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Guidelines on stock records for immunization programme and vaccines store managers

Immunization, Vaccines and Biologicals

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Contents

Abbreviations and acronyms

AD	auto disable (syringe)
AMC	average monthly consumption
BCG	bacille Calmette-Guérin (tuberculosis vaccine)
CCM	cold chain monitor
DT	diphtheria–tetanus (vaccine)
DTP	diphtheria, tetanus (toxoid) and pertussis vaccine
EEFO	earliest-expiry-first-out
EVSM	(WHO-UNICEF) Effective Vaccine Store Management initiative
FIFO	first-in-first-out
HepB	hepatitis B (vaccine)
Hib	*Haemophilus influenzae* type b (vaccine)
MIS	management information system
ml	millilitre
MMR	measles–mumps–rubella (vaccine)
OPV	oral polio vaccine
Td	tetanus (toxoid)-diphtheria reduced component (vaccine)
TT	tetanus toxoid (vaccine)
UNICEF	United Nations Children's Fund
VVM	vaccine vial monitor
WHO	World Health Organization

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Glossary*

Adjustments: Administrative corrections - e.g., a physical stock count that is different from quantity on stock keeping records. Also used for all losses within the facility (breakage, expiry, freezing, etc.)

Batch card: A stock keeping record that keeps information about a single lot of a product. Also called as "bin card".

Cold chain: The entire chain of storage facilities and transportation links through which supplies move from manufacturer to consumer, including port facilities, the primary store, intermediate stores, all service delivery points, equipment and transport vehicles.

Commodities: Used interchangeably with stock, goods, products, supplies, and other terms in this manual to refer to all the items that flow through a supply system.

Consumption records: Records kept on products consumed. See also *stock keeping records* and *transaction records.*

Feedback report: A report that (a) informs lower levels about their performance and in some cases providing additional information about reporting from other facilities; and (b) informs managers at higher levels about how the system is functioning.

Forecasting: A management function that estimates the quantities of products a programme will dispense to users for a specific period of time in the future.

Inventory control card: An individual stock keeping card that keeps information about all lots of a product.

* The terms referenced in this document are commonly understood definitions used in many supply management systems. Some national systems may apply different terminology for similar concepts, but WHO encourages all to align their definitions with these internationally-recognized principles and terms.

Issue voucher: Transaction record that lists the items and quantities of products issued to a facility.

Issues data: Information on the quantity of goods shipped from one level of a system to another. See also *consumption data.*

Lead time: The time between when new stock is ordered and when it is received and available for use. Lead time varies, depending on the system, speed of deliveries, availability and reliability of transport, and sometimes, weather.

Losses: The quantity of stock removed from the pipeline for any reason other than consumption by clients (e.g., expiration and damage).

Maximum stock level: The largest amount of stock the programme should have in stock, usually expressed as the number of months of supply. It is the minimum stock plus that amount of stock used between orders.

Min/max: Assigned minimum and maximum stock levels designed to ensure that a programme does not run out of immunization supplies and also does not become overstocked.

Minimum stock level: The least amount of stock that programmes should have in stock or the level which, when reached, initiates a reorder; usually expressed as the number of months of supply. It is the amount of stock used between placing and receiving an order plus the safety stock. Also known as "reorder level".

Packing slip: Transaction record sent with products that lists the names and quantities of each product shipped. Usually paired with a receiving record.

Physical inventory: A count of all the commodities on stock to verify that the amount that is actually stored is the same as the quantity listed in the stock-keeping records.

Pull system: A distribution system in which the personnel who receive the supplies determine the quantities to order. Also called as "requisition" system.

Push system: A distribution system in which the personnel who issue the supplies determine the quantities to be issued. Also called as "allocation" system.

Quantity in hand: The quantity of usable stock in inventory at a particular point in time.

Rate of consumption: The average quantity of stock dispensed to users during a particular time period.

Receiving record: Transaction record that lists the names and quantities of items received. Usually paired with a packing slip.

Reorder level: See *Minimum stock level*.

Requisition and issue voucher: Transaction record used in a pull distribution system that lists the items and quantities requested by a facility, the quantity actually issued and received.

Safety stock: The amount of stock (number of months' supply) below the minimum level which serves as a cushion or buffer against major fluctuations in vaccine demands or unexpected shipment delays.

Service delivery point: Any facility that serves clients directly and where clients (users) receive supplies. Service delivery points are frequently health posts and centres, clinics and hospitals.

Shelf life: The length of time a product may be stored without affecting its usability, safety, purity, or potency.

Simple report: A summary report that lists the name of the facility, reporting period, beginning quantity in hand, receipts, and quantities issued or dispensed, losses and adjustments, and ending quantity in hand for each product.

Stock card: A generic name for either an inventory control card or a batch card.

Stock out: A condition under which there are not enough commodities on stock to meet demand.

Stock keeping records: Records kept on products in storage. Also see *transaction records* and *consumption records.*

Store ledger: A stock keeping record that keeps information about all lots of a product.

Summary report: Report that includes all essential data items for a specific facility and a specific time period (usually monthly or quarterly).

Transaction records: Records kept on products being moved from one facility to another. Also see *stock keeping records* and *consumption records.*

1. Introduction

Effective stock control is one of the ten global criteria defined by the **WHO-UNICEF Effective Vaccine Store Management (EVSM) initiative**[1] . The purpose of the EVSM is to encourage countries to procure and maintain equipment and to adopt management and training practices that fully protect vaccines in primary and intermediate vaccine stores. The initiative provides countries with self-assessment tools, guidelines and model standards, focused specifically on vaccine storage and distribution. Countries use these tools and documents to assess weaknesses in equipment and operating procedures and to make the improvements necessary to meet the ten criteria set out in EVSM.

WHO-UNICEF Effective Vaccine Store Management initiative

EVSM assessment process is to be carried out over a twelve month period. Satisfactory performance is set as the vaccine store meeting at least 80% of the each criterion.

Over a period of 12-months:

1. pre-shipment and arrival procedures have ensured that all shipments were in satisfactory condition when received in the primary stores;
2. all vaccines have been stored within WHO recommended temperature ranges;
3. the capacity of cold storage has been sufficient to meet the demand;
4. the buildings, equipment and transport available to the programme have enabled the cold store to function effectively;
5. all buildings, equipment and transport have been correctly maintained;
6. stock management has been effective;
7. deliveries of vaccine to the next level have been timely, sufficient and correct;
8. minimal damage has occurred to the vaccine during distribution;
9. the facility has followed standard operating procedures; and
10. human and financial resources have been sufficient.

[1] *WHO-UNICEF Effective Vaccine Store Management Initiative: Modules 1-4.* Geneva: World Health Organization, 2005 (WHO/IVB/04.16-20 and UNICEF/Immunization.03 and 04.01-04)

The EVSM is based upon quality assurance principles. Vaccine quality can only be assured if the product is correctly stored and handled from the point of manufacture to the point of use. Programme managers can only establish with certainty that quality has been maintained when detailed records are kept and these records are reliable. If records are incomplete or inaccurate, the system cannot be properly assessed. A system that cannot be assessed is not 'quality assured' and cannot be accepted as satisfactory under the EVSM.

In order to maintain the quality of vaccines throughout the cold chain, it is essential to keep complete and accurate records of all stock transactions.

A stock control system comprises three steps, each of which must be performed regularly, accurately and completely. The three steps are:

- Checking and recording details of vaccine consignments when they **arrive** at a storage point;
- Checking details and conditions of vaccine stocks **during** the time they are kept in storage;
- Checking and recording details of vaccines consignments when they **leave** the storage point for distribution to regions, provinces, districts and eventually, the user.

In addition, good warehousing practices should be adopted and physical stock counts should be carried out on a regular basis to verify stock records.

The EVSM requires that a standard recording and reporting of all stock transactions is carried out. Computerized recording is preferred at the primary level. Many countries use manual systems at intermediate levels.

The EVSM assessment tool section 6 is dedicated to assess performance of stock management of the vaccine stores. The questionnaire focuses on four major areas (highlighted in **bold** and ***italic*** below) as described in the Model Quality Plan[2]:

1. Standardized recording and reporting of all stock transactions is carried out. Preferably this is computerized at the primary level.
    - **Arrival.** Accurately record incoming vaccines, diluents and droppers, and other consumables.
    - **Requisitions.** Operate an effective system for receiving and checking requisitions.
    - **Dispatch:** Establish a pre-delivery or pre-collection notification system.
    - **Dispatch.** Issue vaccines, diluents and other date-limited products in earliest-expiry first-out (EEFO) order. If vaccine vial monitor (VVM) status indicates that some vaccine vials should be used ahead of its correct EEFO order, this may be done, but the reason for doing so should be recorded.

[2] Model Quality Plan. Geneva: World Health Organization, 2005 (WHO/IVB/04.18 and UNICEF/ Immunization/04.02)

- **Dispatch.** When vaccines and consumables leave the store, verify the information in the stock record system for all items that are issued. Record any change in VVM status in the stock record system and transfer this information accurately to the vaccine delivery/arrival form.
- **Arrival at intermediate store.** When vaccines and consumables arrive at the intermediate store, check the delivery/arrival form, report any discrepancies and report all indicator changes.
- **Disposal.** Safely dispose of damaged or expired stock in accordance with standing orders.
- **Back up** all computer records at least once a week.

2. Stocks have been maintained between the safety stock level and the maximum stock level for each vaccine and for other consumables.
   - Establish a maximum stock level and a safety (reserve) stock level for each vaccine and for each consumable. Ensure that it is possible to store the maximum anticipated stock within the facility.
   - When orders for new vaccine stocks and consumables are placed, allow sufficient lead-time so as to ensure that each item arrives before the safety stock level for that item is breached.

3. Periodic physical inventories have been conducted.
   - Carry out a physical inventory of vaccine, diluent and dropper stocks must be carried out at least once every three months.
   - Carry out a physical inventory of other consumables (auto disable (AD) syringes, safety boxes, consumables, spare parts, etc.) at least once every three months.

4. Good warehousing practices are in place.
   - **Stock security:** keep all vaccines and consumables under secure conditions.
   - **Data security:** keep all records secure.
   - **Storage:** store all vaccines, diluents and droppers and other consumables in an orderly fashion.
   - **Cleanliness:** keep the vaccine store clean and free of pests.
   - **Supervision:** ensure that all staff are effectively supervised.

Vaccine management performance is affected by many factors inter-related to each other. None of these factors is independent from one another.

This manual is prepared in support of the WHO-UNICEF EVSM initiative to help immunization programme managers and responsible staff at the primary and intermediate storage facilities with standard stock control tool. It reviews the necessity of information to be recorded and provides standard approaches in recording and reporting processes. It also provides examples on how to fill in forms recommended in the manual.

The manual includes both manual and computerized versions of standardized recording and reporting of all stock transactions. As indicated in the Model Quality Plan of EVSM initiative, preferably this is computerized at the primary level. Electronic version of the suggested tool along with electronic version of this manual recording forms and reference materials are provided in the accompanying CD-ROM.

2. Vaccine stock management systems

2.1 The purpose of a stock management system

Stock management systems obtain and move supplies and equipment to the places where they are needed in a timely fashion and at an optimum cost. Supplies usually cannot go directly from their source to the end user; they frequently must be held in the stores at some points along the way[3].

There are two reasons for storing commodities:

- It is not logical and practical to send small quantities of commodities to lower level facilities each time. Commodities should stay in a safe storage place until they reach to a size that is efficient to transfer. On the other hand, it is not possible to transfer needs of lower level facilities in single shipments, since lower levels may not have enough storage capacity. Instead commodities are stored in upper level stores and are sent in small batches through a distribution system.
- A reasonable amount of safety stock is needed for unpredicted increases in demand, emergencies, or transportation delays.

A stock management system must be simple. Its purpose is to move supplies, not to create paperwork.

2.2 Decision making

The essential questions in understanding the structure of a stock management system are: Who decides what (and when and how many) commodities move through a link from one facility to another, and how does he/she decide?

The answer of who decides what to move, how many and when is explained in two different well known types of stock management systems. These are:

- *Allocation*, or "push" systems
- *Requisition*, or "pull" systems

[3] In this manual, vaccine stores are categorized as primary (principal or main store that receives vaccine from the manufacturer) and intermediate (stores that receive vaccine from another store).

The main difference between the two systems lies in who makes the decision concerning the distribution of supplies. In the push or allocation systems, distribution decisions are made by higher-level facilities. The quantities distributed are usually based on usage and stock reports without receiving requisitions. In the pull systems however, the lower level facilities are responsible for ordering supplies. Decisions on quantity of shipments are made by lower level managers or by the functionary responsible for supply.

A pull system is best when; there is no supply shortage, the responsibility for programme operations is decentralized, and lower levels have sufficient management and data processing skills. Alternatively, it is better to choose a push system, if programme operations are centralized, data processing and analysis are conducted at the upper levels, the staff at lower levels do not have the management skills to direct a distribution system and the stocks are limited.

Once the system has been chosen as "push" or "pull", then the responsibility for providing transport has to be decided. If responsibility is on supplying facility then it is called a distribution system. If receiving facility provides transportation then this is called a collection or pickup system. Therefore, combination of these systems can be designed depending on the needs of the country.

Figure 1: Possible system designs by decision making and transportation responsibilities

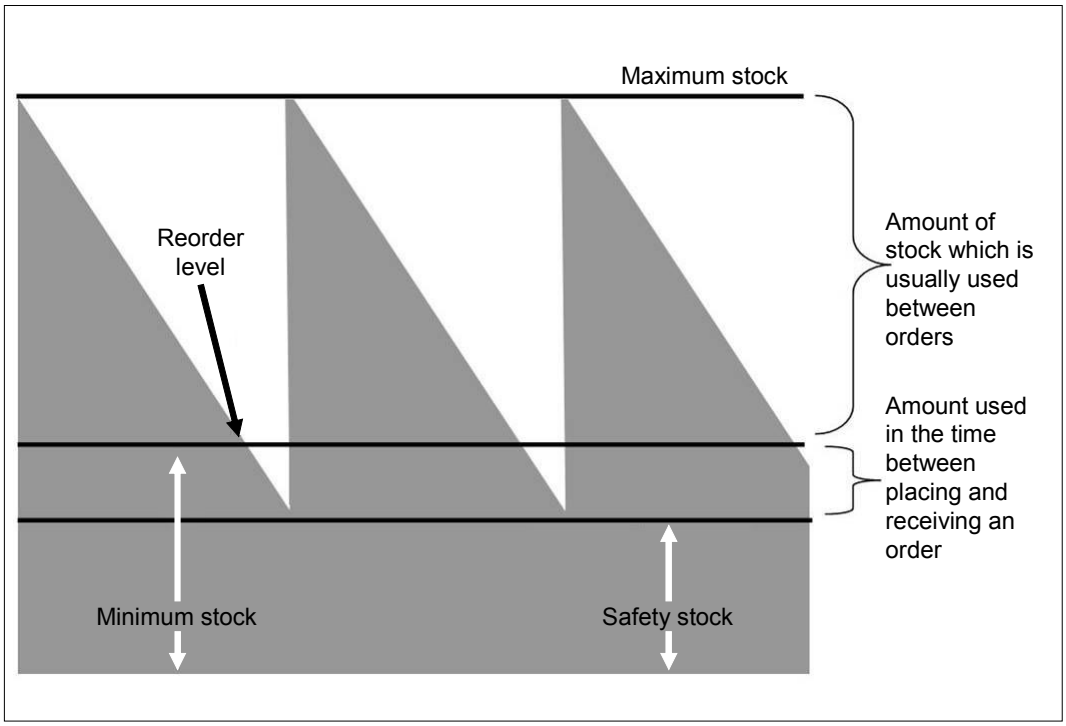
		Transportation responsibility	
		Requesting facility	**Issuing facility**
Decision Making responsibility	**Requesting facility**	Pull-Collection	Pull-Distribution
	Issuing facility	Push-Collection	Push-Distribution

This management structure may differ at various levels of the system; higher levels may pull and then push to lower levels. Even at a single level, the system may be mixed: a regional warehouse might allocate stock to a health center quarterly, but the health center may be able to request additional supplies if needed.

2.3 Inventory control systems

Minimum/maximum (min/max) inventory control system is recommended in vaccine stock management in which, each organizational level of the programme is assigned maximum and minimum levels for its supplies. Using a min/max inventory control system will help managers to prevent both over-stocking (which leads to higher wastage) and shortages or stock outs of vaccine and other immunization supplies. The **minimum stock level** is the level below which stocks should never drop without having placed an order. It is the amount of stock you will use in the time between placing and receiving an order plus the reserve or safety stock[4] that is kept for emergencies and unanticipated demand or delivery delays. The **maximum stock level** is set to guard against oversupply which results in losing vaccines to expiration before they can be used. It consists of the minimum stock plus that amount of stock which is normally used between orders (Figure 2).

Figure 2: Stock movements and relation between minimum, maximum and safety stocks[5]



[4] The **safety stock** is the reserve stock used to protect against stock outs due to delivery delays, product shortages at the supplier level, or when stock is dispensed at an unexpectedly high rate. The level of safety stock required is usually different for each programme and should be based on past consumption data.

[5] From WHO Global Training Network Vaccine Management Training Course materials (Module 5)

A min/max system makes sure that the amount of quantity in hand is always between established maximum and minimum stock levels. Maximum and minimum levels are expressed in number of months of supply rather than quantities. For example, an intermediate store might be required to keep a maximum of four months' worth of supplies in hand of all products and a minimum of one month. To find out the maximum and minimum quantities for each product, we have to multiply the level given in months of supply by that product's average monthly consumption (AMC).

There are generally two methods for inventory control: the periodic review system and the continuous review system.

In the **continuous review system**, the inventory level is reviewed on an ongoing basis for every transaction or usage. When the amount of stock reaches a predetermined reorder level, an order is initiated to replenish the stocks to the desired maximum level. This system is based on stock levels rather than on time intervals.

