VACCINES, COLD CHAIN AND LOGISTICS MANAGEMENT

ANNEXES

Department of Health
National Immunization Program

VACCINES, COLD CHAIN AND LOGISTICS MANAGEMENT

ANNEXES

5TH EDITION
2018
MANILA, PHILIPPINES

List of Annexes

Tool for Bundling Calculation

Vaccines	Target Population	Number of Doses per Target Group	Doses per Vial	Wastage Factor for Vaccines	Doses Needed	Wastage Factor for Syringes	0.05 ml AD Syringes	0.5ml AD Syringes	2 ml mixing syringes	5 ml mixing syringes	Diluent	Droppers	Safety boxes
A	B	C	D	E	F=B*C*E	G	H=B*C*G	I=B*C*G	J=F/D	K=F/D	L=F/D	M=F/D	N=(H+I+J+K)/100
BCG		1	20	2.50	-	1.11	-		-		-		-
HepB		1	10	1.18	-	1.11		-					-
Pentavalent		3	1	1.05	-	1.11		-					-
bOPV		3	20	1.33	-							-	
PCV		3	1	1.05	-	1.11		-					-
IPV		1	10	1.18	-	1.11		-					-
MMR		2	5	1.33	-	1.11		-		-	-		-
MR		2	10	1.33	-	1.11		-		-	-		-
Td (Adolescent)		2	10	1.18	-	1.11		-					-
Td (Pregnant)		2	10	1.18	-	1.11		-					-
JE		1	5	1.33	-	1.11		-		-	-		-
HPV		2	1	1.05	-	1.11		-					-
PPV		1	1	1.05	-	1.11		-					-
Flu		1	10	1.18	-	1.11		-					-
Rotavirus		2	1	1.05	-								
Dengue		3	5	1.33	-	1.11		-		-	-		-

Vaccine Stock Card

Name of Vaccine ______________________

Generic Name ______________________

Brand Name ______________________

Manufacturer ______________________

Quantity Received (in vials) ______________

Dose per vial ______________

Storage Location ______________

Date (mm/dd/yyyy)	Property Transfer Receipt No.	To Whom Received/Issued	QUANTITY (in vials)			Balance	QUANTITY (in Dose)	VVM STATUS	Remarks
			Received	Issued	Expiry Date/ Lot No.	Qty			Issued by/ Verified by
	Beginning Balance					5,000	0		
						5,000	0		
						5,000	0		
						5,000	0		
						5,000	0		
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						5,000	0		
						5,000	0		
						5,000	0		

Prepared by:

____

Verified by:

____

Diluent Stock Card

Name of Vaccine ______________________
Generic Name ______________________
Brand Name ______________________
Manufacturer ______________________

Quantity Received (in vials) ______________
Dose per vial ______________
Storage Location ______________

Date (mm/dd/yyyy)	Property Transfer Receipt No.	To Whom Received/Issued	QUANTITY (in vials)				QUANTITY (in Dose)	VVM STATUS	Remarks
			Received	Issued	Expiry Date/ Lot No.	Balance Qty			Issued by/Verified by
	Beginning Balance					5,000	0		
						5,000	0		
						5,000	0		
						5,000	0		
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						5,000	0		
						5,000	0		
						5,000	0		
						5,000	0		

Prepared by: ______________________

Verified by: ______________________

Annex 3

Stock Count Sheet for Syringes, Safety Boxes and Other Products

Date:			**Location:**			**Sheet no:**	
First count team:							
Second count team:							
Count no.	**Item description**	**Pack type (A)**	**Units per pack (B)**	**Total units (A x B)**	**Lot no.** (where applicable)	**Expiry date** (where applicable)	**Notes**
				0			
				0			
				0			
				0			
				0			
				0			
				0			
				0			
				0			
				0			
				0			
				0			
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				0			
				0			
				0			
				0			
				0			
				0			
				0			
				0			

Form 1: Vaccine Use and Wastage Monthly Monitoring Form for Vaccination Facilities

Name of Facility: _____ Reporting Month: _____ Date of Report: _____ Reported by: _____

Name of Region: _____ Name of Province: _____ Name of City/Municipality: _____

Reporting Level: ☐ Province ☐ City/Municipality ☐ Barangay ☐ Others (please specify): _____

Antigen	Dose per vial	STOCK AVAILABLE FOR THE REPORTING MONTH						UTILIZATION AND WASTAGE REPORT													INVENTORY REPORT	
		Starting balance (in vials) for the reporting month	# of vials received from higher level or other sources for the reporting month	# of vials received from any source in the reporting month*	# of vials returned to higher level or transferred to other health facility	Total stock available for the reporting month		Vials Discarded					# of vials available for routine immunization *(g-l)*	# of Vials Administered			Wasted doses during immunization *(q-o)*	# of unopened vials		Wastage Rate	Ending balance (in vials) for the reporting month	Remarks
						# of vials *(c+d+e)-f*	# of doses *(b x g)*	# of vials expired	# of vials with VVM 3/4	# of vials damaged	Total Discarded Vials *(i+j+k)*	Total Discarded in Doses *(b x l)*		# of doses administered	# of utilized vials			# of vials kept at the facility ***	# of doses *(b x s)*			
															# of opened vials**	# of doses *(b x p)*						
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v	w
BCG	20																					
HepB	10																					
Pentavalent	1																					
bOPV	20																					
IPV	10																					
PCV	1																					
MR	10																					
MMR	5																					
Rotavirus	1																					
Td	10																					
HPV	1																					
JE	5																					
TT	20																					
Measles	10																					
Dengvaxia	5																					
Flu	10																					
PPV23	1																					

** Number of vials received from sources other than DOH (e.g., donation, procured by LGU, etc.)*

*** Actual number of vials opened during immunization sessions for the reporting month*

****Based on actual physical count or inventory after the last immunization session of the reporting month.*

Consolidation Report Form 2: Vaccine Usage and Wastage Database

Antigen: _____ Date Report(mm/dd/yy): _____

Name of Region: _____

Name of Province: _____

Name of City/ Municipality: _____

Reporting Level: _____

Dose per Vial: _____

Note:

* Number of vials received from sources other than DOH (e.g., donation, procured by LGU, etc.)

