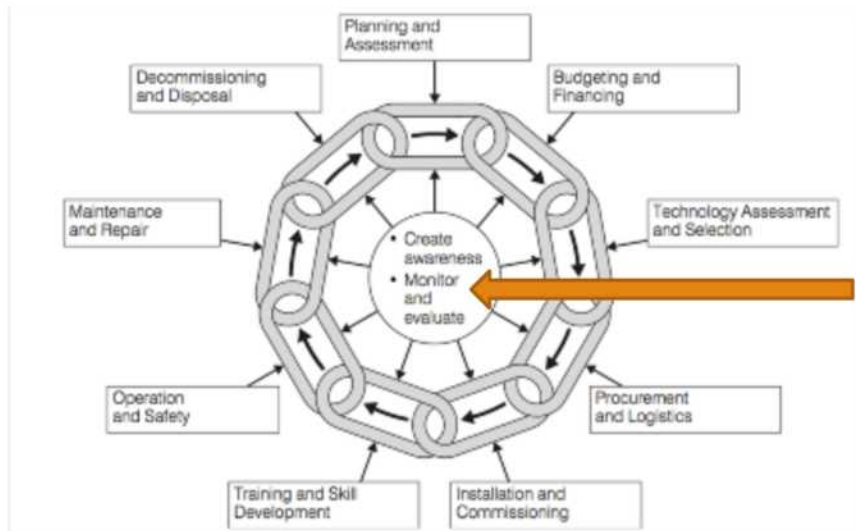


Conducting inventory

- Conduct inventory of medical equipment
- Update medical equipment inventory
- Identify service and training gaps in medical equipment
- Contact stakeholders on medical equipment inventory
- Use different inventory systems



Unit B 9.8 Conducting inventory of medical equipment
Module 279 09 B Medical Equipment Management and Maintenance

Inventory: the basis for equipment management

A guest who has never been to your home is coming to visit.

They call you, and they ask: How do I get there ?

What is the first question you ask ?



if you don't know where you are,
you will not get where you want
to be

Where are you ?

Inventory: intro

What is an Inventory?

A list of all things you own, plus their attributes; you can have separate inventories for e.g. equipment, tools, furniture; or have a large, combined list

What attributes ?

All attributes **that are relevant for the tasks** that need to be done; for example:

- serial and model number, installation date, year of manufacture
- functional status
- location, condition,
- value
-

Why do you need an Inventory?

To help you understand your situation (starting point, baseline data) and plan for the future; for example:

- identify upcoming shortages in equipment, consumables
- list required replacement equipment
- request next year's budget in equipment and related consumables

Based on an inventory, you can calculate rather than estimate/guess: fact-based management

Conduct inventory: Establishing Inventory Code Numbers

What is an Inventory Code Numbering System?

Inventory codes are numbers that the HTM Service uses to label each separate piece of equipment, so that individual machines can be identified from among many similar items.

It is important to be able to do this so that you could consider the maintenance history of *a specific suction pump, for example*, compared to the performance of all suction pumps in general.

Labelling: attaching an **inventory code number** to each piece of equipment



Inventory: labelling

Inventory Code Number Options	Advantages	Disadvantages
Basic Sequence Number 1,2,3, ... etc. A new item simply gets the next number	Ideal for computerized inventories (search number in computer database)	Not informative for visual inspection (without having the master list)
'Speaking' Numbers give info on e.g. location, type of equipment, etc. e.g. T1 199 02	from the code number you can identify the coded aspects (such as location, etc.)	List of meanings has to be agreed and understood by the whole organization. If the location changes, you have to change the numbering
Barcodes commercial barcode stickers are purchased which can be read by barcode readers. The info is then transferred to a computer. Software programming is required to link the barcode to equipment details	No need to write large sequences of numbers onto the equipment. This is a computer-based system	Looking at the barcode gives no info. You need a regular supply of barcode stickers/readers and a software program



Inventory: what attributes / data to record ?