In the **periodic review system** (also called the fixed-order interval system), the inventory status is reviewed at regular intervals (usually at the time of a scheduled reorder). The inventory is counted and the order quantity is calculated by subtracting the level of quantity in hand from the desired maximum inventory level. A manager using this system determines the resupply schedule by establishing a reorder interval, and places orders based on this schedule.

Reordering the same amount as used last month often is not an adequate strategy.

2.4 Types of records and reports

From the management point of view, only three things can happen to commodities in the cold chain; they are either stored, moved (received, dispatched or lost) or used (consumed). Vaccine stores receive, store and dispatch items, therefore consumption applies only to facilities where immunization services are delivered.

Responsible staff in stores should prepare two types of reports based on the above mentioned records: reports for decision makers in higher levels and feedback reports for the lower level facilities served. Details of these reports and their uses are discussed in Chapter 4.

2.5 Minimum information required to be recorded

It is essential to keep complete and accurate stock records in order to maintain the quality of vaccines. Responsible staff should know the quantity in hand, rate of consumption, losses and adjustments. In order to be able to have correct data on these, stock control involves the following three steps, each of which must be performed regularly, accurately and completely.

Step 1

When vaccine consignments arrive at a storage point their details are checked and recorded.

All details of each consignment must be checked and recorded in the stock register. (In the case of international shipments, see also Annex 1 on checking vaccine shipments on arrival.)

The details to be recorded include:

- type of vaccine
- presentation (vial size)
- quantity received (doses)
- vaccine manufacturer
- manufacturing batch or lot number or numbers (there may be more than one batch or lot in a consignment)
- expiry date for each batch
- status of temperature monitoring indicators - VVM, cold chain monitor (CCM), freeze indicators and electronic data loggers on arrival of the consignment.

In consignments of freeze-dried vaccine, each shipment should **always** arrive with the correct quantity of diluent for reconstituting the vaccine when it reaches the user. For such shipments, the following details must also be checked and recorded for the accompanying diluent:

- type of diluent (i.e. type of vaccine with which it is to be used)
- quantity received (doses)
- diluent manufacturer
- manufacturing batch or lot number or numbers (there may be more than one batch or lot in a consignment)
- expiry date for each batch

Step 2

During the time that vaccine stocks are in storage their details and conditions are checked.

All vaccines and diluents have an expiry date, after which they must not be used. All stocks must be distributed **well before** their expiry date in order to allow sufficient time for them to pass through the distribution system and reach the user.

EEFO handling is safer than first-in-first-out (FIFO) handling. In general, when two batches of vaccine are delivered at different times, the second to arrive has a later expiry date than the other. However, this is not always the case, particularly when vaccines are obtained from different sources. The expiry date should always be checked and the vaccine with the shortest shelf-life should be distributed first, even if it arrived last.

All stocks must be distributed well before their expiry date is reached in order to allow sufficient time for them to pass through the distribution system and reach the user. Newly arrived stocks generally have a longer period before expiry than those which have been in storage for some time. Thus, older stocks with shorter expiry dates should normally be distributed first so as to ensure that supplies are properly rotated and that no batch or lot remains too long in storage. All vaccines and diluents must be systematically arranged in the store so as to facilitate an EEFO stock management system.

During the period that vaccines remain in storage the **expiry dates** of the stock should be regularly checked in order to ensure that there are no older batches that should have been distributed before more recently produced ones. The **integrity of the stocks** should also be regularly checked by reviewing the status of the VVMs for each batch or lot. Any significant colour change in VVM during the period the vaccines have been in storage indicates a serious weakness in the cold chain system. Repair or maintenance of the cold chain equipment may be needed.

Only vaccine stocks that are suitable for use should be included in stock records. Any expired vials, heat-damaged vials or vials with VVMs beyond the discard point should **not** appear in the available stock balance. If such vaccines have to be retained for some time, e.g. until accounting or auditing procedures have been completed, they should be recorded on a separate page or card until disposal takes place.

Step 3

When vaccine consignments leave the storage point for distribution to regions, provinces, districts and, eventually, the user, their details are checked and recorded.

The details of each consignment leaving the store should be recorded in the appropriate, stock ledger or stock card, and the remaining balance on stock should be calculated. This should be done at **the time of distribution** in order to ensure that all details are correctly recorded. The following information is recorded for each consignment that is distributed:

- type of vaccine or diluent
- presentation (vial size)
- quantity distributed (doses)
- vaccine manufacturer
- manufacturing batch or lot number or numbers
- expiry dates for each batch
- status of temperature monitoring indicators (VVM) as the vaccine **leaves** the store.

3. Stock keeping records

Stock keeping records are used to record information about items in storage. They must contain the quantity received/issued, quantity in hand and the quantity of losses and adjustments. Consumption data are not found on stock keeping records since it is collected by the lower levels.

Whenever commodities are received, issued or separated to be discarded they should be entered in stock recording system immediately. Entries should also be recorded when stock is counted during a physical inventory.

Stock records are completed by the authorized staff receiving and issuing stock from the store as well as the ones who are actively involved in physical inventories.

There are two types of stock records in a vaccine cold store:

- batch card (bin card)
- inventory control card (store ledger)

3.1 Batch card

A **batch card** is an individual stock keeping card that keeps information about a **single batch** of a product. For example, one batch card would contain information about a single lot of hepatitis B (HepB) vaccine in a cold room. It should note the quantity in hand, losses and adjustments for that particular batch of HepB. **Batch** cards are kept by the store manager and should indicate the bin location (in which refrigerator or shelves of the cold room the batch is located). When there is more than one batch on stock, batch card with the earliest-expiry should be placed on top. This will allow to practice and follow EEFO principle. Once the batch is exhausted, the card should be kept in another cabinet for filing. WHO-UNICEF EVSM initiative requires that such records are kept for at least three years.

Figure 3 shows a sample **batch** card. As for diluent for freeze dried vaccines, a separate **batch** card should be opened.

Figure 3: Batch card

Store name: _____ **Product:** _____ **Size:** _____

Manufacturer: _____ **Batch number:** _____ **Expiry date:** _____

Bin location: _____

				Vaccine quantities					
Date	**Voucher no**	**From (supplier)**	**To (Store/health unit)**	**Opening balance (doses)**	**Received (doses)**	**Issued (doses)**	**Loss/ adjustment (doses)**	**End Balance (doses)**	**Remarks and initials**
A	B	C	D	E	F	G	H	I	K

For easy identification, labels should also be attached to doors and/or shelves of refrigerators and/or cold/freezer rooms indicating the contents, expiry dates and batch numbers. Quantities may also be added but is not necessary.

Figure 4: Store manager showing labels on the shelves of the primary vaccine cold store in Kabul, Afghanistan

Photo: Ü. Kartoglu/WHO

3.2 Inventory control card

Inventory control cards keep information about **all** batches of a product. One inventory control card should be kept for each product. For example, for a DTP vaccine of three different batches, there should be three batch cards and one inventory control card. In the inventory control card, total quantity in hand of DTP vaccines, as well as the total losses and adjustments regardless of the batch numbers and locations of the products will be seen. Inventory control card is a summary of the batch cards for a product (Figure 5).

In some countries, government rules require the use of **store ledgers**. A store ledger is a stock keeping record that contains same information as the inventory control card. Ledger format is less flexible tool for store manager, because it is easy to run out of space for an individual product. It is also hard to add new products. Individual inventory cards can be kept in abc order, but pages cannot be alphabetized in a bound book.

Information should be entered on the inventory control card each time a new shipment is received, or dispatched. Results of the physical inventories should also be entered on the inventory card. For tracking the movement of stock, inventory control cards should include a reference number for the shipment (voucher number). In all cards a column for the initials for the person entering data is helpful for tracking receipt and dispatch activities.

It is strongly recommended that vaccines for campaigns should be recorded separately from vaccines used in routine immunization. Otherwise, it will give unrepresentative picture of stock levels for routine immunization and could result in mismanagement.

Figure 5: Inventory control card

Store name: _____ **Most recent AMC:** _____

Product Name: _____ **Vial size:** _____ **AMC calculation date:** _____

		Quantities						
Date	**Voucher no**	**Opening balance**	**Received (doses)**	**Issued (doses)**	**Loss/ adjustment (doses)**	**End Balance (doses)**	**Stock level (months)**	**Remarks and initials**
A	B	C	D	E	F	G	H	I

3.3 Carrying out and recording findings in physical inventory

Responsible staff should know how to carry out a systematic physical stock count and how to reconcile any discrepancies found in the stock records.

Sometimes errors occur in counting the quantities of vaccines and diluents entering or leaving a store. A regular physical check is the only way to ensure that stock records and running balances are accurate, matching and complete.

All stocks of every vaccine, diluent or other commodities in storage should be physically counted and compared the totals to those shown as the running balance in the stock records. The count should also match diluents and droppers to the correct vaccine batches. If the result of counting a stock item is different from that shown in the record, the stock should be counted again to ensure there was no counting error. If a second count gives the same result as the first, the stock record is probably in error, and must be corrected. The following actions should be taken:

- *If more vials are counted than are recorded:* Record the additional amount in the loss/adjustment column of batch and inventory control cards with an explanation of the reason in the remarks column.
- *If fewer vials are counted than are recorded:* Record the missing amount as a negative value in the loss/adjustment column of batch and inventory control cards with an explanation of the reason in the remarks column. In addition a loss report should be filled (see section 3.4 Loss report).

Corrected balances should be entered on a separate line in all related cards such as batch card, inventory stock card, and/or stock ledger, below the old balance, and a note should be written with responsible staff signature beside it, to indicate that a physical check has confirmed the new balance. This corrected total should be used for all future stock calculations. VVM and freeze indicator status should also be spot checked. If any damaged, heat-exposed or cold-exposed vaccines are found in the course of the physical count, they should be set aside and dealt with. Only vaccine stocks which are fit for use should be included in stock records. Damaged or expired vaccines should **not** appear in the available stock balance. If such vaccines do need to be kept until accounting or auditing procedures have been completed, details should be recorded on a separate page or card, pending disposal.

WHO-UNICEF EVSM initiative recommends that physical stock checks should be completed each time a monthly or three-monthly summary is made in the stock book or card. In addition to monthly or three-monthly checks, an annual physical stock check is also essential.

Figure 6: Physical inventory report[6]

Name of the store:

Report number:

Vaccine/diluent		Batch number	Expiry date	Current stock	Freeze indicator status	VVM status	Remarks
OPV	1						
	2						
	3						
Total							
DTP+HepB	1						
	2						
	3						
Total							
BCG	1						
	2						
	3						
Total							
BCG diluent	1						
	2						
	3						
Total							
Measles	1						
	2						
	3						
Total							
Msls diluent	1						
	2						
	3						
Total							
Reconstitution syringe	1						
	2						
	3						
Total							
AD syringe BCG	1						
	2						
	3						
Total							
AD syringe 0.5ml	1						
	2						
	3						
Total							
Safety box	1						
	2						
	3						
Total							
Inventory done by		**Title**		**Date**		**Signature**	
Approved by		**Title**		**Date**		**Signature**	

[6] It should be noted that this is a sample. Countries should create their custom made reports with description of items that are in stock.

3.4 Loss report

In cases where damaged vaccine cannot be used, the stock records should be adjusted and the loss should be recorded on a loss report similar to Figure 7.

Figure 7: Loss report (adapted from a standard UNICEF form)

Loss report

Serial number:

Issuing office		
Issued by	**Title**	**Date and signature**
Approved by	**Title**	**Date and signature**
Nature of loss		
☐ **Damaged in store** ☐ **Damaged in transit**	☐ **Damaged by heat** ☐ **Freezing** ☐ **Other**	☐ **Expired** ☐ **Missing inventory**

No	Item description	Unit size	Quantity to be disposed of	Remarks

Recommendations of corrective actions and disposal

Property Survey Board submission
List of documents attached to the report (photos, claim, laboratory analysis, batch & expiry dates…)

Original copy	Copy 1	Copy 2	Copy 3

3.5 Transaction records

Transaction records are used to keep information about the movement of stock from one storage facility to another. They are initiated each time a facility requests or issues supplies and completed when the receiving facility confirms receipt of the items shipped.

The type of transaction record used depends on whether the system is pull or push. The most common formats are:

- Issue vouchers in push systems, and
- Requisition/issue vouchers in pull systems

Transaction records are used as **reminders** that either a request was made and not yet received or that an item was issued but confirmation of receipt is still pending. In general, one transaction record is usually used to request or issue several products. All types of transaction records include a reference number that identifies each transaction.

In some countries it is obligatory to use **packing slips** and **receiving reports.** These forms usually include the same information as issue vouchers and requisition/ issue vouchers. In many cases, these vouchers are also used for financial control purposes, because they include unit prices and value of the shipment. If possible, issue vouchers or requisition/issue vouchers should be used instead of packing slips and receiving reports.

An **issue voucher** lists the items and quantities issued to a facility (see Figure 8). It also includes a separate column for the quantities received in case some items are lost or damaged during transportation.

Issue vouchers are used in allocation/push systems; the higher level determines the quantity to be sent and issues the supplies to the lower level.

An issue voucher should be completed in three copies. The issuing facility completes the date and quantities issued, signs the record, and sends the top two (1 and 2) copies to the receiving facility along with the supplies. The bottom copy (3) is remained in the issuing facility. The receiving facility verifies the quantity received, signs the form, and sends the top copy (1) back and keeps the middle copy (2) for its records. The top copy (1) arrives at the issuing facility, which issuing facility then disposes of copy (3) and keeps the top copy (1) for its files. At the end, each of the facilities ends up with a completed copy of the issue voucher for filing (see Figure 9).

Figure 8: Issue voucher

Voucher no: _____ Issuing store: _____ Ship to: _____

Article no	Commodity name	Batch number	Expiry date	ISSUE			RECEIVE			
				Freeze indicator	VVM status	Amount (doses)	Freeze indicator	VVM status	Amount (doses)	Remarks
A	B	C	D	E	F	G	H	I	J	K
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
ISSUE							RECEIVE			

Approved by

Name: _____

Title: _____

Signature: _____ Date: _____

Shipped by

Name: _____

Title: _____

Signature: _____ Date: _____

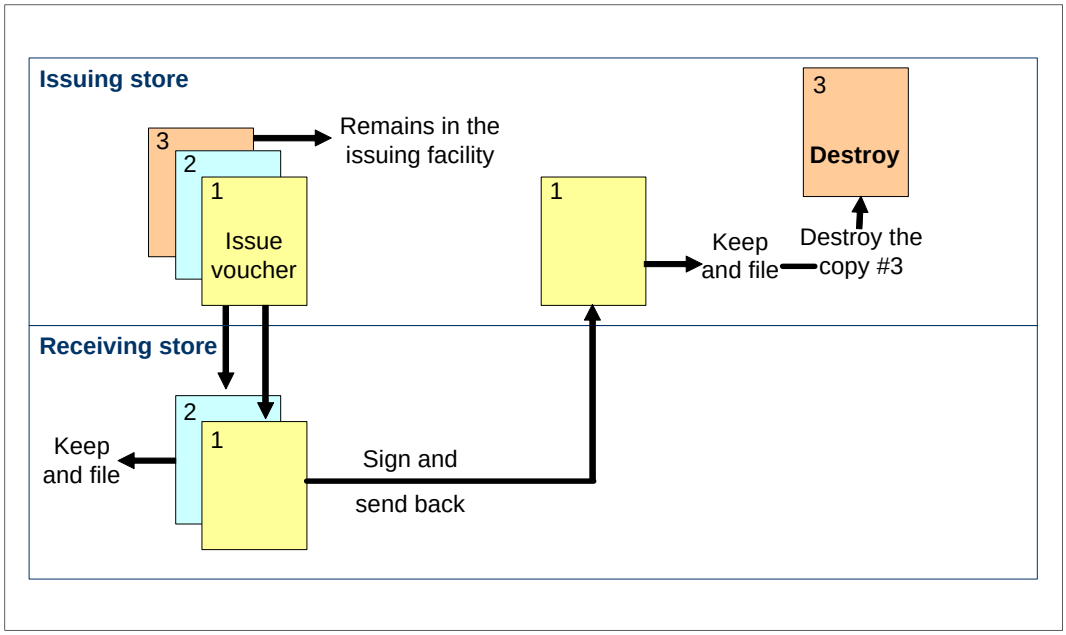
Received by

Name: _____

Title: _____

Signature: _____

Figure 9: Flow diagram for issue voucher



A **requisition/issue voucher** is similar to an issue voucher; however it is used in requisition/pull systems. Requisition/issue voucher lists the items and quantities requested by a facility. It also includes a column for the quantity actually issued. When issuing store supplies lesser quantity than requested, explanations should be given in remarks column (see Figure 10).