** Actual number of vials opened during immunization sessions for the reporting month

***Based on actual physical count or inventory after the last immunization session of the reporting month.

Name of Barangay/Municipality/ Province/City	STOCK AVAILABLE FOR THE REPORTING MONTH						UTILIZATION AND WASTAGE REPORT													INVENTORY REPORT	
	Starting balance (in vials) for the reporting month	# of vials received from higher level or other sources for the reporting month	# of vials received from any source in the reporting month*	# of vials returned to higher level or transferred to other health facility	Total stock available for the reporting month		Vials Discarded					# of vials available for routine immunization (f-k)	# of Vials Administered		Wasted doses during immunization (p-n)	# of unopened vials		Wastage Rate	Ending balance (in vials) for the reporting month	Remarks
					# of vials (b+c+d)-e	# of doses (b7 x f)	# of vials expired	# of vials with VVM 3/4	# of vials damaged	Total Discarded Vials (h+i+j)	Total Discarded in Doses (b7 x k)		# of doses administered	# of utilized vials			# of vials kept at the facility ***	# of doses (b7 x r)			
														# of opened vials**	# of doses (b7 x o)						
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o	p	q	r	s	t	u	v
Total																					

Vaccine and Safe Injection Equipment Request
Form 1: Quarterly Delivery Schedule

Region: _____ **Date:** _____

Province/City: _____

Total Population: _____ **Quarter** _____

Instruction: Please do not forget to fill-up all columns and the total population of the requesting facility. All vaccine quantity are calculated in vials.

EPI Vaccines	Previous Quarter Stock					Estimation of Current Vaccine Order				REMARKS
	PREVIOUS STOCK	QUANTITY RECEIVED FROM PREVIOUS ORDER	QUANTITY ISSUED	QUANTITY DAMAGED, EXPIRED, LOSS, etc.)	CURRENT STOCK f = (b + c) - (d + e)	QUARTERLY REQUIREMENT*	BUFFER STOCK ** h = g	RECOMMENDED STOCK LEVEL i = (g + h)	CURRENT ORDER/ REQUEST j = (i - f)	
a	b	c	d	e	f	g	h	i	j	k
BCG (20-dose/vial)										
Hepatitis B (10-dose/vial)										
DPT-HepB-HiB (1-dose/vial)										
Bivalent Oral Polio Vaccine (20-dose/vial)										
Pneumococcal Conjugate Vaccine (1-dose/vial)										
Inactivated Polio Vaccine (IPV), (10-dose/vial)										
Measles Mumps Rubella, (5-dose/vial)										
Tetanus diptheria, Adolescent (10-dose/vial)										
Tetanus diptheria, Pregnant Women (10-dose/vial)										
Measles Rubella (10-dose/vial)										
Japanese Encephalitis (5-dose/vial)										
Rotavirus Vaccine (1-dose/vial)										
Human Papillomavirus Vaccine (1-dose/vial)										
Pneumococcal Polysaccharide Vaccine (1-dose/vial)										
Influenza Vaccine (10-dose/vial)										
EPI Safe Injection Devices	**Previous Quarter Stock**					**Estimation of Current Vaccine Order**				**REMARKS**
	PREVIOUS STOCK	QUANTITY RECEIVED FROM PREVIOUS ORDER	QUANTITY ISSUED	QUANTITY DAMAGED, EXPIRED, LOSS, etc.)	CURRENT STOCK f = (b + c) - (d + e)	QUARTERLY REQUIREMENT*	BUFFER STOCK ** h = g	RECOMMENDED STOCK LEVEL i = (g + h)	CURRENT ORDER/ REQUEST j = (i - f)	
a	b	c	d	e	f	g	h	i	j	k
bOPV Droppers										
Safety boxes										
0.05ml AD syringes for BCG										
0.5ml AD syringes (total quantity)										
Hepatitis B (10-dose/vial)										
DPT-HepB-HiB (1-dose/vial)										
Pneumococcal Conjugate Vaccine (1-dose/vial)										
Inactivated Polio Vaccine (IPV), (10-dose/vial)										
Measles Mumps Rubella, (5-dose/vial)										
Tetanus diptheria, Adolescent (10-dose/vial)										
Tetanus diptheria, Pregnant Women (10-dose/vial)										
Measles Rubella (10-dose/vial)										
Japanese Encephalitis (5-dose/vial)										
Human Papillomavirus Vaccine (1-dose/vial)										
Pneumococcal Polysaccharide Vaccine (1-dose/vial)										
Influenza Vaccine (10-dose/vial)										
2 ml or 3 ml Mixing syringes for BCG										
5 ml Mixing syringes (total quantity)										
Measles Mumps Rubella, (5-dose/vial)										
Measles Rubella (10-dose/vial)										
Japanese Encephalitis (5-dose/vial)										

* **g = ((total population * 2.7% eligible population * required no. of doses * wastage factor) ÷ dose per vial) ÷ 4 quarters**

** **Annual buffer stock : 25% of the annual**

Prepared by:

Name: _____
Designation: _____
Email: _____
Mobile No.: _____

Approved by:

Name: _____
Designation: _____
Tel No. : _____
Fax No.: _____

Received at RITM:

Received by: _____
(name and signature)
Date & Time _____

Vaccine And Safe Injection Equipment Request
Form 2: Monthly Delivery Schedule

Region: _____ Municipality: _____ Date: _____

Province/City: _____ RHU/Health Center: _____ Month: _____

Total Population: _____

Instruction: Please do not forget to fill-up all columns and the total population of the requesting facility. All vaccine quantity are calculated in vials.