Equipment inventory

- date inventory taken
- facility, department, location
- type of equipment
- inventory code number
- name of manufacturer
- model name and/or number
- manufacturers serial number
- year made or bought
- supplier bought from
- status/condition
- your property or leased
-

Service history file

- address of manufacturer,
- address of supplier and local representative
- technical ratings
- end-of-warranty date
- price paid
- any external funding agency involved
- stocks of consumables, accessories, spare parts received
- results of inspection tests during commissioning
- frequency of PPM required
- estimated value of the equipment
- details of any maintenance contract/contractor
- maintenance history
-

Financial data file

- running costs
-

The Equipment Inventory covers technical details and is restricted to items which the HTM maintenance staff will service and maintain throughout their lives

Inventories are linked via inventory code numbers !

Inventory: what attributes / data to record ?

It is efficient if the equipment inventory system is uniform across the health service organization.

If all facilities collect the same type of information, the data can be compiled to form an inventory for the whole country and can more easily be entered into a computer system using common software



put a code number on all equipment !
(sticker or marker pen, don't scratch)

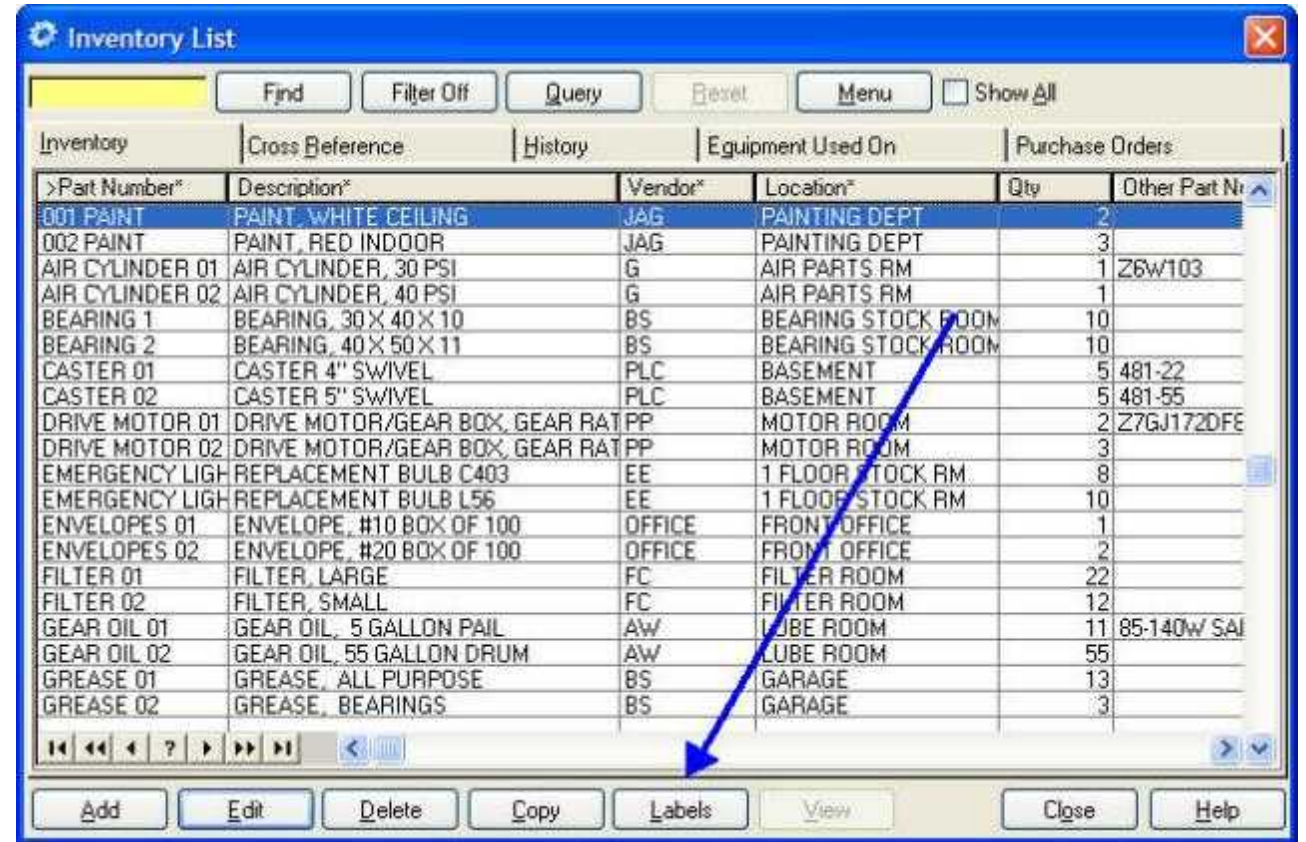
Equipment Inventory: initial

An initial inventory should take place, in which a team, including technical personnel, visits each department, physically checking each piece of equipment, and writing down all the details.

This is a large task, since every room, cupboard, drawer, worktop, shelf, and store room must be investigated.

Every piece of equipment is given an inventory code number.

New equipment arriving at the hospital must be allocated a code during the commissioning and acceptance testing process