Figure 10: Requisition/issue voucher

Voucher No:

Article No	Request				Issue					Receive			
	Commodity Name	Previous Month's Consumption (doses)	Quantity in hand (doses)	Quantity requested (doses)	Batch Number	Expiry date	Freeze Indicator	VVM Status	Amount (doses)	Freeze Indicator	VVM Status	Amount (doses)	Remarks
A	B	C	D	E	F	G	H	I	J	K	L	M	N
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

Requesting Facility :

Requested by

Name :

Title :

Requisition Date :

Signature :

Issuing Facility :

Approved by

Name :

Title :

Approval Date :

Signature :

Receiving Facility :

Received by

Name :

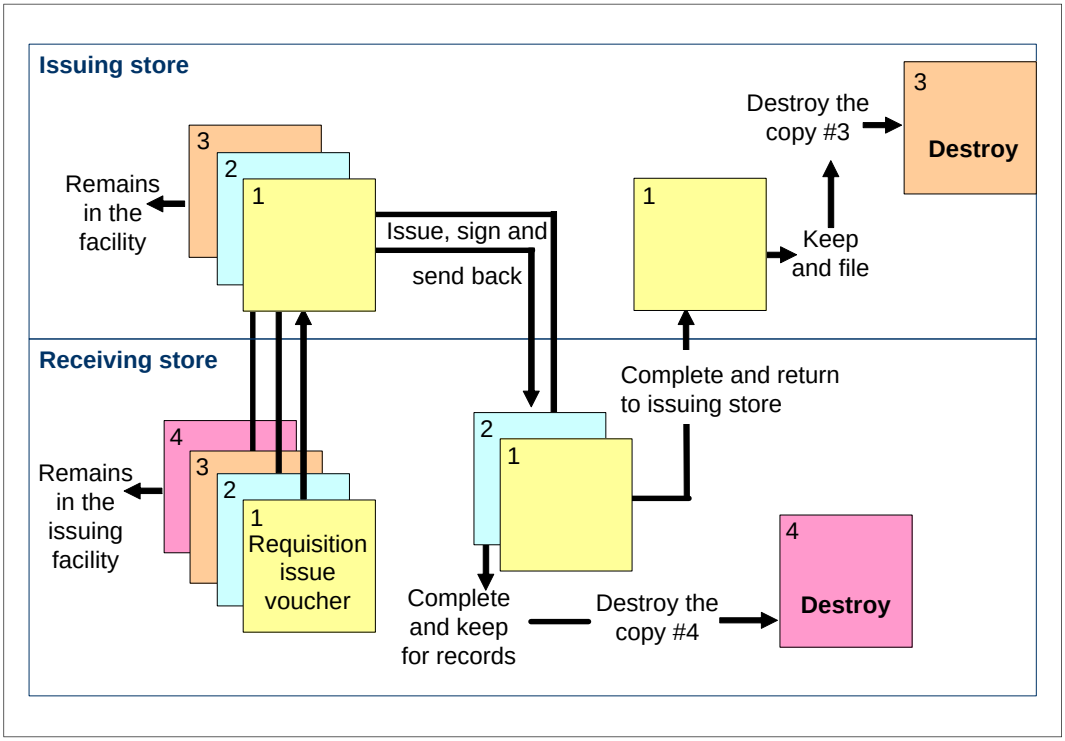
Title :

Date :

Signature :

Requisition/issue voucher should be completed in four copies. The requesting facility completes the form, signs the record and sends the top three copies (1, 2, and 3) to the issuing facility, keeping the bottom copy (4). The issuing facility fills in the order, signs the form, and sends the top two copies (1 and 2) to the receiving facility, along with the supplies, keeping the bottom copy (3) as a reminder. Upon arrival of goods, the receiving facility verifies the quantity received, signs the form and sends back the top copy (1). The receiving facility keeps the second copy (2) for its files and destroys the copy (4) that was kept before. The top copy (1) arrives at the issuing facility, which then issuing facility destroys the reminder (3) and keeps the top copy (1) for its files. At the end, each of the facilities ends up with a completed copy of requisition/issue voucher for filing. Figure 11 illustrates the flow of a requisition/issue voucher.

Figure 11: Flow diagram for requisition/issue voucher



All transaction records should include transaction date, name, title and signatures, and a space for comments. The date enables programme managers and responsible staff to calculate lead times. The signatures indicate authorization of a transaction. Limiting the number of required signatures on a transaction record reduces the administrative burden and time spent collecting signatures. A space for comments should be available for recording reasons if the quantities shipped are different than those requested.

Transaction records move with the product from the issuing facility to the receiving facility. In a requisition/pull system the requisition/issue voucher may be brought in person by the facility requesting supplies, such as during a monthly meeting. Otherwise, requisition voucher move by regular mail, fax or are hand-delivered from the requesting facility to the higher-level facility.

In a well-functioning MIS, information recorded on different forms should be matching. Programme managers regularly supervise stock records for ensuring quality management by the store.

4. Reporting systems

Reports are forms on which essential information from a specific facility for a specific time is sent to other levels on a regular basis.

Stock keeping and transaction records in a store are used to collect data for daily activities. However, data should be presented in a way for easy review and decision making. Reports provide necessary and essential information to decision makers.

4.1 Summary reports

Primary purpose of a summary report is to summarize all essential information from a specific store for a specific period of time (usually monthly or quarterly). They should contain all essential information - quantity in hand, consumption, and losses/adjustments.

Lower-level facilities are usually given a reporting deadline, and each consecutive level is given another deadline for reporting to the next level. For example, health centers may be given until the first week of the following month to report to districts, districts may have until the third week to report to the region, and the region may have until the last day of the month to report to the central level.

Each level reports the beginning quantity in hand, receipts, the quantity issued or used, losses and adjustments, and the end stock for a given period of time. Summary reports should also include a place for comments, particularly explanations for losses and adjustments. The responsible person completing the report should sign the report and date it.

A simple report is a summary report listing the name of the facility, the reporting period, the beginning quantity in hand, receipts, quantities issued or used, losses and adjustments, and the ending quantity in hand. (Figure 12).

Well designed reports are self-balancing. The reader can determine whether the report is mathematically correct by adding and subtracting the data on the report. Self-balancing reports are helpful because supervisors can verify the calculations. Unfortunately, self-balancing reports may not reflect actual quantities in hand if districts complete the report without comparing the end balance with the actual quantity in hand. Opening balances should be equal to the end balance of the previous report. A physical inventory conducted at the beginning or end of the month, however, may reveal a discrepancy in the beginning or ending quantity in hand. In that case, the discrepancy should be reported as a *loss/adjustment* for the reporting period. It is critical that the reported *end balance* equals the actual quantity in hand, so the quantity to be ordered will be determined directly by the actual quantity in hand and not by estimation.

Figure 12: Monthly summary report[7]

Reporting facility: _____ **Reporting period:** _____

Commodity name	Opening balance (doses)	Received (doses)	Issued (doses)	Losses/ Adjustments (doses)	End balance (doses)	AMC	Stock level (months)
A	B	C	D	E	F	G	H
OPV							
DTP+HepB							
BCG							
BCG diluent							
Measles							
Measles diluent							
Reconstitution syringe							
AD syringe BCG							
AD syringe (0.5ml)							
Safety box							

Explanation of losses and adjustments:

Report by: _____ **Preparation date:** _____

Title: _____

[7] It should be noted that this is a sample. Countries should create their custom made reports with description of items that are in stock.

4.2 Feedback reports

All stock management systems should be designed with feedback mechanisms. Feedback should be given not only when there is a problem; positive feedback is extremely important for the lower levels. Facilities also would like to see in feedback reports how their performance would fit within the overall system.

Feedback reports inform lower levels about their performance and provide information about other facilities in the same level. They may point errors in incoming reports and provide guidance on how to correct them. In addition, feedback reports let the person sending the report knowing his/her work has been received and processed. Feedback reports may be used to motivate lower levels to send complete, error-free reports on time by reporting which sites are producing quality reports.

Preparing feedback reports is easiest when the system is automated. Computers quickly calculate mathematical errors and highlight missed deadlines; list the percentage of expected reports received. Feedback reports are essential for manual systems too. But more time and effort is needed to prepare them manually.

Figure 13: Quarterly feedback report[8]

Date covered from: _____ **to:** _____

Facility name	Reports sent on time	Commodity name	Opening balance (doses)	Received (doses)	Used (doses)	Losses/ Adjustments (doses)	End balance (doses)	AMC (doses)	Stock level (months)	Remarks
A	B	C	D	E	F	G	H	I	J	K
		OPV								
		DTP+HepB								
		BCG								
		BCG diluent								
		Measles								
		Measles diluent								
		Reconstitution syringe								
		AD syringe BCG								
		AD syringe (0.5ml)								
		Safety box								
		OPV								
		DTP+HepB								
		BCG								
		BCG diluent								
		Measles								
		Measles diluent								
		Reconstitution syringe								
		AD syringe BCG								
		AD syringe (0.5ml)								
		Safety box								

[8] It should be noted that this is a sample. Countries should create their custom made reports with description of items that are in stock.

5. Processing data

The purpose of a management information system (MIS) is to collect, organize and report data that will be used to make decisions. In order to define what type of data should be collected and processed, a detailed analysis of decisions that will be made based on the information generated from these data should be conducted. Systems should only collect information that will be used. Collecting information that will not be used puts extra burden on programme staff and makes the information flow heavy and slow.

The ultimate measure of an MIS's success is how the data are used - by whom and for making what decisions. Recording and processing information is not a goal in itself, but a way to improve decision making within a supply chain.

5.1 Assessment of stock status in a vaccine cold store

In vaccine stock management, the main task is to turn numbers into information that can be used to determine whether there is enough stock to last until the next planned arrival.

Time is an essential element in assessing stock status. For example, using 1000 doses of DTP in a week or in a month are entirely two different situations. It is highly recommended that all stores calculate how many months supplies will last on a regular basis. This can easily be calculated by dividing the amount of a certain product on stock by average consumption over a period of time. Since data are collected on a monthly basis, the results are submitted as months of supply.

$$\text{Months of supply} = \frac{\text{Quantity in hand}}{\text{Average monthly consumption}}$$

Quantity on stock can be found in inventory stock card or in store ledger. AMC can be derived from consumption data. As mentioned earlier, issue data substitutes consumption data in vaccine stores. However, this should be used with some caution. In an allocation/push system issues data might be less accurate because dispatches are not based on actual consumption.

Consumption rate may vary from month to month depending on various reasons. New vaccine introduction is a typical situation for this until the programme utilization levels up. Measures taken to increase coverage rates, and increased outreach activities may also increase monthly consumption of vaccines. Average monthly consumption should be calculated based on at least the most recent six months data.

Case study 1:

Everland district vaccine store has 3 600 doses of measles vaccine in hand and wants to assess how long will they last. Measles safety stock is set as 2 800 doses while reorder level is 3 000 doses. During the last six months total number of measles doses used by the health centres and clinics in the district were as follows:

Table 1. Measles consumption, Everland district vaccine store

Months	Distribution (consumption)
February	1 200
Mach	1 600
April	1 400
May	1 500
June	1 300
July	1 600
TOTAL	**8 600**

The average monthly consumption then, is:

$$\text{Average monthly consumption} = \frac{\text{Total number of doses distributed}}{\text{Number of months}} = \frac{8\,600}{6} = 1\,433 \text{ doses}$$

Consequently, months of supply remaining in stock can be calculated as follows:

$$\text{Months of supply} = \frac{\text{Quantity in hand}}{\text{AMC}} = \frac{3\,600}{1\,433} = 2.5 \text{ months}$$

With the given current rate of consumption, the stocks will only last for 2.5 months, however, since the safety stock is set as 1.9 months worth of supplies (2 800 doses divided by AMC), time to reorder new measles vaccine must strictly observed. Otherwise, programme will face risk of stock outs.

5.2 Assessing stock status by expiry dates

While assessing the supply status, utmost attention should be paid to expiry dates. If the quantity in hand is going to expire in three months, any amount beyond this will be unusable and stock status will be limited with only three months.

It is easier to make stock assessments by expiry dates with a computerized MIS. This analysis takes more time if done manually.

Case study 2:

During an EVSM assessment, the assessors have calculated the following stock status in the primary vaccine store in the country:

Table 2. Vaccine stock status, Primary vaccine store

Vaccine	Quantity in hand by 2 September 03	Average monthly consumption	Months of supply in stock
DTP	463 330	251 683	1.8
HepB	1 658 350	308 425	5.4
OPV	1 360 150	425 874	3.2
Measles	1 530 240	94 618	16.2
BCG	353 800	107 291	3.3

After this information was consolidated from inventory stock records, assessors went through batch cards to check the expiry dates of each batch to see whether months of supply on stock is really achievable. Assessors also checked order plan and planned arrivals of each vaccine.

Table 3. Analysis of stock situation by expiry dates, Primary vaccine store

Vaccine	Months of supply by 2 September 03	Number of batches available	Latest expiry date in months	First planned arrival in months
DTP	1.8	1	6.0	0.5
HepB	5.4	1	9.0	3
OPV	3.2	2	4.0	1
Measles	16.2	2	11.0	9
BCG	3.3	1	7.0	5

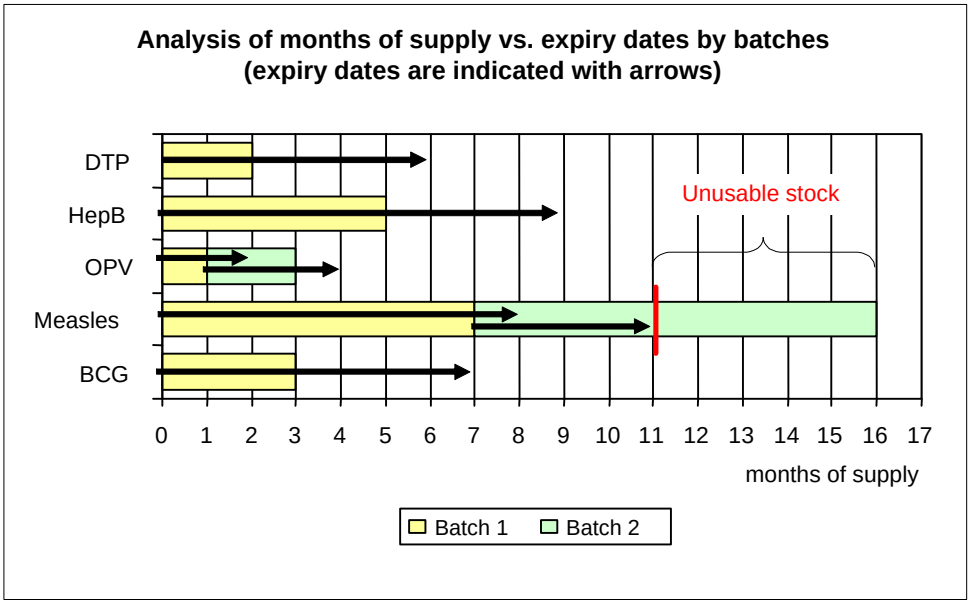
As seen from the above table, primary store had 16 months of measles vaccine supply based on the assumption that average monthly consumption would remain the same. There were no planned supplementary immunization activities for measles. Although stock records showed 16 months of supply, this was found to be NOT achievable when expiry dates of the two batches were examined. The second batch had the expiry date of July 2004 meaning that available stocks cannot be used beyond this point. In reality, months of supply should have been considered as 11 months rather than 16. Although DTP levels were found to be quite low (under the minimum stock), in 15 days there was a scheduled delivery of 6 months of supplies.

Based on this information, assessors prepared the below graph to illustrate the relationship between the months of supply and expiry dates by batches.

(continued)

Case study 2 *(cont'd...)*

Figure 14: Analysis of months of supply vs. expiry dates, Primary vaccine store



Assessors recommended that the country should inform neighboring countries to coordinate moving out approximately 570 000 doses of measles vaccine to those in need.

5.3 When to assess stock status

Stock status should be assessed on a regular basis, preferably monthly. Having scheduled shipments on a quarterly or six monthly and/or reporting on a quarterly basis should not make any difference. When monitored on a monthly basis, programme will ensure that there is no risk of a stock out. Simply looking up at a shelf and making a decision will definitely lead to stock outs and, consequently the inability of service providers to provide planned services.

Management information system data can be processed manually or by computer, to prepare reports and orders. In many cases, data processing is done manually at the intermediate and lower levels of a supply chain.

Manual processing works well with a small volume of data and simple reports. Computer processing is required as the data volume grows or as reports become more complex and includes performance indicators. Vaccine management has reached a level of sophistication where a computerized MIS is almost essential for managing central supply functions - forecasting, procurement, and nationwide distribution.

Experiences show that MIS software applications must be customized to the requirements of each programme, and that both hardware and software must be supported locally. Changing programme priorities and vaccine types, new organizational structures, and the growing data needs of MIS users require local modifications in MIS computer systems.

Figure 15: Manual processing of data works well with a small volume of data, but computer processing is needed when the volume of data increases

Photo: A. Afsar/WHO

With appropriate automation and effective use of information, the quality of data improves dramatically. Automation of a manual MIS adds value to supply chain operations by enabling:

- tracking of the products
- regularly monitoring sites
- aggregating data quickly, analyzing and making it available to guide decision making
- sending feedback (timely and accurate) to lower levels and policy makers

The accompanying CD-ROM provides electronic versions (in Excel) of the forms recommended in this manual. This can be used as a first step if a store plans to use computers in management and do not have any means of having standard software developed and adopted to their situation.

5.4 Vaccine wastage calculations in storage facilities

Vaccine wastage rate in vaccine stores always correspond to proportional vaccine wastage rate in unopened vials and is calculated as follows:

$$\text{Wastage rate} = \frac{\text{Number of doses discarded}}{\text{Start balance + doses received}} \times 100$$

Number of doses discarded would include all discards of unopened vials because of expiry, VVM indication, heat exposure, breakage, freezing, missing inventory and theft. This wastage rate is specific to vaccine stores, and cannot be compared with overall vaccine wastage rate in a country. WHO-UNICEF EVSM initiative recommends that this rate should not exceed 1%. Vaccine deliveries during the calculation period should not be subtracted from the denominator because, if any quantities of vaccines are damaged during transportation, this wastage is recorded in the sender's vaccine store account[9].