EPI Vaccines and safe injection devices	Previous Month stock					Estimation of Current Order				
	PREVIOUS STOCK	QUANTITY RECEIVED FROM PREVIOUS ORDER	QUANTITY ISSUED	QUANTITY DAMAGED, EXPIRED, LOSS, etc.)	CURRENT STOCK f = (b + c) - (d + e)	MONTHLY REQUIREMENT**	BUFFER STOCK ** h = g	RECOMMENDED STOCK LEVEL i = (g + h)	ORDER/REQUEST j = (i - f)	REMARKS
a	b	c	d	e	f	g	h	i	j	k
BCG										
Hepatitis B										
DPT-HepB-HiB										
Bivalent Oral Polio Vaccine										
Pneumococcal Conjugate Vaccine										
Inactivated Polio Vaccine (IPV), (										
Measles Mumps Rubella,										
Tetanus diptheria										
Tetanus diptheria										
Measles Rubell										
Japanese Encephalitis										
Rotavirus Vaccine										
Human Papillomavirus Vaccine										
Pneumococcal Polysaccharide Vaccine										
Influenza Vaccine										

EPI safe injection devices	Previous Quarter Stock					Estimation of Current Vaccine Order				REMARKS
	PREVIOUS STOCK	QUANTITY RECEIVED FROM PREVIOUS ORDER	QUANTITY ISSUED	QUANTITY DAMAGED, EXPIRED, LOSS, etc.)	CURRENT STOCK f = (b + c) - (d + e)	QUARTERLY REQUIREMENT*	BUFFER STOCK ** h = g	RECOMMENDED STOCK LEVEL i = (g + h)	CURRENT ORDER/ REQUEST j = (i - f)	
a	b	c	d	e	f	g	h	i	j	k
bOPV Droppers										
Safety boxes										
0.05ml AD syringes for BCG										
0.5ml AD syringes (total quantity)										
Hepatitis B										
DPT-HepB-HiB										
Pneumococcal Conjugate Vaccine										
Inactivated Polio Vaccine (IPV), (										
Measles Mumps Rubella,										
Tetanus diptheria										
Tetanus diptheria										
Measles Rubell										
Japanese Encephalitis										
Human Papillomavirus Vaccine										
Pneumococcal Polysaccharide Vaccine										
Influenza Vaccine										
2 ml or 3 ml Mixing syringes for BCG										
5 ml Mixing syringes (total quantity)										
Measles Mumps Rubella,										
Measles Rubell										
Japanese Encephalitis										

g = ((total population * 2.7% eligible population * required no. of doses * wastage factor) ÷ dose per vial) ÷ 12 months

** Annual buffer stock : 8.33% of the annual

Prepared by:

Name: _____

Designation: _____

Email: _____

Mobile No.: _____

Approved by:

Name: _____

Designation: _____

Tel No. : _____

Fax No.: _____

Received at supplying vaccine store:

Received by: _____

(name and signature)

Date & Time _____

Annex 7a

Invoice Receipt of Property

REPUBLIC OF THE PHILIPPINES
INVOICE – RECEIPT FOR PROPERTY

IR NO : 2017-****
DATE : (M-D-YR)

DATE DISPATCH :
STORAGE TEMP.: 2° to 8° C

QTY	UNIT	NAME / DESCRIPTION	LOT NUMBER	EXPIRY DATE	UNIT VALUE	TOTAL VALUE
					Php	Php 0.00
				TOTAL >>>		Php 0.00

FOR :(RECIPIENT)
Name of Supply Officer
Supply Officer ********
Address

Attention: Name of Cold Chain Manager
Tel No: *******

VACCINE	x-x-x-x-x	x-x-x-x-x	x-x-x-x-x	x-x-x-x-x	x-x-x-x-x	x-x-x-x-x
Manufacturer						
P.O No. Date						
DR No. Date						
Invoice No. Date						
AWB No. Date						

INVOICE

I certify that I transferred to

Name & Designation

The above listed articles/property of

Name of Agency

(Printed Name over Signature)
Designation
(Invoicing Accountable Officer)

RECEIPT

I certify that I have received the above listed articles for

(RECEPIENT)
Name of Agency

Name & Designation

Date :(M-D-YR)

Annex 7a (cont'd)

Packing List

DATE: (M-D-YR)
FOR: (RECEPIENT)
IR NO. (2017-****)

DATE DISPATCH : (M-D-YR)

Vaccines	Box No.	Qty/Box(vls/amps/pcs)	No. of Boxes
		TOTAL	0ctns

No. of boxes: 0
No. of ice packs: 0
VVM Reading: 1

Please sign on IR and return immediately to:
DOH RITM Warehouse
FCC Comp. Alabang Munt City or fax to (02) 807-3397
Kindly return them to RITM thru (FORWARDER)

Issued by:

(Printed Name over Signature)

Checked by:

(Printed Name over Signature)

REVISION 005 27February2018

DEPARTMENT OF HEALTH
Disease Prevention and Control Bureau
NATIONAL IMMUNIZATION PROGRAM

VACCINE ARRIVAL REPORT

GENERAL INSTRUCTIONS:

1. Please accomplish the form and submit to RITM-Storage and Distribution Department within **three (3) days** upon arrival of vaccine shipment
2. Put **"N/A"** on the space provided if not applicable
3. Ensure that all fields are duly accomplished prior submission of VAR
4. For other vaccine or biological please specify on the space provided
5. Accomplished VAR shall be submitted to the following
   Telefax: (02) 807-33-97
   Email address: storage_distribution@yahoo.com

RHO/PHO/CHO: _____ Date of Report: _____
Province/City: _____ Quarter: _____

Place of Inspection	Date and Time	Date and Time Vaccines stored inside the Cold Storage/Freezer

PART I – PRE-ADVICE

Date received by consignee	Fax/e-mail Message

PART II –ARRIVAL DETAILS

Expected Time of Arrival as per notification		Actual Time of Arrival	
Date	Time	Date	Time

PART III – DETAILS OF VACCINE SHIPMENT

BCG Doses per vial: _____				DILUENT No. of boxes: _____		
Quantity	Lot Number	Expiry Date	VVM Status	Lot Number	Quantity	Expiry Date

