vaccinated.

Failure to do so may result in prosecution under the law. Penalty for breaking the law can be up to one million dollars ($1,000,000) or imprisonment for up to twelve months.

Name: _____

Signature:_____

Medical Officer (Health)

Date:_____

(Adapted from the Western Regional Health Authority)

Appendix F: Key Messages for Immunization Education and Promotion

- Immunization saves the lives of millions of children every year by preventing serious illnesses.
- Every child has a right to be immunized and it is the duty and responsibility of parents to take their children for immunization.
- Immunization is free and available at health facilities and outreach sites (including schools and community).
- It is safer, easier and less costly to immunize a child than to treat a child for vaccine preventable diseases.
- All vaccines have been tested and approved by regulatory authorities, Ministries of Health, World Health Organization and the United Nations Children's Fund. They are not used until proven to be safe.
- It is safe to vaccinate a child who has a mild illness, a disability or malnutrition.
- Caregivers should take the immunization card every time they take their children to a health facility or outreach site. A child's immunization status should be reviewed every time they have a health care visit for any reason.
- The Immunization Regulations of 1986 requires all children under the age of 7 years must be immunized before entry to daycare centres, early childhood education centres and schools.

Immunization is a must!

Appendix G: Needle Stick, Sharp Object Injury and Fluid Exposure Report

HIV/STI/TB Programme - Ministry of Health

Parish:_____

Needle Stick, Sharp Object Injury and Fluid Exposure Report

1. **Name:**_____ **DOB:**_____ **Sex:** M F
   Occupation: _____
2. **Date/Time of Exposure/Injury:** _____
5. **Reported by:**_____ **Date:** _____
7. **Institution where exposure/injury occurred:** _____
8. **Where did the exposure/injury occur?**

A	Ward *(specify)*_____	☐	G	Operating Theatre	☐
B	Dressing Room	☐	H	Dialysis Unit	☐
C	Phlebotomy room	☐	I	Labour & Delivery Room	☐
D	Outpatient clinic	☐	J	Service/ Utility Area (*laundry, garage, disposal, etc.*)	☐
E	ICU	☐	K	Other *(specify)*: _____	
F	A&E / Casualty	☐			

9. **Name of the source patient:**_____ ☐ Source Unknown
10. **Docket No.**_____ ☐ Not Applicable
11. **Source patient HIV Status:** ☐ Positive ☐ Negative ☐ Unknown
    ☐ Source Patient tests positive for other blood borne pathogen *(specify)* _____
12. **Type of exposure:** ☐ Sharp item ☐ Body Fluid exposure *(specify type and volume)*: _____
13. **In the case of body fluid exposure, was the skin of the exposed person intact?** ***(if not body fluid exposure skip this question)***
    ☐ YES ☐ NO *(explain)* _____
14. **Specify Sharp Item** *(if not sharp item, skip to Question 17)*:
    ☐ Needle, specify gauge ☐ Blade
    ☐ Branula, specify gauge _____ ☐ Glass, specify *(broken test tube, etc.)* _____
    ☐ Other Needle *(suture needle, etc.)* specify type & size ☐ Other *(specify)* _____
15. **Was the injury:** ☐ Superficial (little or no bleeding) ☐ Moderate (skin punctured, some bleeding)
    ☐ Severe *(deep stick/cut, or profuse bleeding)*

16. If the injury was to the hands, did the sharp item penetrate: *(check one)*

☐ Single pair gloves ☐ No gloves ☐ Other *(specify)*_____

17. Did the injury/exposure occur:

☐ Restraining Patient
☐ Disassembling device or equipment
☐ In preparation for reuse of reusable instrument *(sorting, disinfecting, sterilizing, etc.)*
☐ While recapping used needle
☐ Withdrawing a needle from rubber or other resistant material *(rubber stopper, I.V. port, etc.)*
☐ Device left on floor, table, bed or other inappropriate place
☐ Other after use, before disposal *(in transit to trash, cleaning, sorting, etc.)*
☐ From item left near or on disposal container
☐ While putting the item in a disposal container
☐ After disposal, stuck by item protruding from opening of disposal container
☐ Item placed on side of disposal container
☐ After disposal, item protruded from trash bag or inappropriate waste container
☐ Other, describe _____

18. Describe the circumstances leading to this injury: *(please note if a device malfunction was involved)*

_____

_____

_____

19. State the location of the exposure/injury: _____

20. Hepatitis B immunization? ☐ None ☐ YES Dates: _____

21. Immunization Card seen? ☐ YES ☐ NO

22. Has the injured person had any previous needle stick injuries? ☐ YES ☐ NO

23. If yes, were the previous incidents reported? ☐ NO ☐ YES Date(s): _____

24. Risk Category: ☐ Low ☐ Moderate ☐ High

25. Was area bled/flushed/washed? ☐ YES ☐ NO

26. Was disinfectant used?** ☐ YES ☐ NO

**NOTE: The use of bleach, alcohol, Savlon or other disinfectants is not recommended.

27. Action taken by head of department:

a. Counselling? ☐ YES ☐ NO

b. Blood taken for HIV testing? ☐ YES ☐ NO *(if "NO", explain)* _____

c. Blood taken for Hepatitis B Antigen? ☐ YES ☐ NO *(if "NO", explain)* _____

d. PEP Medication Given? *(see last page of this form for PEP Guidelines)*

☐ YES TYPE_____ Date/Time Started _____

☐ NO *(if "NO", explain)* _____

☐ Low Risk ☐ Not Available ☐ Exposed Person Refusal* ☐ Other *(specify)*_____

*In the case of refusal the exposed person must sign the attached waiver form

To be sent to Medical Officer of Health for surveillance

Form completed by:

Name:_____

Designation:_____

Signature: _____

Post Exposure Prophylaxis (PEP) Dosages:

All of the following are to be given within 1-2 hours or at most 72 hours after exposure* and continued for four weeks:

Low Risk:

a. Tenofovir (TDF) 300 mg, Lamivudine (3TC) 300 mg and Dolutegravir (DTG) 50mg p.o. od

OR

b. Tenofovir/Lamivudine (TDF/3TC)1 tab od and Atazanavir 300mg od with Ritonavir 100mg od (ATV/r).

High Risk: Either of the above

In cases of hypersensitivity to DTG use:

Atazanavir 300mg od with Ritonavir 100mg od (ATV/r).

In cases of hypersensitivity to ATZ use:

Lopinavir/Ritonavir (LPV/r) 2 tabs bid

*Studies in animals (no human studies done) suggest that treatment is not as effective when started more than 24-36 hours after exposure. PEP has no value after 72 hours in humans.

PEP Refusal form:

I,_____, hereby waive my right to take the PE Prophylaxis to prevent possible infection of the HIV virus. I understand that by refusing to take the medication I am putting myself at greater risk for infection.

Signed:

_____

Date:

_____

Witness signature:

_____

Witness (print name neatly):

_____

Source: MOHW 2020. Clinical Management Of HIV Disease – Guidelines for Medical Practitioners