[9] *Monitoring vaccine wastage at country level: Guidelines for programme managers.* Geneva: World Health Organization, 2005 (WHO/V&B/03.18.Rev.1)

6. Form and report preparation guidelines

Figure 16: Batch card

Store name: _____ **Product:** _____ **Size:** _____

Manufacturer: _____ **Batch number:** _____ **Expiry date:** _____

Bin location: _____

				Vaccine quantities					
Date	**Voucher no**	**From (supplier)**	**To (Store/health unit)**	**Opening balance (doses)**	**Received (doses)**	**Issued (doses)**	**Loss/ adjustment (doses)**	**End Balance (doses)**	**Remarks and initials**
A	B	C	D	E	F	G	H	I	K

Store name:	Name of the store where this product is being kept
Product:	Name of the product for which the batch card is opened (e.g. OPV, measles diluent, reconstitution syringe, safety box)
Size:	Unit size of the product (e.g. 20 doses/vial; in case of syringes indicate such as *reconstitution syringe, 0.5ml AD syringe*)
Manufacturer:	Manufacturing company's name
Batch number:	Batch/Lot number of the product, which this batch card is opened for.
Expiry date:	Date of expiration as written on the product label
Bin location:	Location of the batch in the cold store (which refrigerator, cold/freezer room and which shelf)
Date (A):	Transaction date (in full date format dd/mm/yyyy e.g. 03.06.2007)
Voucher no (B):	Transaction document (requisition issue voucher or issue voucher) number related to this shipment.
From (C):	Sending facility's name if a shipment is received
To (D):	Receiving facility's name if a shipment is sent. A separate row should be used for each shipment.
Opening balance (E):	End balance (I) carried from the previous row. Opening Balance should be zero when a new card is opened.
Received (F):	Number of commodities received
Issued (G):	Number of commodities issued
Loss/Adjustments (H):	Losses are commodities removed from the system for any reason other than consumption (theft, loss, expiry…). Adjustments are the difference between calculated ending balance and physical count. If result of physical inventory is less then the calculation, then it should be recorded as a minus value.
End balance (I):	Balance is calculated differently for receipt and issuing; for receipt: E+F±H, for issuing: E-G±H
Remarks/Initials (K):	Explanation for losses and adjustments. Initials for the person entering data should be placed here

Figure 17: Inventory control card

Store name: _____ **Most recent AMC:** _____

Product Name: _____ **Vial size:** _____ **AMC calculation date:** _____

		Quantities						
Date	**Voucher no**	**Opening balance**	**Received (doses)**	**Issued (doses)**	**Loss/ adjustment (doses)**	**End Balance (doses)**	**Stock level (months)**	**Remarks and initials**
A	B	C	D	E	F	G	H	I

Store name:	Name of the store where this product is being kept
Product name:	Name of the product for which the inventory control card is opened (e.g. OPV, measles diluent, reconstitution syringe, safety box,…)
Vial size:	Unit size of the product (e.g. 20 doses/vial; in case of syringes indicate such as *reconstitution syringe, 0.5ml AD syringe*)
Most recent AMC:	Average Monthly Consumption (see Chapter 5 for details)
AMC calculation date:	Date (day/month/year) that AMC is calculated
Date (A):	Transaction date (in full date format dd/mm/yyyy e.g. 03.06.2007)
Voucher no (B):	Transaction document (requisition issue voucher or issue voucher) number related to this shipment
Opening balance (C):	End balance (G) carried from the previous row. Opening Balance should be zero when a new card is opened.
Received (D):	Number of commodities received
Issued (E):	Number of commodities issued
Loss/Adjustments (F):	Losses are commodities removed from the system for any reason other than consumption (theft, loss, expiry…). Adjustments are the difference between calculated ending balance and physical count. If result of physical inventory is less then calculation, then it should be recorded as a minus value.
End balance (G):	Balance is calculated differently for receipt and issuing; for receipt: C+D±F, for issuing: C-E±F
Stock level (H):	Balance (G) divided by most recent AMC. Shows the number of months that stocks will last. (see chapter 5 for details)
Remarks/Initials (I):	Explanation for losses and adjustments. Initials for the person entering data should be placed here

Figure 18: Issue voucher

Voucher no: _____ Issuing store: _____ Ship to: _____

Article no	Commodity name	Batch number	Expiry date	ISSUE			RECEIVE			
				Freeze indicator	VVM status	Amount (doses)	Freeze indicator	VVM status	Amount (doses)	Remarks
A	B	C	D	E	F	G	H	I	J	K
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
ISSUE							RECEIVE			

Approved by
Name:
Title:
Signature: Date:

Shipped by
Name:
Title:
Signature: Date:

Received by
Name:
Title:
Signature:

Voucher no:	Each voucher should have a unique number for easy tracking the commodities.
Issuing store:	Name of the store from where the commodities are issued
Ship to:	Name of the facility which the commodities are dispatched
Article no (A):	Each commodity should be recorded on a separate line described by a number.
Commodity name (B):	Names of the issued commodities.
Batch number (C):	Batch/Lot number of issued commodities products.
Expiry date (D):	Date of expiration as written on the product label
Freeze indicator status(E)	Freeze indicator readings in the issuing facility
VVM status (F):	Vaccine Vial Monitor readings in the issuing facility.
Amount (G):	Number of commodities issued (in doses for vaccines and diluents, pieces for other items).
Freeze indicator status(H)	Freeze indicator readings in the receiving facility.
VVM status (I):	Vaccine Vial Monitor readings in the receiving facility.
Amount (J):	Number of commodities issued.
Remarks (K):	Explanation of differences between issues and receipts - if any.
Approved by/date:	Name and signature of the authority approving this shipment and approval date (dd/mm/yyyy)
Shipped by/date:	Name and signature of the authority that shipped the commodities and shipping date (dd/mm/yyyy)
Received by/date:	Name and signature of the authority that received the commodities and receipt date (dd/mm/yyyy)

Figure 19: Requisition and issue voucher

Voucher No:

Article No	Request				Issue					Receive			
	Commodity Name	Previous Month's Consumption (doses)	Quantity in hand (doses)	Quantity requested (doses)	Batch Number	Expiry date	Freeze Indicator	VVM Status	Amount (doses)	Freeze Indicator	VVM Status	Amount (doses)	Remarks
A	B	C	D	E	F	G	H	I	J	K	L	M	N
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

Requesting Facility :

Requested by

Name :

Title :

Requisition Date :

Signature :

Issuing Facility :

Approved by

Name :

Title :

Approval Date :

Signature :

Receiving Facility :

Received by

Name :

Title :

Date :

Signature :

Article no (A):	Each item should be written on a separate line.
Commodity name (B):	Names of the issued commodities.
Quantity in hand (C):	Amount of commodities in requesting facility when this voucher prepared (in doses for vaccines and diluents, pieces for other items).
Quantity requested (D):	Amount of commodities requested (in doses for vaccines and diluents, pieces for other items).
Batch number (E):	Batch/Lot number of issued commodities.
Expiry date (F):	Date of expiration as written on the product label
Freeze indicator status(G)	Freeze indicator readings in the issuing facility.
VVM status (H):	Vaccine Vial Monitor readings in the issuing facility.
Amount(I):	Number of commodities issued (in doses for vaccines and diluents, pieces for other items).
Freeze indicator status(J)	Freeze indicator readings in the receiving facility.
VVM status (K):	Vaccine Vial Monitor readings in the receiving facility.
Amount(L):	Number of commodities issued (in doses for vaccines and diluents, pieces for other items).
Remarks (M):	Explanation of differences between issues and receipts - if any.
Requested by/date:	Name and signature of the authority that requested the commodities and requisition date (dd/mm/yyyy).
Approved by/date:	Name and signature of the authority that approved this shipment and approval date (dd/mm/yyyy).
Shipped by/date:	Name and signature of the authority that shipped the commodities and shipping date (dd/mm/yyyy).
Received by/date:	Name and signature of the authority who received the commodities and receipt date (dd/mm/yyyy).

Figure 20: Monthly summary report

Reporting facility: _____ **Reporting period:** _____

Commodity name	Opening balance (doses)	Received (doses)	Issued (doses)	Losses/ Adjustments (doses)	End balance (doses)	AMC	Stock level (months)
A	B	C	D	E	F	G	H
OPV							
DTP+HepB							
BCG							
BCG diluent							
Measles							
Measles diluent							
Reconstitution syringe							
AD syringe BCG							
AD syringe (0.5ml)							
Safety box							

Explanation of losses and adjustments:

Report by: _____ **Preparation date:** _____

Title: _____

Reporting facility:	Name of the facility sending the report.
Reporting period:	Indicated as dd/mm/yyy to dd/mm/yyyy that reporting period corresponds.
Commodity name (A):	It is recommended to preprint commodity names. By doing this, same items will appear in the same line in all reports for easier comparison and evaluation.
Opening balance (B):	Number of commodities on stock at the beginning of reporting period. Beginning stock should be equal to end balance (F) of the previous report.
Received (C):	Number of commodities received during reporting period.
Issued (D):	Number of commodities issued during reporting period.
Loss/Adjustments (E):	Losses are commodities removed from the system for any reason other than consumption (theft, loss, expiry). Adjustments are the difference between calculated ending balance and physical count. If result of physical inventory is less than the calculation, then it should be recorded as a minus value.
End balance (F):	Balance is equal to B+C-D±E
AMC (G):	Most recent Average Monthly Consumption (*see Chapter 5 for details*).
Stock level (H):	Ending balance (F) divided by AMC (G). Shows the number of months that stocks will last. (*see chapter 5 for details*).
Explanation for losses and adjustments:	Losses and adjustments should be explained.
Reported by/title:	Name, title and signature of the reporting authority (dd/mm/yyyy).
Preparation date:	Date when the report is done.

Figure 21: Quarterly feedback report

Date covered from: _____ **to:** _____

Facility name	Reports sent on time	Commodity name	Opening balance (doses)	Received (doses)	Used (doses)	Losses/ Adjustments (doses)	End balance (doses)	AMC (doses)	Stock level (months)	Remarks
A	B	C	D	E	F	G	H	I	J	K
		OPV								
		DTP+HepB								
		BCG								
		BCG diluent								
		Measles								
		Measles diluent								
		Reconstitution syringe								
		AD syringe BCG								
		AD syringe (0.5ml)								
		Safety box								
		OPV								
		DTP+HepB								
		BCG								
		BCG diluent								
		Measles								
		Measles diluent								
		Reconstitution syringe								
		AD syringe BCG								
		AD syringe (0.5ml)								
		Safety box								

Facility name (A):	Name of the facilities that reporting and receiving the feedback
Reports sent on time (B):	Number of reports sent on time/number of reports facilities supposed to send during covered period (presented like 2/3, or 3/3)
Commodity name (C):	It is recommended to preprint commodity names. By doing this, same items will appear in the same line in all reports for easier comparison and evaluation.
Opening balance (D):	Number of commodities on stock at the beginning of reporting period. Opening balance should be equal to ending balance (H) of the previous report.
Received (E):	Number of commodities received by facilities during reporting period
Used (F):	Number of commodities used during reporting period
Loss/Adjustments (G):	Losses are commodities removed from the system for any reason other than consumption (theft, loss, expiry). Adjustments are the difference between calculated ending balance and physical count. If result of physical inventory is less than the calculation, then it should be recorded as a minus value.
End balance (H):	Is equal to D+E-F±G,
Average monthly consumption (I):	Most recent Average Monthly Consumption (*see Chapter 5 for details*)
Stock level (J):	End balance (H) divided by AMC (I). Shows the number of months that stocks will last. (*see chapter 5 for details*)
Remarks (K):	Explanation for losses and adjustments

Figure 22: Physical inventory report

Name of the store:

Report number:

Vaccine/diluent		Batch number	Expiry date	Current stock	Freeze indicator status	VVM status	Remarks
OPV	1						
	2						
	3						
Total							
DTP+HepB	1						
	2						
	3						
Total							
BCG	1						
	2						
	3						
Total							
BCG diluent	1						
	2						
	3						
Total							
Measles	1						
	2						
	3						
Total							
Msls diluent	1						
	2						
	3						
Total							
Reconstitution syringe	1						
	2						
	3						
Total							
AD syringe BCG	1						
	2						
	3						
Total							
AD syringe 0.5ml	1						
	2						
	3						
Total							
Safety box	1						
	2						
	3						
Total							
Inventory done by		**Title**		**Date**		**Signature**	
Approved by		**Title**		**Date**		**Signature**	

Commodity name:	Names of the commodities that counted during the physical inventory
Batch number:	Batch/Lot numbers as written on the product label
Expiry date:	Date of expiration as written on the product label
Current stock:	Number of commodities on stock that physically counted and available for use
Freeze indicator status:	Freeze indicator readings in the storing facility.
VVM status	Vaccine Vial Monitor readings
Remarks:	Explanation for losses and adjustments
Approved by/date:	Name and signature of the staff responsible for physical inventory/physical inventory date (dd/mm/yyyy)

Figure 23: Loss report

Loss report

Serial number:

Issuing office		
Issued by	**Title**	**Date and signature**
Approved by	**Title**	**Date and signature**
Nature of loss		

☐ **Damaged in store**
☐ **Damaged in transit**
☐ **Damaged by heat**
☐ **Freezing**
☐ **Other**
☐ **Expired**
☐ **Missing inventory**

No	Item description	Unit size	Quantity to be disposed of	Remarks

Recommendations of corrective actions and disposal

Property Survey Board submission
List of documents attached to the report (photos, claim, laboratory analysis, batch & expiry dates…)

Original copy | **Copy 1** | **Copy 2** | **Copy 3**

Serial number :	Number assigned to the report (in consecutive order)
Issuing office :	Name of the office (store) issuing the report
Issued by :	Name of the person filling in the form
Title:	Title of the person filling in the form
Date and signature:	Date and signature of the person filling in the form
Approved by :	Name of the person approving the information on the form
Title:	Title of the person approving the form
Date and signature :	Date and signature of the person approving the form
Nature of loss :	Tick for place where loss has had happened (in store or in transit) and type of loss (damaged by heat, freezing, expiry, missing inventory or other - and explain)
No :	Line number of items in the report
Item description :	Name of the commodity
Unit size :	Indicate either vials, doses, pack of X
Quantity to be disposed of :	Number of units to be disposed of
Remarks :	Any explanation regarding the reason of disposal
Recommendations of corrective actions and disposal :	Explain how the commodities will be disposed and how further damages/losses could be prevented
Property Survey Board submission :	List of documents attached to the report (photos, claims, laboratory analysis, batch and expiry dates, etc.)

7. Simulation

In this section of the manual, readers will find a full explanation of "what to do" with various information regarding stock status, vaccine arrivals, vaccine deliveries and physical inventories[10]. The scenario is set to take place in the Republic of Tamhestan. In order to simplify the operations, only four vaccines (OPV, DTP+HepB, BCG and measles) are used in this simulation[11].

To illustrate, let's start with the current situation:

1. Tamhestan primary vaccine store has the following vaccines in stock on 1 January 2007.

Table 4. Stock status, Tamhestan primary vaccine store, 1 January 2007

Type of vaccine	Manufacturer	Batch number	Expiry	Stock in doses 1 Jan 2007	Freeze indicator status	VVM status
OPV 10 dose	KKK	A111-0	05.2007	50,000		OK
	GGG	G111-1	12.2007	42,100		OK
DTP+HepB 10 dose	GGG	D-222-1	12.2007	62,000	OK	OK
	GGG	D-333-1	04.2008	100,400	OK	Stage 2
BCG 20 dose	SSS	B-444-0	06.2008	157,500		OK
BCG diluent 20 dose	SSS	BD-44.1	12.2010	157,500		
Measles 10 dose	LLL	M-555-3	08.2007	15,700		OK
Measles diluent 10 dose	LLL	MD-55.1	11.2011	15,700		

[10] From WHO Global Training Network Vaccine Store Management Training Course materials (Module 6). All records are set as arbitrary and have no direct implications in regards to mentioned vaccine manufacturers.

[11] Syringes are not included in this simulation, mainly to keep the scenario as simple as possible.

Table 5. Average monthly consumption in doses, Tamhestan primary vaccine store by 1 January 2007

Vaccine	AMC in doses
OPV	25,000
DTP+HepB	11,500
BCG	16,200
Measles	8,800

2. Stock management system that is explained in this manual is being introduced and Tamhestan programme staff are asked to enter all information to batch cards and inventory control cards. Following events take place after they open new batch and inventory cards for the current stock on 1 January 2007.

3. On 5 January 2007, as scheduled Tamhestan receives the following international shipment:

Measles vaccine in 10 dose vials

Number of doses received 70,400

Batch number M111-A

Expiry date 08 - 2008

Manufacturer: LLL

Voucher number: PO-111A

No diluents arrived. You checked with the carrier company and the manufacturer. You have learned that there was a problem with the cargo space in the plane and the diluents were offloaded. They are scheduled to arrive on 17 January 2007.

4. Tamhestan primary vaccine store staff opens new batch card for this vaccine and enters the same information to measles inventory control card.

5. On 7 January 2007, primary vaccine store receives a **requisition and issue voucher** from Devrek intermediate vaccine store:

Figure 24: Requisition and issue voucher received from Devrek intermediate vaccine store

Voucher No: *07-111*

Article No	Request				Issue					Receive			
	Commodity Name	Previous Month's Consumption (doses)	Quantity in hand (doses)	Quantity requested (doses)	Batch Number	Expiry date	Freeze Indicator	VVM Status	Amount (doses)	Freeze Indicator	VVM Status	Amount (doses)	Remarks
A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	*OPV*	*29,000*	*10,200*	*29,500*									
2	*DTP+HepB*	*18,200*	*6,200*	*18,800*									
3	*BCG*	*27,000*	*8,000*	*27,760*									
4	*Measles*	*18,000*	*6,000*	*18,000*									
5													
6													
7													
8													
9													
10													

Requesting Facility : *Devrek Intermediate*
Requested by
Name : *Ahmet Tokus*
Title : *Store manager*
Requisition Date : *07 January 2007*
Signature : *signed*

Issuing Facility :
Approved by
Name :
Title :
Approval Date :
Signature :

Receiving Facility :
Received by
Name :
Title :
Date :
Signature :

6. As seen in the requisition and issue voucher, Devrek intermediate vaccine store manager did not indicate separately BCG and measles diluent - which he should have. Tamhestan primary vaccine store manager first analyzes the request and decides the quantities that need to be issued. Regardless of what quantity of vaccines Devrek has in hand, requested quantities match with previous month's consumption, and therefore Tamhestan primary vaccine store manager issues the same requested quantities. However, primary vaccine store ONLY has 15,700 doses matching quantities of measles vaccine and diluent. Therefore, primary vaccine store decides to issue ONLY 15,700 doses of measles vaccine and 15,700 doses of measles diluents with an explanation that remaining quantity will be sent after 17 January 2007 following expected measles diluent arrival. Primary vaccine store issues the supplies on 11 January 2007. In this issuance, primary vaccine store issues the earliest expiry vaccines first. As for DTP+HepB, primary vaccine store issues the batch with second stage VVM first.