1

HEPATITIS B
Doses per vial: _____ No. of boxes: _____

Lot Number	Quantity	Expiry Date	VVM Status

BIVALENT ORAL POLIO
Doses per vial: _____ No. of boxes: _____

Lot Number	Quantity	Expiry Date	VVM Status

DROPPERS
No. of boxes: _____

Lot Number	Quantity	Expiry Date

DTP-HEPATITIS B-HiB
Doses per vial: _____ No. of boxes: _____

Lot Number	Quantity	Expiry Date	VVM Status

PNEUMOCOCCAL CONJUGATE VACCINE
Doses per vial: _____ No. of boxes: _____

Lot Number	Quantity	Expiry Date	VVM Status

MEASLES MUMPS RUBELLA (MMR)
Doses per vial: _____ No. of boxes: _____

Lot Number	Quantity	Expiry Date	VVM Status

DILUENT
No. of boxes: _____

Lot Number	Quantity	Expiry Date

TETANUS DIPHTHERIA (Td)
Doses per vial: _____ No. of boxes: _____

Lot Number	Quantity	Expiry Date	VVM Status

MEASLES RUBELLA (MR)
Doses per vial: _____ No. of boxes: _____

Lot Number	Quantity	Expiry Date	VVM Status

DILUENT
No. of boxes: _____

Lot Number	Quantity	Expiry Date

OTHER VACCINE:

Name of Vaccine: **Please Specify** _____ **and Check appropriate box**

☐ **Flu** ☐ **PPV** ☐ **HPV** ☐ **ROTAVIRUS** ☐ **JE**

Doses per vial: _____

Quantity	Lot Number	Expiry Date	VVM Status

	Yes	No	Comments
Was quantity received as per shipping notification?			
It not, were details of short-shipment provided prior to Vaccine arrival?			

PART IV – DOCUMENTS ACCOMPANYING THE SHIPMENT

Property Transfer Report (PTR)	Bill of Lading (BL)	Packing List	Other (Please Specify)
☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No	

PART V – STATUS OF SHIPPING INDICATORS

Total Number of Boxes : _____			Status ☐ With Ice ☐ Melted but Cold ☐ Melted and Warm ☐ Others _____			
Box No.	Lot No.	VVM (1,2,3,4)	Number of Data Logger	Serial Number	Temperature Reading	Date/Time Inspected

Use separate sheet if necessary

PART VI – GENERAL CONDITIONS OF SHIPMENT

What was the condition of boxes on arrival?	
Were necessary labels attached to shipping boxes?	
Other Comments:	

PART VII – NAME AND SIGNATURE

Prepared by:

_____
Signature over printed name
EPI Manager/Cold Chain Manager

Noted By:

_____
Signature over printed name
Cluster Head/Authorized Official

Annex 10

REPUBLIC OF THE PHILIPPINES
REPUBLICA DE FILIPINAS

BILL OF LADING

CONOCIMIENTO DE EMBARQUE BL-DOH-

MANILA, Philippines, (M-D-YR)

_____(FORWARDER)_____
(Carrier)

YOU ARE HEREBY AUTHORIZED to receive, carry and deliver the following-described merchandise to ***(RECIPIENT)*** in accordance with the authorized and prescribed rates and classifications, and according to the law of common carriers in force on the date hereof. Settlement and payment of charges to be made by ***(FUNDING SOURCE)***.

(PRINTED NAME OVER SIGNATURE)
(DESIGNATION)
(Shipper)

RECEIVED the following-described merchandise in apparent good order and condition, save as noted (contents and condition of contents of sealed packages unknown) for transportation and delivery in accordance with above.

Date at _____, Philippines, _____, 2017

(Agent for carrier)

Number of Packages	Marks	CONTENTS (Should be listed in detail)	VALUE	WEIGHT/ ctn (kg)	MEASUREMENT/ctn (cm)
0	**ctns**	**Total** For the use of : RECIPIENT Address IR # 2017-**** Dtd (M-D-YR) AWB NO.:	**Php-**		

_____. Philippines, _____, 20____

RECEIVED the above-described merchandise apparently in same conditionas when shipped, save as noted below

(Consignee-Consignatario)

(Designation-Designacion)

MARDY/2017

Different Types of Temperature Monitoring Devices

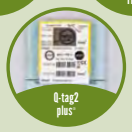
TEMPERATURE MONITORING DEVICES: AN OVERVIEW

LOCATION	MINIMUM WHO RECOMMENDATION	AVAILABLE WHO PREQUALIFIED DEVICES (July 2013)		DEVICE USE
INTERNATIONAL VACCINE SHIPMENTS (2°C to 8°C)	Electronic shipping indicators (liquid-crystal display [LCD] or computer downloadable)	**20-DAY ELECTRONIC SHIPPING INDICATORS** (irreversible)		Monitors temperature during shipment of vaccines. Alarm is activated if temperatures exceed or fall below the recommended range. Single use; once the alarm has been activated, the device cannot be used again.
INTERNATIONAL VACCINE SHIPMENTS (-20°C [e.g., oral polio vaccine])	Cold chain monitor cards	**COLD CHAIN MONITOR CARDS** (irreversible)		Monitors temperature during shipment of frozen vaccine. Single use; once the alarm has been activated, the device cannot be used again.
THROUGHOUT THE SUPPLY CHAIN	Vaccine vial monitors (VVM)	**VVM2, VVM7, VVM14, VVM30** (irreversible) Types are determined by WHO based on heat stability of vaccine.	 Photo: Umit Kartoglu	Assesses heat exposure of individual vials or other primary containers of vaccines. Used throughout the supply chain.
COLD ROOMS AND FREEZER ROOMS	Continuous temperature monitoring systems with alarm and a back-up dial thermometer	**INTEGRATED DIGITAL OR DIAL TEMPERATURE MONITORS**	 Photo: PATH/Amy MacIver Included on all PQS prequalified cold rooms and freezer rooms.	Monitors the temperature inside a cold room or freezer room. Presents an external visual display of the current temperature.
		DIAL THERMOMETERS (gas/vapor pressure)	 Photo: World Health Organization	Monitors current temperature. Included with all cold/freezer room purchases. May be used as a backup external temperature display in case of power failure.
		CENTRAL TEMPERATURE MONITORING SYSTEMS	 Photo: PATH and Berlinger & Co. Photo: PATH	Monitors temperatures and sends recorded data and alarms to a central server or cellular phone at set intervals. Recommended for large, multiple, or remote cold/freezer rooms.
		30-DAY ELECTRONIC TEMPERATURE RECORDERS		Records temperatures at regular intervals. Provides alarms if temperatures exceed or fall out of range. If a central temperature monitoring system is not relevant, available, and/or affordable, device may be used as a back-up external temperature display or internal recording device in case of power failure.
		FREEZE INDICATORS (irreversible)		May be used as a backup indicator for potential freeze exposure in low-temperature locations within a cold room. Single use; once the alarm has been activated, the device cannot be used again. Not used in freezers.
REFRIGERATED VEHICLES	Electronic continuous temperature monitoring systems with recording capacity and one freeze indicator per shipment	**DASHBOARD-MOUNTED CONTINUOUS TEMPERATURE MONITORS**	No prequalified products are currently available.	Monitors current temperature inside refrigerated vehicle. Installed in refrigerated vehicle with visual dashboard mount.
		FREEZE INDICATORS (irreversible)		Detects freeze incidents. One freeze indicator should be placed near the most freeze-sensitive vaccine in the shipment when the vaccine is packed in the issuing store. Single use; once the alarm has been activated, the device cannot be used again.

Unless otherwise indicated, all photos: PATH/Patrick McKern.

August 2013

TEMPERATURE MONITORING DEVICES: AN OVERVIEW

LOCATION	MINIMUM WHO RECOMMENDATION	AVAILABLE WHO PREQUALIFIED DEVICES (July 2013)		DEVICE USE
REFRIGERATORS	Integrated digital or dial thermometers	INTEGRATED DIGITAL OR DIAL THERMOMETERS	 Photo: PATH/Amy MacIver Included on all PQS prequalified refrigerators	Monitors current temperature and displays temperature externally.
		FREEZE INDICATORS (irreversible)	 Freeze-tag®  FreezeAlert®  Q-tag® Quad	Detects freezing incidents. Not needed if 30-day temperature recorders are used. Single use; once the alarm has been activated, the device cannot be used again.
		30-DAY ELECTRONIC TEMPERATURE RECORDERS	 LogTag® TRID30-7FW  Fridge-tag®  Fridge-tag 2®	Records temperatures at regular intervals. Provides alarms if temperatures exceed or fall out of range. Used to ensure that equipment is functioning effectively.
FREEZERS	Integrated digital or dial thermometers	INTEGRATED DIGITAL OR DIAL THERMOMETERS	 Photo: PATH / Amy MacIver Included on all PQS prequalified freezers	Monitors current temperature and displays temperature externally.
		DIAL THERMOMETERS (gas or vapor pressure)	 Rueger TFV1008I Photo: World Health Organization	Monitors current temperature. External display of freezer temperature.
COLD BOXES AND VACCINE CARRIERS	Irreversible freeze indicators when freeze sensitive vaccine is being transported	FREEZE INDICATORS (irreversible)	 Freeze-tag®  FreezeAlert®  Q-tag® Quad	Detects freezing incidents. Single use; once the alarm has been activated, the device cannot be used again.
		20-DAY ELECTRONIC SHIPPING INDICATORS	 VaxAlert®  LogTag® TIC20  Q-tag® CLm doc  Q-tag2 plus®  Q-tag® CLm	Monitors temperatures inside cold boxes and vaccine carriers during transport. Provides alarms if temperatures exceed or fall below range. Typically used in shipping but could be used in cold boxes and vaccine carriers. Single use; dispose of after 20 days.
		VVM + PEAK TEMPERATURE INDICATORS	No prequalified peak temperature indicators available.	Used together, the VVM and peak temperature indicator show whether cumulative or peak heat exposure has occurred. Used for transport of vaccines licensed for use in a temperature controlled chain.
TEMPERATURE MAPPING OF COLD ROOMS AND FREEZER ROOMS	30-day temperature recorders or user programmable data loggers	30-DAY ELECTRONIC TEMPERATURE RECORDERS	 LogTag® TRID30-7FW  Fridge-tag®  Fridge-tag 2®	Records temperatures at regular intervals. Provides alarms if temperatures exceed or fall out of range. Used to map temperatures in cold/freezer rooms. Devices are placed in specific areas of the cold or freezer rooms or as part of a centralized system with wireless sensors.
STUDIES OF THE ENTIRE SUPPLY CHAIN OR A PORTION OF THE SUPPLY CHAIN (e.g., validating transport routes)	User programmable data loggers	USER PROGRAMMABLE DATA LOGGERS	 Libero CB PDF Logger®  Libero CS PDF Logger®  Libero Tri PDF Logger®  LogTag® PTE030-7F  LogTag® PTI030-7F  LogTag® TRIX-8	Records temperatures at user-specified intervals. Provides alarms if temperatures exceed or fall out of range. Used for studies to understand the quality of existing cold chain equipment and management and report the temperature profiles of vaccines throughout the supply chain.