7. On 11 January 2007, Tamhestan primary vaccine store sends the vaccines to Devrek intermediate vaccine store with the following copy of the requisition and issue voucher.

Figure 25: Requisition and issue voucher with ISSUE section filled in

Voucher No: *07-111*

Article No	Request				Issue					Receive			
	Commodity Name	Previous Month's Consumption (doses)	Quantity in hand (doses)	Quantity requested (doses)	Batch Number	Expiry date	Freeze Indicator	VVM Status	Amount (doses)	Freeze Indicator	VVM Status	Amount (doses)	Remarks
A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	*OPV*	*29,000*	*10,200*	*29,500*	*A111-0*	*5.2007*	*-*	*OK*	*29,500*				
2	*DTP+HepB*	*18,200*	*6,200*	*18,800*	*D333-1*	*4.2008*	*OK*	*2*	*18,800*				
3	*BCG*	*27,000*	*8,000*	*27,760*	*B444-0*	*6.2008*	*-*	*OK*	*27,760*				
4	*Measles*	*18,000*	*6,000*	*18,000*	*M555-3*	*8.2007*	*-*	*OK*	*15,700*				*remaining to be sent on 17 January*
5	*BCG diluent*				*BD44-1*	*12.201*	*-*	*-*	*27,760*				
6	*Msls diluent*				*MD55-1*	*11.2011*	*-*	*-*	*15,700*				*remaining to be sent on 17 January*
7													
8													
9													
10													

Requesting Facility : *Devrek Intermediate*
Requested by
Name : *Ahmet Tokus*
Title : *Store manager*
Requisition Date : *07 January 2007*
Signature : *signed*

Issuing Facility : *Primary vaccine store*
Approved by
Name : *Hasan Tomruk*
Title : *Chief, Primary vaccine store*
Approval Date : *11 January 2007*
Signature : *signed*

Receiving Facility :
Received by
Name :
Title :
Date :
Signature :

8. Primary vaccine store enters the issued quantities of vaccines and diluents to corresponding batch and inventory control cards.

9. On 12 January 2007, Devrek intermediate store returns back 18,800 doses of DTP+HepB along with a report that freeze indicator was found to be activated and vaccine failed in shake test therefore considered to be damaged by freezing. Devrek intermediate vaccine store returns back the filled copy of requisition and issue voucher for primary vaccine store records.

Figure 26: Completed requisition and issue voucher sent back from Devrek intermediate vaccine store along with 18,800 doses of frozen DTP+HepB vaccine

Voucher No: *07-111*

Article No	Request				Issue					Receive			
	Commodity Name	Previous Month's Consumption (doses)	Quantity in hand (doses)	Quantity requested (doses)	Batch Number	Expiry date	Freeze Indicator	VVM Status	Amount (doses)	Freeze Indicator	VVM Status	Amount (doses)	Remarks
A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	*OPV*	*29,000*	*10,200*	*29,500*	*A111-0*	*5.2007*	*-*	*OK*	*29,500*	*-*	*OK*	*29,500*	*OK*
2	*DTP+HepB*	*18,200*	*6,200*	*18,800*	*D333-1*	*4.2008*	*OK*	*2*	*18,800*	*Active*	*2*	*18,800*	*All failed in shake test*
3	*BCG*	*27,000*	*8,000*	*27,760*	*B444-0*	*6.2008*	*-*	*OK*	*27,760*	*-*	*OK*	*27,800*	*40 extra*
4	*Measles*	*18,000*	*6,000*	*18,000*	*M555-3*	*8.2007*	*-*	*OK*	*15,700*	*-*	*OK*	*15,700*	*OK*
5	*BCG diluent*				*BD44-1*	*12.201*	*-*	*-*	*27,760*	*-*	*-*	*27,760*	*OK*
6	*Msls diluent*				*MD55-1*	*11.2011*	*-*	*-*	*15,700*	*-*	*-*	*0*	*No diluent received*
7													
8													
9													
10													

Requesting Facility : *Devrek Intermediate*
Requested by
Name : *Ahmet Tokus*
Title : *Store manager*
Requisition Date : *07 January 2007*
Signature : *signed*

Issuing Facility : *Primary vaccine store*
Approved by
Name : *Hasan Tomruk*
Title : *Chief, Primary vaccine store*
Approval Date : *11 January 2007*
Signature : *signed*

Receiving Facility : *Devrek Intermediate*
Received by
Name : *Ahmet Tokus*
Title : *Store manager*
Date : *07 January 2007*
Signature : *signed*

10. From the report it is understood that Tamhestan primary vaccine store sent 40 extra doses of BCG (2 vials more than recorded) to Devrek intermediate store. Also, Tamhestan primary vaccine store failed to include 15,700 doses of measles diluents despite indicated in the requisition and issue voucher.

11. Based on this information, Tamhestan primary vaccine store completes a **loss report** for the frozen DTP+HepB vaccine. They plan to do a physical inventory on 18 January to check wrongly issued BCG as well as failing to send measles diluents.

12. On 17 January, as noted before, primary vaccine store receives the following shipment:

Measles diluent in 10 dose vials

Number of doses received 70,400

Batch number MD66.1

Expiry date 11.2010

Manufacturer: LLL

Voucher number: PO-111B

This consignment is the missing diluents that did not arrive with the vaccine on 5 January 2007.

13. Primary vaccine store opens new batch card and for this measles diluent and enters this information to measles diluent inventory control card as well.

14. On 18 January 2007, physical inventory is carried out. The following results are obtained:

Figure 27: Physical inventory report, Tamhestan primary vaccine store, 18 January 2007

Name of the store: *Primary vaccine store*

Report number: *07-01*

Vaccine / diluent		Batch number	Expiry date	Current stock	Freeze indicator status	VVM status	Remarks
OPV	1	*A111-0*	*05.2007*	*20,500*	*-*	*OK*	
	2	*G111-1*	*12.2007*	*42,100*	*-*	*OK*	*Match*
	3						
Total				*62,600*			*Match*
DTP+HepB	1	*D222-1*	*12.2007*	*62,000*	*OK*	*OK*	*Match*
	2	*D333-1*	*04.2008*	*81,600*	*OK*	*2*	*Match*
	3						
Total				*143,600*			*Match*
BCG	1	*B444-0*	*06.2008*	*129,700*	*-*	*OK*	*40 doses missing*
	2						
	3						
Total				*129,700*			*40 dose missing*
BCG diluent	1	*BD44-1*	*12.2010*	*129,740*	*-*	*-*	*Mismatch with vaccine*
	2						
	3						
Total				*129,740*			
Measles	1	*M111-A*	*08.2008*	*70,400*			*Match*
	2						
	3						
Total			*70,400*			*Match*	
MsIs diluent	1	*MD55-1*	*11.2011*	*15,700*			*Records show zero*
	2	*MD66-1*	*11.2010*	*70,400*			*Match*
	3						
Total				*86,100*			*Mismatch with vaccine*
Inventory done by *Jane Steel*		Title *Technical Officer, MOH*		Date *18 January 2007*		Signature *signed*	
Approved by *John Trust*		Title *EPI manager*		Date *18 January 2007*		Signature *signed*	

15. As seen from the physical inventory results, 40 doses of BCG were found to be missing (that is to confirm that it was sent as extra to Devrek). As a result, 40 extra doses of BCG diluent were found in the store. Similarly, 15,700 doses of measles diluent were found in the store (on the contrary it was indicated that it is sent to Devrek).

16. On 19 January, Tamhestan primary vaccine store issues DTP+HepB vaccine to replace frozen vaccine, 40 doses of BCG diluent to match the diluent quantities with issued BCG vaccine and missing measles diluent as well as missing quantity of measles that were not sent on 5 January 2007:

Figure 28: Issue voucher indicating vaccines and diluents sent to Devrek intermediate vaccine store on 19 January 2007

Voucher No: *07-222*

Article No	Request				Issue					Receive			
	Commodity Name	Previous Month's Consumption (doses)	Quantity in hand (doses)	Quantity requested (doses)	Batch Number	Expiry date	Freeze Indicator	VVM Status	Amount (doses)	Freeze Indicator	VVM Status	Amount (doses)	Remarks
A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	*DTP+HepB*				*D333-1*	*4.2008*	*OK*	*2*	*18,800*				
2	*BCG diluent*				*BD44-1*	*12.201*	*-*	*OK*	*40*				
3	*Measles*				*M111-A*	*8.2008*	*-*	*OK*	*2,300*				
4	*MsIs diluent*				*MD55-1*	*11.2011*	*-*	*-*	*15,700*				
5	*MsIs diluent*				*MD66-1*	*11.201*	*-*	*-*	*2,300*				
6													
7													
8													
9													
10													

Requesting Facility :

Requested by

Name :

Title :

Requisition Date :

Signature :

Issuing Facility : *Primary vaccine store*

Approved by

Name : *Hasan Tomruk*

Title : *Chief, Primary vaccine store*

Approval Date : *19 January 2007*

Signature : *signed*

Receiving Facility :

Received by

Name :

Title :

Date :

Signature :

17. On 20 January, Devrek sends back the copy of issue voucher, indicating that all commodities were received in good condition and in correct quantities.

18. The following batch cards, inventory control cards and loss report show the final balances on 20 January 2007:

Figure 29: Batch card for OPV (manufacturer KKK and batch number A111-0)

Store name: *Primary vaccine store* Product: *OPV* Size: *10 dose/vial*

Manufacturer: *KKK* Batch number: *A-111-0* Expiry date: *05.2007*

Bin location: *#1 Freezer room, Shelf #1A*

				Vaccine quantities					
Date	Voucher no	From (supplier)	To (Store/health unit)	Opening balance (doses)	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Remarks and initials
A	B	C	D	E	F	G	H	I	K
01.01.07				*50,000*				*50,000*	*New stock management - UK*
11.01.07	*07-111*	*Primary*	*Devrek*	*50,000*		*29,500*		*20,500*	*Issued to Devrek - UK*

Figure 30: Batch card for OPV (manufacturer GGG and batch number G111-1)

Store name: *Primary vaccine store* Product: *OPV* Size: *10 dose/vial*

Manufacturer: *GGG* Batch number: *G-111-1* Expiry date: *12.2007*

Bin location: *#1 Freezer room, Shelf #1B*

				Vaccine quantities					
Date	Voucher no	From (supplier)	To (Store/health unit)	Opening balance (doses)	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Remarks and initials
A	B	C	D	E	F	G	H	I	K
01.01.07				*50,000*				*50,000*	*New stock management - UK*

Figure 31: Inventory control card for OPV

Store name: *Primary vaccine store* Most recent AMC: *25,000*

Product Name: *OPV* Vial size: *10 dose/vial* AMC calculation date: *01 January 2007*

		Quantities						
Date	Voucher no	Opening balance	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Stock level (months)	Remarks and initials
A	B	C	D	E	F	G	H	I
01.01.2007		*92,100*				*92,100*	*3.6*	*New stock management card - UK*
11.01.2007	*07-111*	*92,100*		*29,500*		*62,600*	*2.5*	*To Devrek intermediate store - UK*

Figure 32: Batch card for DTP+HepB (manufacturer GGG and batch number D-222-1)

Store name: *Primary vaccine store* Product: *DTP+HepB* Size: *10 dose/vial*

Manufacturer: *GGG* Batch number: *D-222-1* Expiry date: *12.2007*

Bin location: *#2 Cold room, Shelf #3*

				Vaccine quantities					
Date	Voucher no	From (supplier)	To (Store/health unit)	Opening balance (doses)	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Remarks and initials
A	B	C	D	E	F	G	H	I	K
01.01.07				*62,000*				*62,000*	*New stock management - UK*

Figure 33: Batch card for DTP+HepB (manufacturer GGG and batch number D-333-1)

Store name:	*Primary vaccine store*	**Product:**	*DTP+HepB*	**Size:**	*10 dose/vial*
Manufacturer:	*GGG*	**Batch number:**	*D-333-1*	**Expiry date:**	*04.2008*
		Bin location:	*#2 Cold room, Shelf #4*		

				Vaccine quantities					
Date	**Voucher no**	**From (supplier)**	**To (Store/health unit)**	**Opening balance (doses)**	**Received (doses)**	**Issued (doses)**	**Loss/ adjustment (doses)**	**End Balance (doses)**	**Remarks and initials**
A	B	C	D	E	F	G	H	I	K
01.01.2007				*100,400*				*100,400*	*New stock management- UK*
11.01.2007	*07-111*	*primary*	*Devrek*	*100,400*		*18,800*		*81,600*	*to Devrek intermediate store - UK*
12.01.2007	*07-111*	*Devrek*		*81,600*	*18,800*		*-18,800*	*81,600*	*Vaccine frozen in transit to Devrek - UK*
19.01.2007	*07-222*	*Primary*	*Devrek*	*81,600*		*18,800*		*62,800*	*to Devrek intermediate store - UK*

It should be noted that the returned frozen vaccine is first entered back to the system and then deducted as LOSS in column H. Vaccines that are damaged during transit belong to sender store's account.

Figure 34: Inventory control card for DTP+HepB

Store name: *Primary vaccine store*

Product Name: *DTP+HepB*

Vial size: *10 dose/vial*

Most recent AMC: *11,500*

AMC calculation date: *01 January 2007*

		Quantities						
Date	Voucher no	Opening balance	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Stock level (months)	Remarks and initials
A	B	C	D	E	F	G	H	I
01.01.2007		*162,400*				*162,400*	*14.1*	*New stock management card - UK*
11.01.2007	*07-111*	*162,400*		*18,800*		*143,600*	*12.5*	*To Devrek intermediate store - UK*
12.01.2007	*07-111*	*143,600*	*18,800*		*-18,800*	*143,600*	*12.5*	*To Devrek intermediate store - UK*
19.01.2007	*07-222*	*143,600*		*18,800*		*124,800*	*10.8*	*To Devrek intermediate store - UK*

Figure 36: Inventory control card for BCG vaccine

Store name: *Primary vaccine store*

Most recent AMC: *16,200*

Product Name: *BCG*

Vial size: *20 dose/vial*

AMC calculation date: *01 January 2007*

		Quantities						
Date	Voucher no	Opening balance	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Stock level (months)	Remarks and initials
A	B	C	D	E	F	G	H	I
01.01.2007		*157,500*				*157,500*	*9.7*	*New stock management card - UK*
11.01.2007	*07-111*	*157,500*		*27,760*		*129,740*	*8*	*To Devrek intermediate store - UK*
19.01.2007	*07-11*	*129,740*			*-40*	*129,700*	*8*	*Missing incvventory - UK*

Figure 37: Batch card for BCG diluent (manufacturer SSS and batch number BD-44.1)

Store name: *Primary vaccine store*
Product: *BCG DILUENT*
Size: *20 dose/vial*
Manufacturer: *SSS*
Batch number: *BD-44.1*
Expiry date: *12.2010*
Bin location: *Ambient store, shelf #2*

				Vaccine quantities					
Date	Voucher no	From (supplier)	To (Store/health unit)	Opening balance (doses)	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Remarks and initials
A	B	C	D	E	F	G	H	I	K
01.01.07				*157,500*				*157,500*	*New stock management- UK*
11.01.07	*07-111*	*primary*	*Devrek*	*157,500*		*27,760*		*129,740*	*to Devrek intermediate store - UK*
19.01.07	*07-01*	*primary*	*Devrek*	*129,740*		*40*		*129,700*	*Sent to Devrek to match with BCG vaccine - UK*

Figure 38: Inventory control card for BCG diluent

Store name: *Primary vaccine store*

Product Name: *BCG DILUENT*

Vial size: *20 dose/vial*

Most recent AMC: *16,200*

AMC calculation date: *01 January 2007*

		Quantities						
Date	Voucher no	Opening balance	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Stock level (months)	Remarks and initials
A	B	C	D	E	F	G	H	I
01.01.2007		*157,500*				*157,500*	*9.7*	*New stock management card - UK*
11.01.2007	*07-111*	*157,500*		*27,760*		*129,740*	*8*	*To Devrek intermediate store - UK*
19.01.2007	*07-11*	*129,740*		*40*		*129,700*	*8*	*Sent to Devrek to match with BCG vaccine - UK*

Figure 39: Batch card for measles (manufacturer LLL and batch number M-555-3)

Store name: *Primary vaccine store* Product: *MEASLES* Size: *10 dose/vial*

Manufacturer: *LLL* Batch number: *M-555-2* Expiry date: *05.2007*

Bin location: *#2 Cold room, shelf #6*

				Vaccine quantities					
Date	Voucher no	From (supplier)	To (Store/health unit)	Opening balance (doses)	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Remarks and initials
A	B	C	D	E	F	G	H	I	K
01.01.2007				*15,700*				*15,700*	*New stock management- UK*
11.01.2007	*07-111*	*primary*	*Devrek*	*15,700*		*15,700*		*0*	*to Devrek intermediate store - UK*

Figure 40: Batch card for measles (manufacturer LLL and batch number M-111-A)

Store name: *Primary vaccine store* Product: *MEASLES* Size: *10 dose/vial*

Manufacturer: *LLL* Batch number: *M-111-A* Expiry date: *08.2008*

Bin location: *#2 Cold room, shelf #7*

				Vaccine quantities					
Date	Voucher no	From (supplier)	To (Store/health unit)	Opening balance (doses)	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Remarks and initials
A	B	C	D	E	F	G	H	I	K
01.01.2007	*PO-111A*	*Serum Institute of India*			*70,400*			*70,400*	*New stock management- UK*
11.01.2007	*07-111*	*primary*	*Devrek*	*70,400*		*2,300*		*68,100*	*to Devrek intermediate store - UK*

Figure 41: Inventory control card for measles

Store name: *Primary vaccine store* **Most recent AMC:** *8,800*

Product Name: *MEASLES* **Vial size:** *10 dose/vial* **AMC calculation date:** *01 January 2007*

		Quantities						
Date	Voucher no	Opening balance	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Stock level (months)	Remarks and initials
A	B	C	D	E	F	G	H	I
01.01.2007		*15,700*				*15,700*	*1.7*	*New stock management card - UK*
05.01.2007	*PO-111A*	*15,700*	*70,400*			*86,100*	*9.7*	*New arrival - UK*
11.01.2007	*07-111*	*86,100*		*15,700*		*70,400*	*8*	*Sent to Devrek intermediate store - UK*
19.01.2007	*07-222*	*70,400*		*2,300*		*68,100*	*7.7*	*Sent to Devrek intermediate store - UK*

Figure 42: Batch card for measles diluent (manufacturer LLL and batch number MD55.1)

Store name: *Primary vaccine store*
Product: *MSLS DILUENT*
Size: *10 dose/vial*
Manufacturer: *LLL*
Batch number: *MD55.1*
Expiry date: *11.2011*
Bin location: *Ambient store, Shelf #7*

				Vaccine quantities					
Date	Voucher no	From (supplier)	To (Store/health unit)	Opening balance (doses)	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Remarks and initials
A	B	C	D	E	F	G	H	I	K
01.01.2007				*15,700*				*15,700*	*New stock management- UK*
11.01.2007	*07-111*	*Primary*	*Devrek*	*15,700*		*15,700*		*0*	*to Devrek intermediate store - UK*
18.01.2007	*07-11*			*0*			*15,700*	*15,700*	*Found in physical inventory- UK*
19.01.2007	*07-222*	*Primary*	*Devrek*	*15,700*		*15,700*		*0*	*to Devrek intermediate store - UK*

Figure 43: Batch card for measles diluent (manufacturer LLL and batch number MD66.1)

Store name: *Primary vaccine store*

Manufacturer: *LLL*

Product: *MSLS DILUENT*

Batch number: *MD55.1*

Bin location: *Ambient store, Shelf #5*

Size: *10 dose/vial*

Expiry date: *11.2010*

				Vaccine quantities					
Date	Voucher no	From (supplier)	To (Store/health unit)	Opening balance (doses)	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Remarks and initials
A	B	C	D	E	F	G	H	I	K
17.01.2007		*Serum Institute*	*Primary*		*70,400*			*70,400*	*New arrival - UK*
19.01.2007	*07-222*	*Primary*	*Devrek*	*70,400*		*2,300*		*68,100*	*to Devrek intermediate store - UK*

Figure 44: Inventory control card for measles diluent

Store name: *Primary vaccine store*

Most recent AMC: *8,800*

Product Name: *MEASLES DILUENT*

Vial size: *10 dose/vial*

AMC calculation date: *01 January 2007*

		Quantities						
Date	Voucher no	Opening balance	Received (doses)	Issued (doses)	Loss/ adjustment (doses)	End Balance (doses)	Stock level (months)	Remarks and initials
A	B	C	D	E	F	G	H	I
01.01.2007		*15,700*				*15,700*	*1.7*	*New stock management card - UK*
11.01.2007	*07-111*	*15,700*		*15,700*		*0*	*0*	*Sent to Devrek intermediate store - UK*
17.01.2007	*PO-111B*	*0*	*70,400*			*70,400*	*8*	*New arrival - UK*
18.01.2007	*07-11*	*70,400*			*+15,700*	*86,100*	*9.8*	*Found in physical inventory - UK*
19.01.2007	*07-222*	*86,100*		*18,000*		*68,100*	*7.7*	*Sent to Devrek intermediate store - UK*

Figure 45: Loss report filled for frozen DTP+HepB vaccine in transit

Loss report

Serial number: 07-01

Issuing office
Primary vaccine store

Issued by	Title	Date and signature
Hasan TOMRUK	Chief, Primary Vaccine Store	12 January 2007
Approved by	**Title**	**Date and signature**
John TRUST	EPI manager	12 January 2007

Nature of loss

☐ Damaged in store	☐ Damaged by heat	☐ Expired
☒ Damaged in transit	☒ Freezing	☐ Missing inventory
	☐ Other	

No	Item description	Unit size	Quantity to be disposed of	Remarks
1	DTP+HepB vaccine	10 dose vial	18,800 doses	Frozen in transit to Devrek intermediate store on 11 January 2007 (failed in shake test)

Recommendations of corrective actions and disposal

Investigation done in the primary store indicated that staff responsible for packaging do not wait until icepacks have slushy noise, therefore exposing vaccines to freezing temperatures. Staff trained on proper conditioning of icepacks and will be monitored for compliance.

18,800 doses of DTP+HepB are removed from the cold room to dry area and clearly marked that they are damaged vaccine and not for use.

Property Survey Board submission
List of documents attached to the report (photos, claim, laboratory analysis, batch & expiry dates…)

1. Shake test report from Devrek intermediate vaccine store (dated 12.01.2007)
2. Copy of batch card (DTP+HepB, Batch number D333-1, expiry date 04.2008)

Original Copy | Copy 1 | Copy 2 | Copy 3

8. Installing and using MS-Excel files

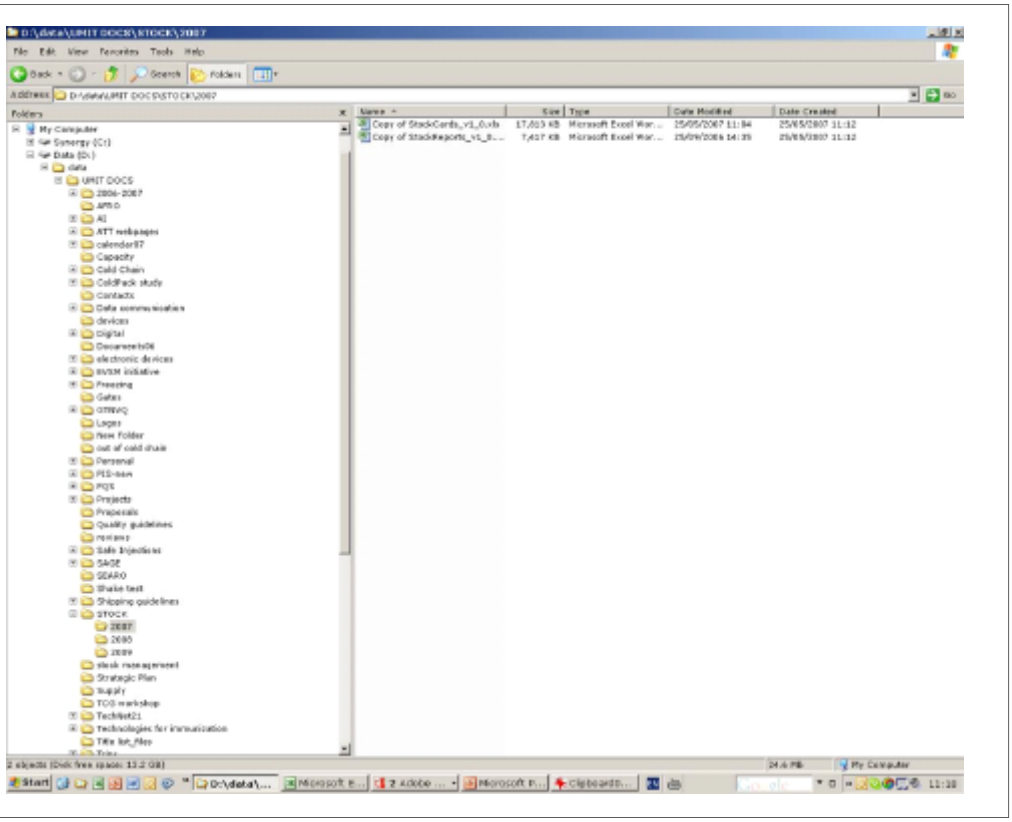
8.1 Description

The accompanying CD-ROM provides electronic versions (in Excel) of the forms recommended in this manual. This can be used as a first step if an intermediate store plans to use computers in management and do not have any means of having standard software developed and adopted to their situation.

Using these files, you can keep your stock data, as well as tracking the monthly reports and feedbacks.

8.2 Installation

Open a new directory under your working disk (C:, D:,….). Rename the directory as “Stock”. Open new directories named as years starting with the current year (2004, 2005, 2006, etc.) under “Stock” directory. Copy StockCards_v1_0.xls and StockReports_v1_0.xls into each year directory.

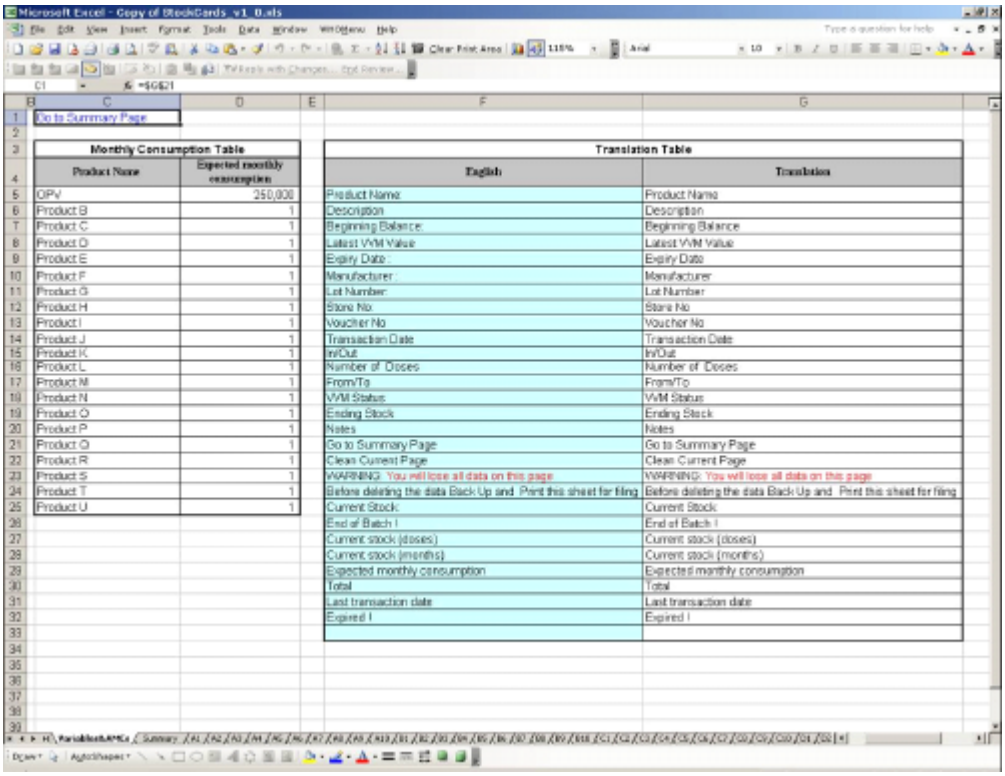


8.3 Using StockCards_v1_0.xls

8.3.1 Entering variables and customization

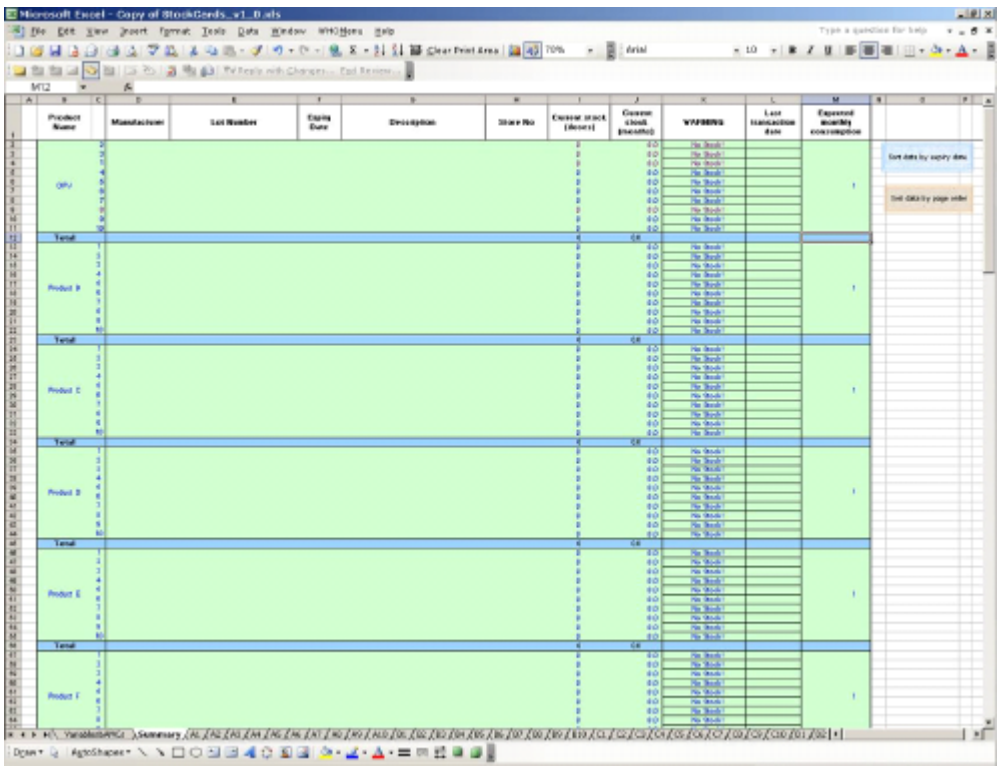
Open StockCards_v1_0.xls under the directory for the current year. Click on Sheet Tab named "Variables&AMCs" and enter most recent Average Monthly Consumption figures for each commodity as described in chapter 5 of the manual. Then change the product names with your commodity names (e.g. change Product A with Measles Vaccine, Product B with Measles Diluent…)

This page can also be used for translating the tool into local language. Changes in column G will automatically be reflected in all pages.

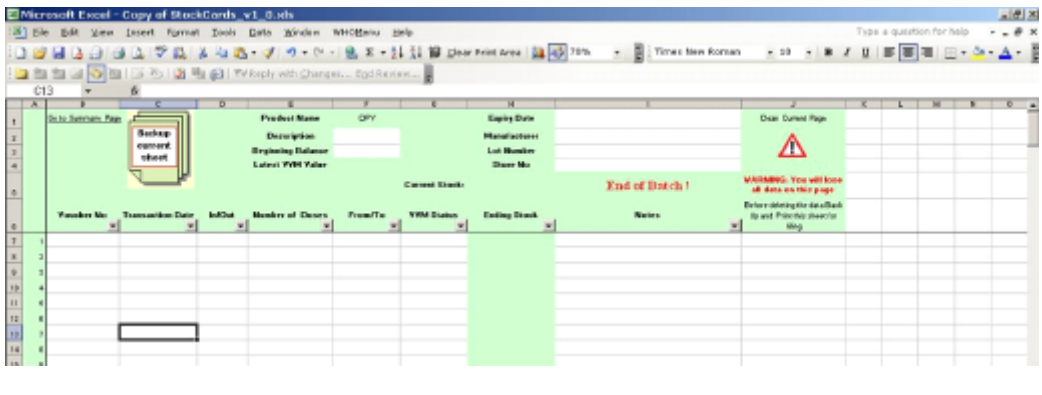


8.3.2 Entering current stocks

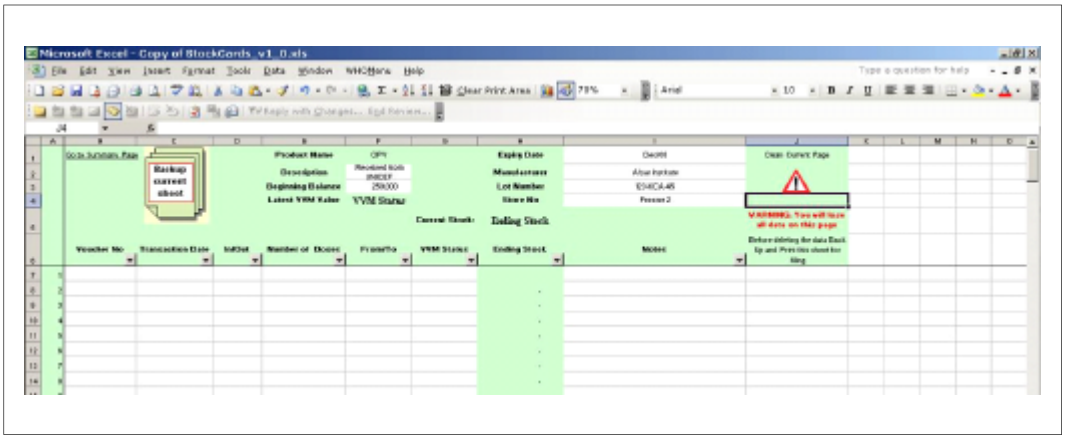
After installation and customization, you should enter the current stock information that is being kept in the warehouse. First of all you should make a physical inventory and fill in the Physical Inventory Report. Make necessary corrections and adjustments on the Batch Cards. Open StockCards_v1_0.xls. Click on "Summary" page tab. You will see an empty stock list.



Click on the first line of the commodity you want to enter (OPV 1, DTP1, etc.). This will open the related batch information sheet.



You will find that Product Name has already been entered for you. Enter Expiry **Date, Manufacturer's Name, and Lot Number.** Then enter your current usable stock of this batch as the beginning balance.



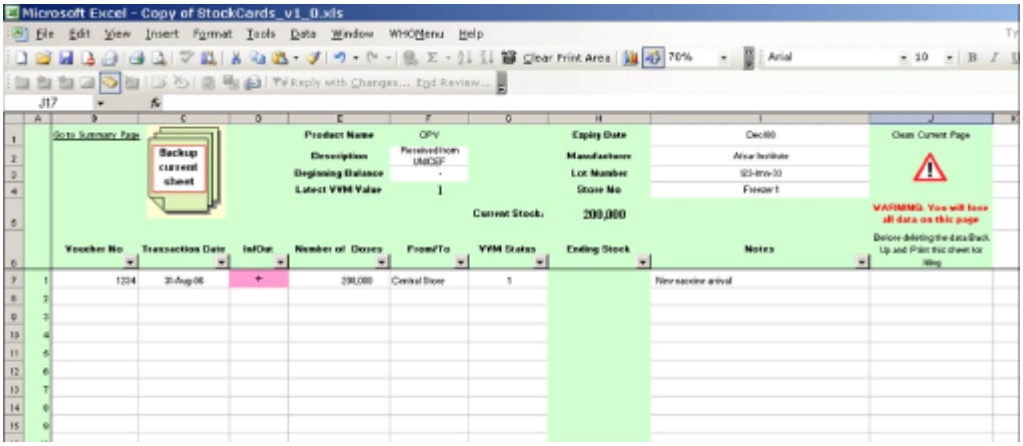
When you finish data entry in this page click on the link at cell B1 (Go to Summary Page). By clicking on this link, you will go back to summary page.