Temperature Monitoring Chart

Cold room/refrigerator number: _____ Start date: <dd/mmm/yyyy> _____

Equipment model: _____ Location: _____

Key: FI = Freeze Indicator (status OK or X)

Day		1		2		3		4		5		6		7		8		9		10		11		12		13		14		15		16		17		18		19		20		21		22		23		24		25		26		27		28		29		30		31	
Temperature chart	°C	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm	am	pm
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	-5																																																															
FI (OK or X)																																																															
>+8°C alarm		Once every 24 hours, enter high alarm status and maximum temperature recorded by the continuous monitoring device																																																												
Alarm time or OK																																																												
Maximum °C																																																												
<0.5°C alarm		Once every 24 hours, enter low alarm status and minimum temperture recorded by the continuous monitoring device																																																											
Alarm time or OK																																																												
Minimum °C																																																												
Initials:																																																												

National: _____ Month: _____ Remarks: _____

Region: _____ Year: _____

Province: _____ Supervisor: _____

City/Municipality: _____

Health center: _____

Sensor Data Recording Sheet

Temperature set point: _____ºC **Recorded by (name & designation): _____**

Start Date: _____ **Start Time: _____** **End Date: _____** **End Time: _____**

Location	Description	Min. (ºC)	Max. (ºC)	Average (ºC)	Pass/ Faila (2-8 ºC)	Initials & Date
Ambient	Immediately outside the cold room or freezer room					
1	Left, front, corner top plane of room					
2	Left, rear, corner top plane of room					
3	Right, rear, corner top plane of room					
4	Right, front, corner top plane of room					
5	Centre, top plane of room					
6	Left, front, corner middle plane of room					
7	Left, rear, corner middle plane of room					
8	Right, rear, corner middle plane of room					
9	Right, front, corner middle plane of room					
10	Centre, middle plane the chamber of room					
11	Left, rear, corner bottom plane of room					
12	Right, rear, corner bottom plane of room					
13	Right, front, corner bottom plane of room					
14	Left, front, corner bottom plane of room					
15	Next to opening side of door					
16	Next to controlling RTD					
17	Refrigeration unit #1: In front of evaporator grille					
18	Refrigeration unit #2: In front of evaporator grille					
19	(Monobloc only) refrigeration unit #1: Near condenser					
20	(Monobloc only) refrigeration unit #2: Near condenser					
Comments:						

Annex 14

Sensor List for Temperature Mapping

Location	Sensor ref. number	Description
Ambient		Immediately outside the cold room or freezer room
1		Left, front, corner top plane of room
2		Left, rear, corner top plane of room
3		Right, rear, corner top plane of room
4		Right, front, corner top plane of room
5		Centre, top plane of room
6		Left, front, corner middle plane of room
7		Left, rear, corner middle plane of room
8		Right, rear, corner middle plane of room
9		Right, front, corner middle plane of room
10		Centre, middle plane the chamber of room
11		Left, rear, corner bottom plane of room
12		Right, rear, corner bottom plane of room
13		Right, front, corner bottom plane of room
14		Left, front, corner bottom plane of room
15		Next to opening side of door
16		Next to controlling RTD
17		Refrigeration unit #1: In front of evaporator grille
18		Refrigeration unit #2: In front of evaporator grille
19		(Monobloc only) refrigeration unit #1: Near condenser
20		(Monobloc only) refrigeration unit #2: Near condenser

Estimating total Storage Volume Required for Vaccines

Vaccines	Packaging doses per vial	United packed volume (cm3)	Annual vaccine doses needed	Quarterly vaccine doses needed (cm3)*	Total storage volume (cm3)	Total storage volume (liters)	Storage volume according to temperature ranges	
							-15 C to -25 C	+2 C to +8 C
a	b	c	d	e	f	g	h	i
bOPV								
BCG								
HepB								
Penta								
IPV								
PCV13								
MMR								
MR								
Td								
PPV								
Flu								
Rota								
Dengue								
TOTAL								

Worksheet for Estimating Required Vaccine Storage Volume

ITEM:										
Storage temperature:	-15C to -25C		+2C to +8C		Ambient		(tick appropriate box)			
A. Presentation:		doses per vial or ampoule								A
B. Packaging:		vials or ampoules per pack								B
C. Volume per dose							—		cm3/ dose	C
D. Total doses/year							—		doses	D
E. Annual volume	C			xD		1000	—		liters	E
F. Supply interval	Enter supply frequency in months					12	—		years	F
G. Safety stock	Enter safety stock level in months					12	—		years	G
H. Storage volume (liters)	E			x(F+G)			—		liters	H
I. Storage volume (cubic meters)				H		1000	—		m3	I
J. Transport box bulking factor	BCG, OPV, MEA, MMR, MR				— 6.0					J
	Other vaccines				— 3.0					
	Diluents, Droppers				— 1.5					
K. Transport box volume	I			xJ			—		m3	K

Worksheet for Estimating Refrigeration Storage Capacity

		At Storage Temperature		
		-15C to -25C	+2C to +8C	
A. Total vaccine volume (Worksheet 2.1)		☐ liters	☐ liters	A
B. Total volume of other refrigerated items		☐ liters	☐ liters	B
C. Total volume of all items	A+B	☐ liters	☐ liters	C
NUMBER OF APPLIANCES REQUIRED		Freezers	Refrigerators	
D. Manufacturer's net vaccine capacity		☐ liters	☐ liters	D
E. Number of units required	C/D	☐ number	☐ number	E
COLD STORE SIZE REQUIRED		Freezer room	Cold room	
F. Cold room grossing factor (See table below)		☐	☐	F
G.Capacity required	(C x F)/1000	☐ m3	☐ m3	G
STORAGE AT AMBIENT TEMPERATURE				
H. Total diluent/dropper volume			☐ m3	H
I. Volume of shelving units required		H x 1.5	☐ m3	I

Grossing factor table

Room volume		5m3	10m3	15m3	20m3	30m3	40m3
Grossing factor		3.2	3.3	3.7	3.9	4.2	4.2

Estimating Total Storage Volume Required for Safe Injection Equipment

Safe injection equipment, diluents and other supplies	United packed volume (cm3)	Expected Quarterly Quantity Needed (units)*	Total storage volume (cm3)
a	b	c	d
0.05 ml ADS for BCG			
0.5 ml ADS			
2 ml reconstitution syringes			
5 ml reconstitution syringes			
Safety boxes (5 liters)			
SUB-TOTAL SYRINGES			
Diluents for BCG			
Diluents for Measles			
SUB-TOTAL DILUENTS			
Dropper for bOPV (20 dose vial)			
TOTAL			

Cold Chain Equipment Inventory

Region		**Population**		
Province/City		**Population**		
Municipality		**Population**		
Barangay		**Population**		