If you have more than one batch from a certain commodity, click on a new line to open a new batch card. Enter other commodities following the same procedures.

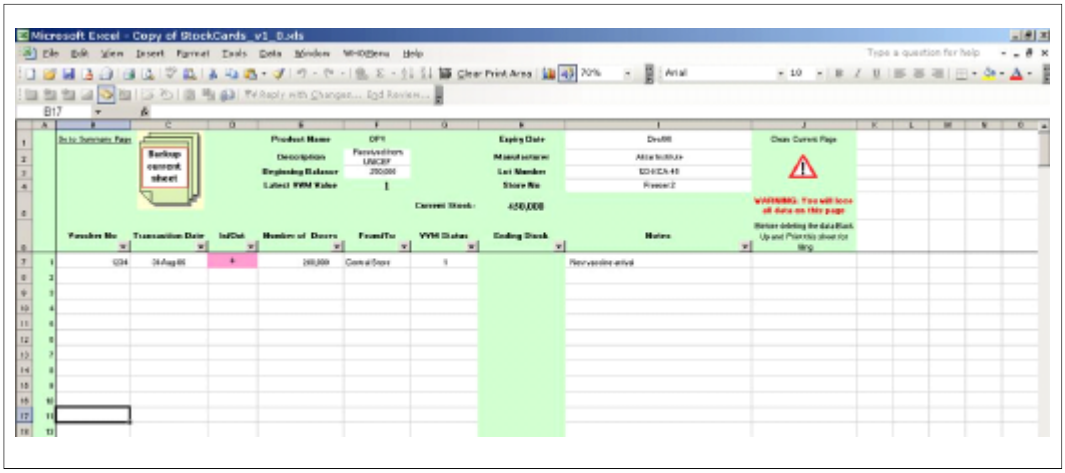
8.3.3 Receiving commodities

When you receive a new batch of a certain commodity, you have to open a new batch card. Go to Summary page and click on an empty line for that commodity. If you want to enter a third batch of OPV for example, click on the OPV line 3 on the Summary page. This will send you to OPV 3 work sheet. Enter Expiry Date, Manufacturer's Name, and Lot Number. Keep the beginning balance as "zero".

Then enter Issuing Voucher's number, current date and number of commodities. You should put a "+" sign to In-Out column since this is adding a commodity to your stock. You will see that background of the "+" sign is turned to red (means you received stock). Under the From/To column enter the warehouse or organization's name that you received this commodity.

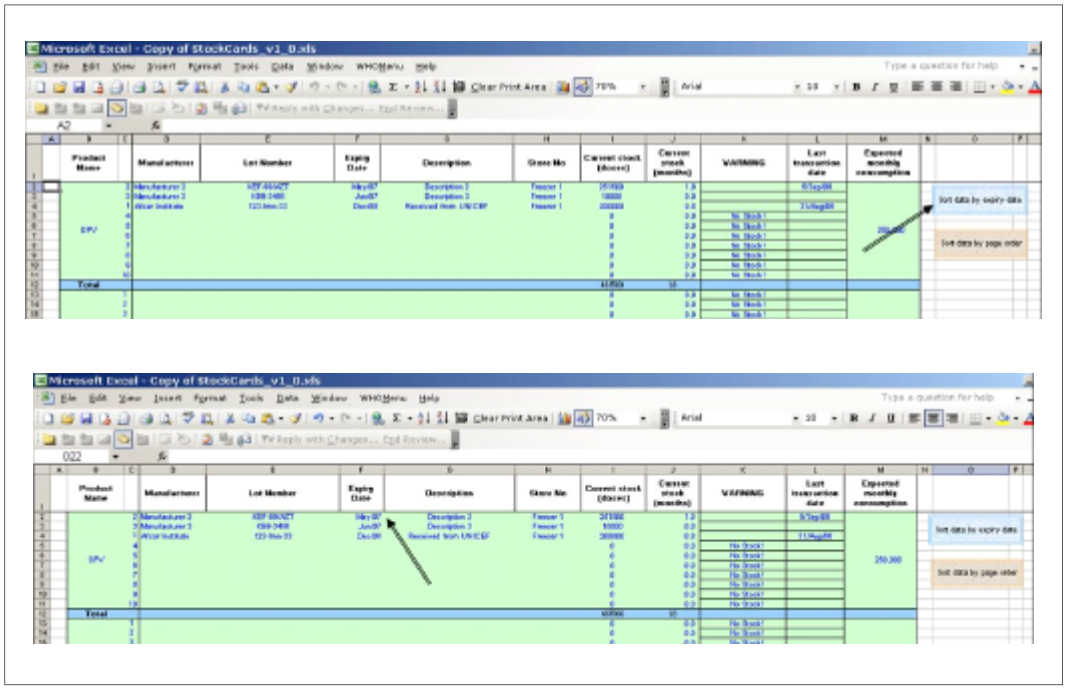


If you receive a new stock from a previous batch, enter Issuing Voucher's number, current date and number of commodities. You should put a "+" sign to In-Out column since this is adding a commodity to your stock. You will see that background of the "+" sign is turned to red (means you received stock). Under the From/To column enter the warehouse or organization's name that you received this commodity.



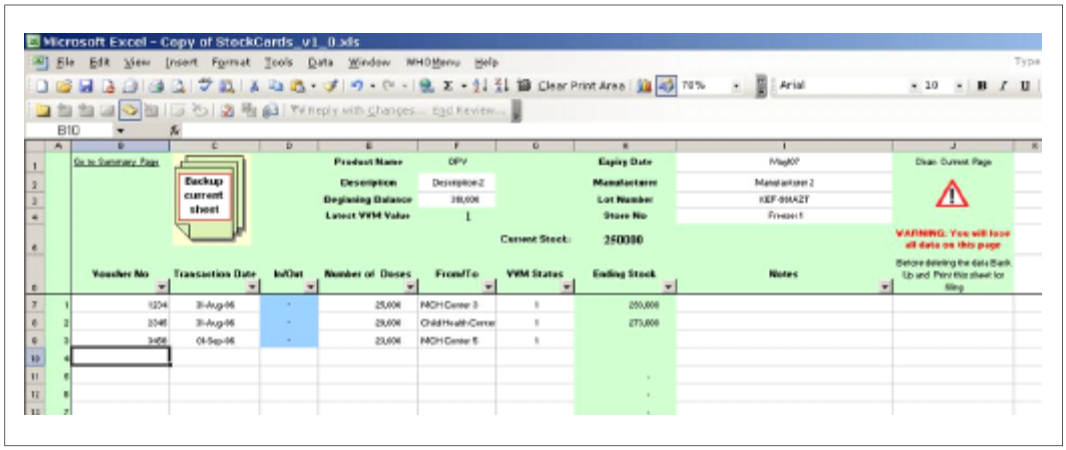
8.3.4 Issuing commodities

When you are issuing commodities, you should start with the Summary page. You have to decide which batch should be issued first. You should follow the Earliest Expiry First Out (EEFO) procedure, unless VVMs show different levels of heat exposure. If you click on the blue colored "sort data by expiry date" box, all batches will be sorted so that earliest expiry dates displayed on the top of the list. If you click on the pink box, the list will return to its default sort order.



Select the best possible batch and click on it. You will go to the selected batch sheet.

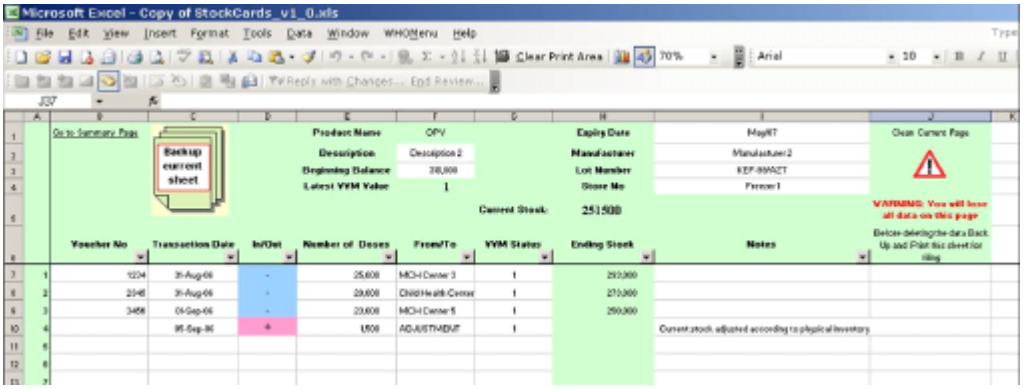
In the batch sheet, enter the voucher number first. Then transaction date, number of commodities to be issued and name of the facility should be entered. Enter a "-" sign to column D (In/Out). You will see the remaining stock in cell G5 (as Current Stock).



8.3.5 Loss and adjustments

Losses are commodities removed from the system for any reason other than consumption (theft, damage, expiry). Adjustments are the difference between calculated ending balance and physical count.

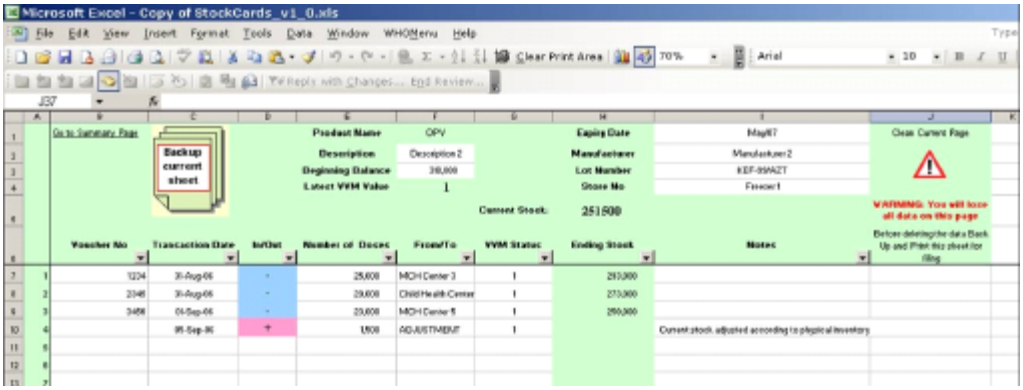
To record an adjustment after a physical inventory, you should enter the difference between calculated current record and physical count as a transaction. If the result of the physical inventory is less then calculated amount, then the difference should be recorded as a minus value. If physical inventory result is higher then the calculation then it should be recorded as a plus value. Enter the word "adjustment" as you enter a facility name and add a note to column I.



8.3.6 Backup and cleaning batch cards

In this limited stock control software, you can control only ten batches from each commodity at a time. You do not have chance to add new batch cards. You have to clean old batch cards where the stock balances reached to zero. Before cleaning a batch card back up the sheet you want to clean by clicking on the

icon, and print it for filing. Then Click on the  sign. Keep in mind that you will lose all data on that page and cleaning process is irreversible. (Undo command does not work).

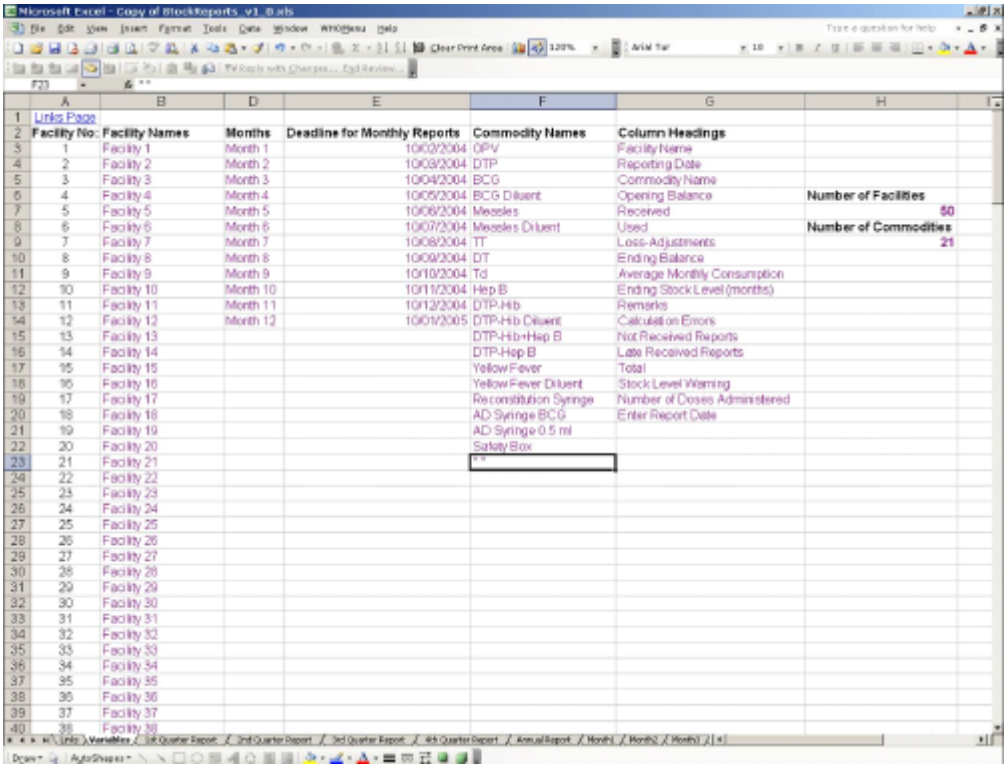


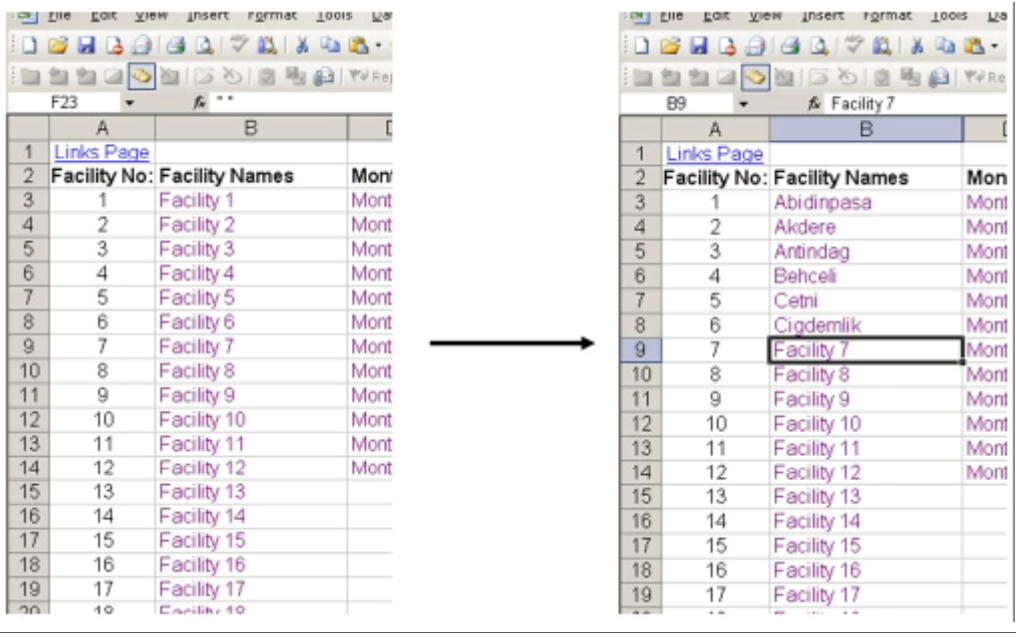
8.4 Using StockReports_v1_0.xls

8.4.1 Entering variables and customization

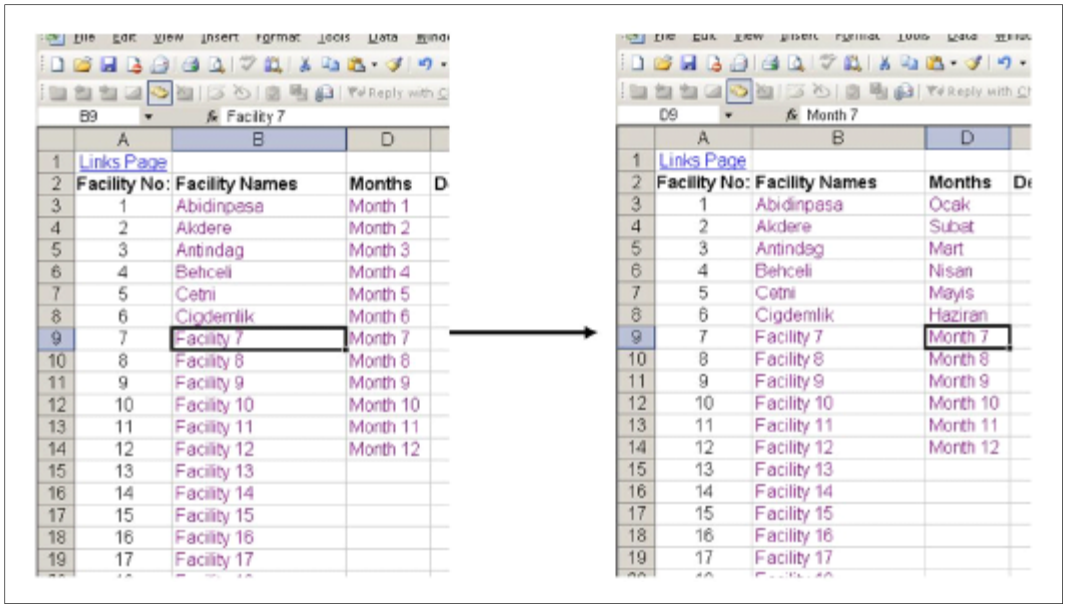
Open StockReports_v1_0.xls under the directory for the current year. Click on Sheet Tab named “Variables” to personalize the workbook.