Information relating to the cold-chain equipment													
PIS/PQS Code	Make	Model	Serial number	Type	Energy source (E=electric; S=solar; G=gas; icepaks)	Curent working status	Vaccine storage capacity, liters		Holdover time or Autonomy (hrs)	Cold life @ +43°C (hrs)	Date of last assessement	Year of installation	Year of planned replacement
							+2°C to +8°C	-15°C to -25°C					
PQS E003/011	Vestfrost	TFW800	1325489	Icepack fzr	E	Working		145	n/a	n/a	2/11/2013	2010	
PQS E003/82M	Vestfrost	MK304	6785439	ILR	E	Non-working	138		26	n/a	7/12/2013	2012	
PIS E3/62-M	Electrolux	TCW 1990	189076	Ref & frzr	E	Working	37.5	17	38	n/a			
PQS E003/24-M	Electrolux	TCW1152/CF	678954	ILR	E	Working	169		24	n/a			
PQS E003/017	Dometic	TCW 3000AC	6678965	ILR	E	Working	150		53	n/a			
PQS E003/043	Dometic	TCW2043SDD	98473636	Ref & frzr	S	Working	70	10	74	n/a			
PIS E4/05-M	Electrolux	RCW 25/CF	123673	Cold box	Icepacka	Functional	20.7		n/a	129.9	2/11/2014	2012	
PIS E4/83-M	Blow kings	BK-VC1.6-CF	64678	vaccine carrier	Icepacka	Functional	1.7		n/a	36	3/12/2015	2011	

Tool for calculating available cold room net storage capacity

Location: _____ Room description: _____

B. *Record the following dimensions in centimetres:*

Internal room dimensions

Room length (L) _____ cm

Room width (W) _____ cm Gross volume (L x W x H) _____ m³

Room/stacking height (H) _____ cm (in very high rooms enter maximum stacking height)

Shelf unit dimensions

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10
Shelf width (w)										
Shelf length (l)										
Nbr of shelves (n)										
Shelf thickness (t)										
Floor to bottom shelf (b)										
Shelf unit volume (litres)										

Net storage capacity _____ litres

_____ m³

Grossing factor _____

Tool for Recording Available PQS Cold Chain Storage Volume

Equipment identification			PIS/PQS code or domestic	Manufacturer's Net vaccine storage capacity (liters)		No. of equipment available	Total net vaccine storage capacity (liters)	
Type	Make	Model		+2°C to +8°C	-15°C to -25°C		+2°C to +8°C	-15°C to -25°C
A	B	C	D	E	F	G	H	I

Annex 22

Vaccine Allocation and Distribution Plan

Name of Region/Province/City: _____

Date prepared: _____ **Prepared by:** _____

Distribution site	Target Population	Total no. of suplies to be distributed			Distribution schedule
		Total no. of vaccine doses	Total no. of diluents	Total no. of safe injection devices	

Property Transfer Report

Entity Name : _____ **Fund Cluster :** _____

From:	Department of Health - Research Institute for Tropical Medicine	PTR No.:	YR-MONTH
To:		Date :	M/D/YR

Transfer Type: (check only one)

☐ Donation ☐ Relocate

☐ Reassignment ☐ Others (Specify) _____

Date Acquired	Property No.	Item Description, P.O. No. and Source	Batch / Lot Number	Expiry Date	Quantity and Unit	Unit Cost	Amount	Condition of PPE
		VACCINE						
		SOURCE						
		SUPPLIER						
		MANUFACTURER						
		P.O. No.						

Reason for Transfer:

_____

_____

_____

	Approved by:	Released/Issued by:	Received by:
Signature :			SIGNATURE
Printed Name :			PRINTED NAME OF ACCOUNTABLE OFFICER
Designation:			DESIGNATION
Date :			RECEIVED DATE

Example of emergency scenarios requiring implementation of the contingency plan

1. Refrigerator breakdown

Scenario 1:

A health facility has a 1 top-opening electric compression refrigerator. The refrigerator recorded temperatures for the past succeeding days fluctuate between 12 °C and 15 °C.

Recommended actions:

- Confirm that the temperature reading is correct by verifying it with another thermometer of the same type which is proven to be accurate.
- Use the proven thermometer to monitor the temperature for at least one day.
- If the temperature is within the normal range of +2°C to +8°C, replace the faulty existing thermometer with an accurate one.
- If the temperature is still outside the temperature range of +2°C to +8°C, visually check the following:
  - Vaccines are arranged properly with good air circulation and not overloaded.
  - Frost build up on the evaporator surface, defrost if frost is more than 5 mm thick.
  - Door is closing tightly, tighten the door hinges if door is not closing properly.
  - Check if the unit is well ventilated, move refrigerator to a well ventilated location and away from sunlight rays or heat emitting source.
  - If no problem is found, transfer vaccines in the cold box or vaccine carrier with conditioned icepacks or request for other health facility to accommodate the vaccines.
  - Record the name of vaccines, quantity, expiry date and VVM status.
  - Inform supervisor or request assistance of cold chain technician for troubleshooting and repair.

2. Electricity power failure

Scenario 2:

A service facility has a PQS compliant ice-lined refrigerator MK 144. Power interruption has been observed for about 10 hours and significant quantities of vaccines are in the refrigerator.

Recommended actions:

- Verify the hold over time of MK 144 from the WHO PQS catalogue.
- If the power interruption is more than the hold over time of the equipment, prepare a cold box, vaccine carrier and conditioned icepacks to temporarily hold the vaccines until the electricity power is restored.
- Check the cold life of the cold box or vaccine carrier to determine how much longer you can keep the vaccines inside.
- If no icepacks are available identity some stores where you can borrow icepacks or use commercial ice in plastic bag and condition it prior to use.
- Keep the refrigerator closed. Avoid opening the unit unnecessarily to maximize the cold life that will keep vaccine potent.
- Record the event and inform supervisor accordingly.