Enter local facility names by overwriting the default ones.





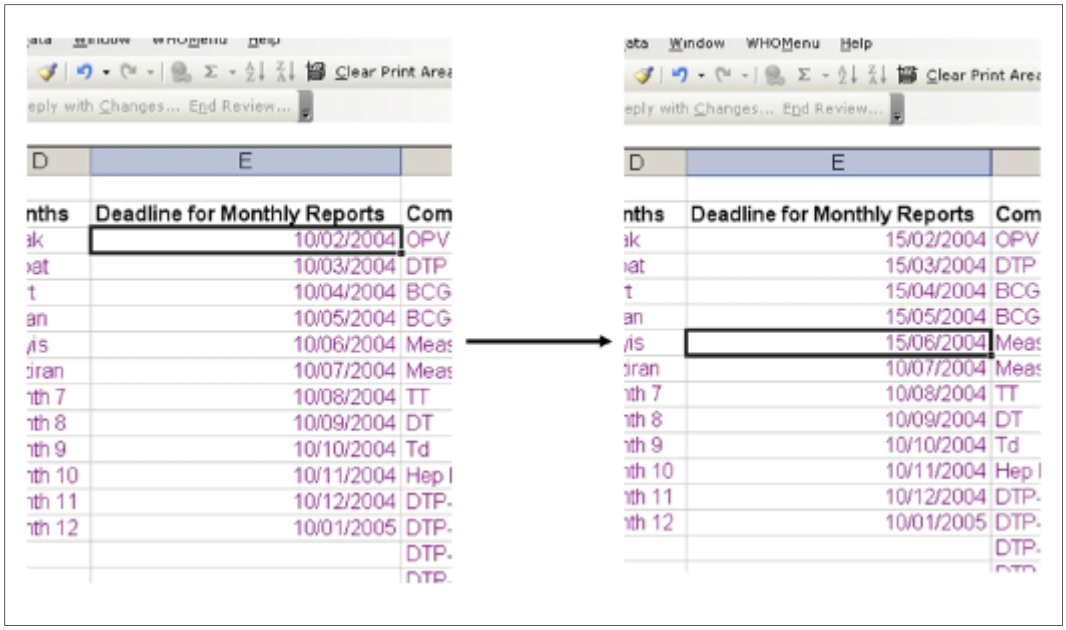
Enter names of the months (in local language) by overwriting the default ones.



	A	B	D
1	Links Page		
2	Facility No:	Facility Names	Months
3	1	Abidinpasa	Month 1
4	2	Akdere	Month 2
5	3	Antindag	Month 3
6	4	Behceli	Month 4
7	5	Cetni	Month 5
8	6	Cigdemlik	Month 6
9	7	Facility 7	Month 7
10	8	Facility 8	Month 8
11	9	Facility 9	Month 9
12	10	Facility 10	Month 10
13	11	Facility 11	Month 11
14	12	Facility 12	Month 12
15	13	Facility 13	
16	14	Facility 14	
17	15	Facility 15	
18	16	Facility 16	
19	17	Facility 17	

	A	B	D
1	Links Page		
2	Facility No:	Facility Names	Months
3	1	Abidinpasa	Ocak
4	2	Akdere	Subat
5	3	Antindag	Mart
6	4	Behceli	Nisan
7	5	Cetni	Mayis
8	6	Cigdemlik	Haziran
9	7	Facility 7	Month 7
10	8	Facility 8	Month 8
11	9	Facility 9	Month 9
12	10	Facility 10	Month 10
13	11	Facility 11	Month 11
14	12	Facility 12	Month 12
15	13	Facility 13	
16	14	Facility 14	
17	15	Facility 15	
18	16	Facility 16	
19	17	Facility 17	

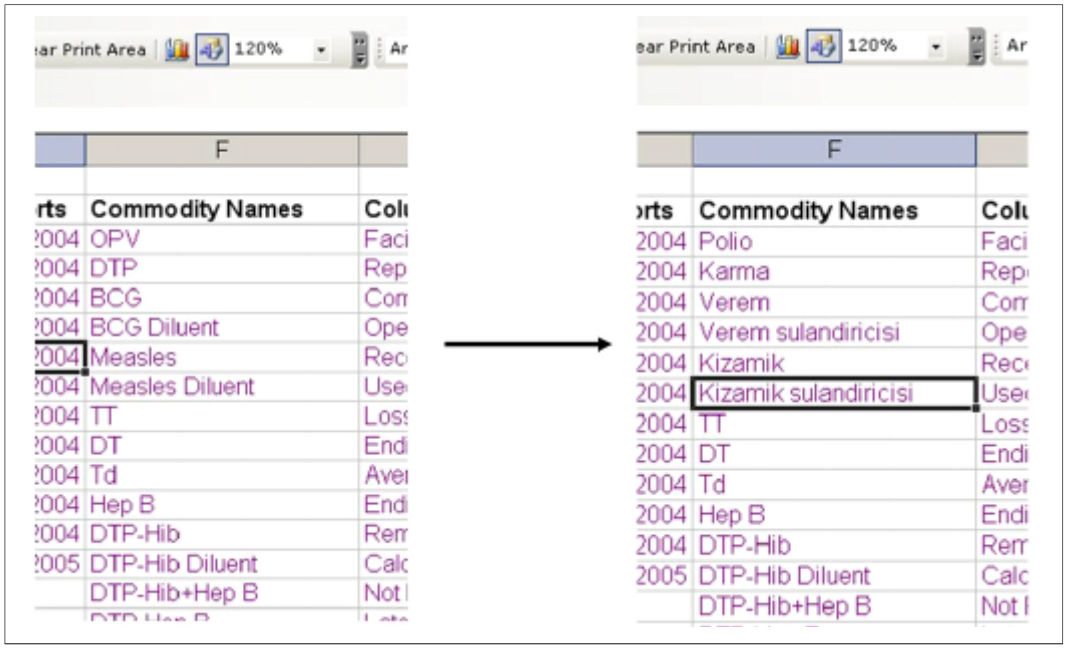
Enter reporting deadlines if different from the default ones (default: 20th of every month).



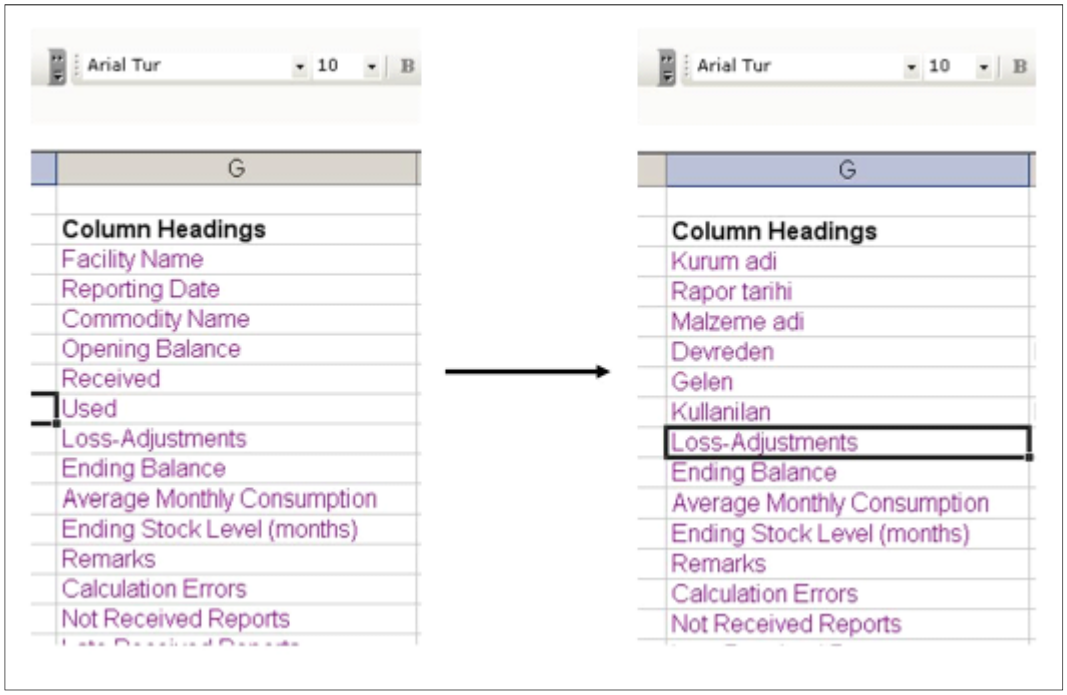
	D	E	
	nths	Deadline for Monthly Reports	Com
	ık	10/02/2004	OPV
	ıat	10/03/2004	DTP
	t	10/04/2004	BCG
	an	10/05/2004	BCG
	ıis	10/06/2004	Meas
	iran	10/07/2004	Meas
	ıth 7	10/08/2004	TT
	ıth 8	10/09/2004	DT
	ıth 9	10/10/2004	Td
	ıth 10	10/11/2004	Hep I
	ıth 11	10/12/2004	DTP-
	ıth 12	10/01/2005	DTP-
			DTP-

	D	E	
	nths	Deadline for Monthly Reports	Com
	ık	15/02/2004	OPV
	ıat	15/03/2004	DTP
	t	15/04/2004	BCG
	an	15/05/2004	BCG
	ıis	15/06/2004	Meas
	iran	10/07/2004	Meas
	ıth 7	10/08/2004	TT
	ıth 8	10/09/2004	DT
	ıth 9	10/10/2004	Td
	ıth 10	10/11/2004	Hep I
	ıth 11	10/12/2004	DTP-
	ıth 12	10/01/2005	DTP-
			DTP-

Overwrite local commodity names if different from the default ones:

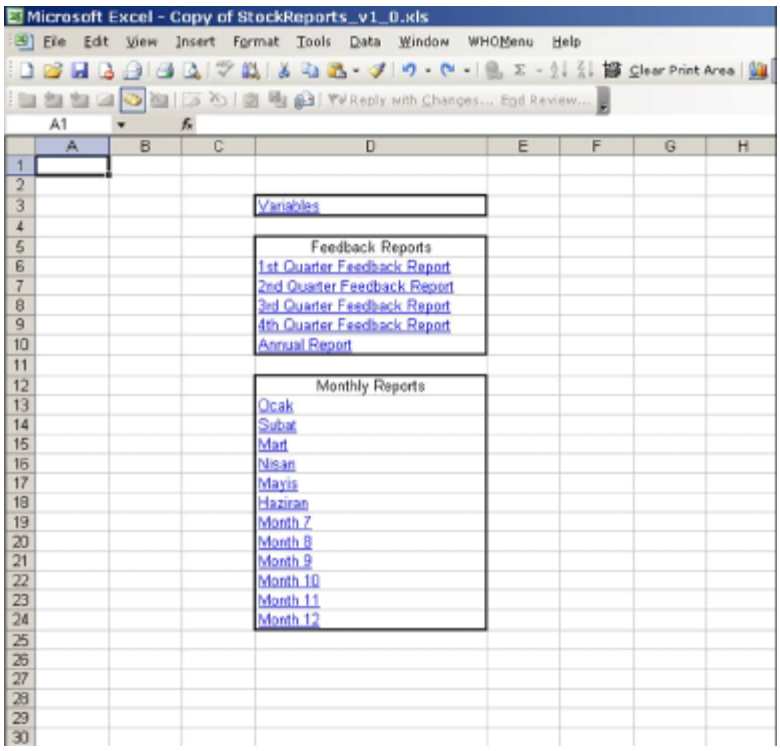


Translate Column Headings to local language if necessary.



8.4.2 Entering data from facility reports

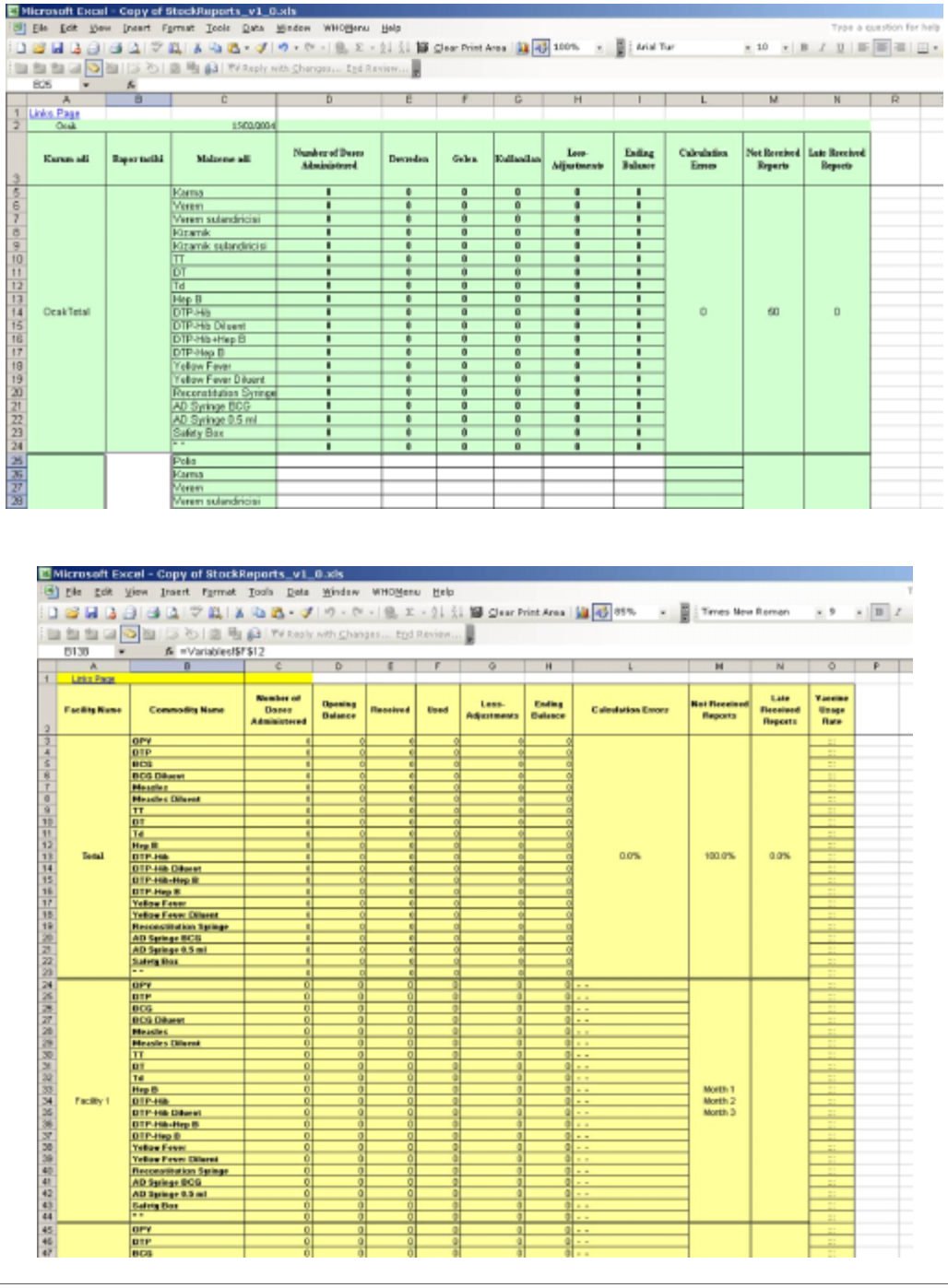
Open StockReports_v1_0.xls file. Select the links page. Click on the month you want to enter data.



When you go to the desired month, scroll down or up to find the reporting facility's name. Enter the date you received that report as the reporting date. If it is later then the deadline you will see the name of the month under column heading "late reported". Enter all other information (beginning balance, received, used, loss/adjustments and ending balance) as reported. You will see the name of the month under the heading "miscalculation" if there is a calculation error. Do not correct these errors without communicating with the reporting facility.

8.4.3 Preparing quarterly feedback reports

At the end of the each quarter, reports will be ready to print. You do not need to change or enter data in the quarterly reports. You can select a feedback report by clicking on the link in “Links” page. Then print the report.



9. References

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7. *Module 5: Stock management. GTN/VM Vaccine management training course.* Geneva: World Health Organization, 2004.
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The World Health Organization has managed cooperation with its Member States and provided technical support in the field of vaccine-preventable diseases since 1975. In 2003, the office carrying out this function was renamed the WHO Department of Immunization, Vaccines and Biologicals.

The Department's goal is the achievement of a world in which all people at risk are protected against vaccine-preventable diseases. Work towards this goal can be visualized as occurring along a continuum. The range of activities spans from research, development and evaluation of vaccines to implementation and evaluation of immunization programmes in countries.

WHO facilitates and coordinates research and development on new vaccines and immunization-related technologies for viral, bacterial and parasitic diseases. Existing life-saving vaccines are further improved and new vaccines targeted at public health crises, such as HIV/AIDS and SARS, are discovered and tested *(Initiative for Vaccine Research).*

The quality and safety of vaccines and other biological medicines is ensured through the development and establishment of global norms and standards *(Quality Assurance and Safety of Biologicals).*

The evaluation of the impact of vaccine-preventable diseases informs decisions to introduce new vaccines. Optimal strategies and activities for reducing morbidity and mortality through the use of vaccines are implemented *(Vaccine Assessment and Monitoring).*

Efforts are directed towards reducing financial and technical barriers to the introduction of new and established vaccines and immunization-related technologies *(Access to Technologies).*

Under the guidance of its Member States, WHO, in conjunction with outside world experts, develops and promotes policies and strategies to maximize the use and delivery of vaccines of public health importance. Countries are supported so that they acquire the technical and managerial skills, competence and infrastructure needed to achieve disease control and/or elimination and eradication objectives *(Expanded Programme on Immunization).*

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