3. Cold chain failure (loss of vaccine potency)

Scenario 3:

The health facility is equipped with a domestic type electric compression refrigerator. The recorded temperature ranges between +3°C in the morning and +8°C in the afternoon. The health facility is closed on Saturdays and Sundays and no health staff come to the facility to monitor and record the temperature. On a Saturday evening there was a power failure for more than 6 hours. On a Sunday early in the morning the electricity has been restored and the unit operates as usual but its thermostat malfunctioned and was not able to switch off the compressor motor. On Monday morning the temperature recorded by the health worker is +3°C; however, it was observed that the freeze tag indicator is already on alarm status.

Recommended actions:

- Check the inventory record and quantity of freeze sensitive and heat sensitive vaccines.
- Check the VVM of all the vaccines particularly the heat sensitive ones; If the VVMs are still in stage 1 or 2, continue to administer the heat sensitive but not freeze sensitive vaccines.
- Do not use the freeze sensitive vaccines until the shake test is conducted.
- Record the event and inform supervisor accordingly.
- If this event occurs frequently, request for a PQS compliant vaccine refrigerator with adequate hold over time.
- Someone should be assigned to check and monitor the vaccine refrigerator on weekends and holidays.

4. Measles vaccine outbreak

Scenario 4:

A measles outbreak has occurred in one province and an immediate response is required to vaccinate 1 to 5 year old children. The estimated target population for the measles outbreak is 280,000 children. The province has a vaccine storage facility with ice lined refrigerators, ice pack freezers, cold box and vaccine carriers.

Recommended actions:

- Calculate the quantity of vaccine and safe immunization supplies requirements to address the epidemic.
- Use the vaccine database (cm^3/dose) to calculate the vaccine storage capacity requirements in liters.
- Use the cold chain equipment inventory and refrigerator data base to determine the total existing storage capacity.
- Determine whether the available existing storage capacity of vaccine refrigerators can cope with the additional storage capacity of the emergency vaccines.
- Determine the quantity of routine EPI vaccines and immunization supplies that are available in stock.
- Determine the actual vaccine storage requirements.
- Determine the number of cold boxes, vaccine carriers and ice packs that are available.
- Determine how many vaccination teams are needed to cope up with the emergency and estimate the number of vaccine carriers and icepacks that are required
- Coordinate with the city, municipality and health facility that will be involved in the emergency response.

- Request all vaccine storage facilities to update their inventory records in order to determine the available storage capacity for vaccines and immunization supplies.
- Arrange transport vehicles for the vaccination teams.If the vaccine storage capacity requirements are not sufficient, then request for additional cold chain equipment.
- Determine whether you have enough staff to administer the vaccines and if vehicles are required.
- Prepare the action plan and discuss with supervisor.

5. Stock-out of vaccines

Scenario 5:

A provincial vaccine storage facility has a recurring stock-out problem for routine EPI vaccines. This problem is replicated in the two health centers served by the province.

Recommended actions:

- Province should review the vaccines and immunization supplies annual quantity requirements for the province and health centers using the most recent and realistic wastage factor.
- Always conduct a physical count of vaccines and immunization supplies to find out any discrepancy from the stock inventory record.
- Calculate required vaccine to cover children missed during the stockout including current need and send request for vaccine supply.
- Monitor releases of vaccines and immunization supplies to the health centers. These should not exceed the total annual quantity requirements.
- Remember that vaccines are always higher in quantity than the AD syringes because of the vaccine wastage factor.
- Vaccine wastage should be regularly monitored and actions have to be implemented to reduce or avoid vaccine wastage.
- Always adhere to the four criteria of the MDVP.
- Investigate cause of stock out and avoid future repeat of the incidence.

6. Flooding

Scenario 6:

An announcement was made that a typhoon is coming and heavy rains is expected that will cause flooding in the area including the health facility.

Recommended actions when flooding is forecasted:

- Be alert by monitoring your surroundings.
- Monitor radio or local television broadcast.
- Seal vents, drainage or opening to prevent flooding.
- If flash flood warning is issued for your area:
  - Health worker should prepare sufficient cold box or vaccine carrier to contain all the vaccines and diluents.
  - Pack vaccines in cold box or vaccine carrier with conditioned ice-packs and take them to a safe area. Empty the refrigerator.
  - Pack all the immunization supplies in a waterproof container and identify a room on the upper level to use for temporary storage.
- Switch off the refrigerator, disconnect the power cord and shut off the circuit breakers.
- Identify one room on the upper level (if available) for the temporary shelter of the vaccine refrigerator.
- If possible move the refrigerator to a higher ground and not prone to flooding.
- If it is not possible to move the refrigerator, after switching off the unit, wrap with plastic the entire compressor particularly the compressor electrical terminals and wirings.
- Secure the refrigerator by locking the doors and windows.

Recommended actions during a flood:

- If the flood comes all of a sudden without warning, shut off the electricity at the circuit breaker.
- If the rising water is still not risky, collect all the vaccines from the refrigerator and placed in a cold box or vaccine carrier and move to safe ground.
- If the water is rising quickly and if you think you are at risk evacuate immediately, save yourself and leave the vaccines in the refrigerator.
- Get out of low areas that may be subject to flooding and go to higher ground as quick as possible.

Recommended actions after a flood:

- Monitor weather broadcast on radio and television.
- Wait until authorities indicate it is safe to return to flooded area.
- If the building was flooded, check for structural damage, inspect foundations for cracks.
- Do not enter the building that has flooded until local building official have inspected it for safety.
- Examine walls, floors, doors, windows and ceilings for risk of collapsing.Keep windows and doors open for ventilation to remove foul odors.Have an electrician check the electrical system.
- Dry both the inside and outside surfaces of the vaccine refrigerator.
- Have a refrigerator technician check the electrical system of the vaccine refrigerator to ensure that the refrigerator is safe to operate.
- Run the refrigerator for at least four hours and monitor its storage temperature.
- Inspect the VVM of the vaccines loaded in the cold box or vaccine carriers.
- When the storage temperature is maintained at +2°C to +8°C for at least four hours, load the vaccines with VVM at stage 1 and stage 2.