>Part Number*	Description*	Vendor*	Location*	Qty	Other Part N°
001 PAINT	PAINT, WHITE CEILING	JAG	PAINTING DEPT	2	
002 PAINT	PAINT, RED INDOOR	JAG	PAINTING DEPT	3	
AIR CYLINDER 01	AIR CYLINDER, 30 PSI	G	AIR PARTS RM	1	Z6w103
AIR CYLINDER 02	AIR CYLINDER, 40 PSI	G	AIR PARTS RM	1	
BEARING 1	BEARING, 30 X 40 X 10	BS	BEARING STOCK ROOM	10	
BEARING 2	BEARING, 40 X 50 X 11	BS	BEARING STOCK ROOM	10	
CASTER 01	CASTER 4" SWIVEL	PLC	BASEMENT	5	481-22
CASTER 02	CASTER 5" SWIVEL	PLC	BASEMENT	5	481-55
DRIVE MOTOR 01	DRIVE MOTOR/GEAR BOX, GEAR RAT	PP	MOTOR ROOM	2	Z7GJ172DFE
DRIVE MOTOR 02	DRIVE MOTOR/GEAR BOX, GEAR RAT	PP	MOTOR ROOM	3	
EMERGENCY LIGH	REPLACEMENT BULB C403	EE	1 FLOOR STOCK RM	8	
EMERGENCY LIGH	REPLACEMENT BULB L56	EE	1 FLOOR STOCK RM	10	
ENVELOPES 01	ENVELOPE, #10 BOX OF 100	OFFICE	FRONT OFFICE	1	
ENVELOPES 02	ENVELOPE, #20 BOX OF 100	OFFICE	FRONT OFFICE	2	
FILTER 01	FILTER, LARGE	FC	FILTER ROOM	22	
FILTER 02	FILTER, SMALL	FC	FILTER ROOM	12	
GEAR OIL 01	GEAR OIL, 5 GALLON PAIL	AW	LUBE ROOM	11	85-140W SAI
GEAR OIL 02	GEAR OIL, 55 GALLON DRUM	AW	LUBE ROOM	55	
GREASE 01	GREASE, ALL PURPOSE	BS	GARAGE	13	
GREASE 02	GREASE, BEARINGS	BS	GARAGE	3	

Who is responsible for the equipment inventory ?

HTM team (central level)

- defines Equipment Inventory format and software tool/environment
- makes sure that staff is trained in use of the Equipment Inventory
- shares paper version with each facility and district
- analyses Equipment Inventory for planning purposes

HTM teams (local)

- collecting data (carrying out inventory), correcting, updating; supported by a user of each department
- uses the defined Equipment Inventory format
- keep (paper) copy of inventory, updated
- feed back any changes to central level HTM

Updating the inventory

An inventory is an active record , **it must be kept up-to-date** if it is to be of any use. Out of date Data is of little use for planning purposes

Update inventory data when:

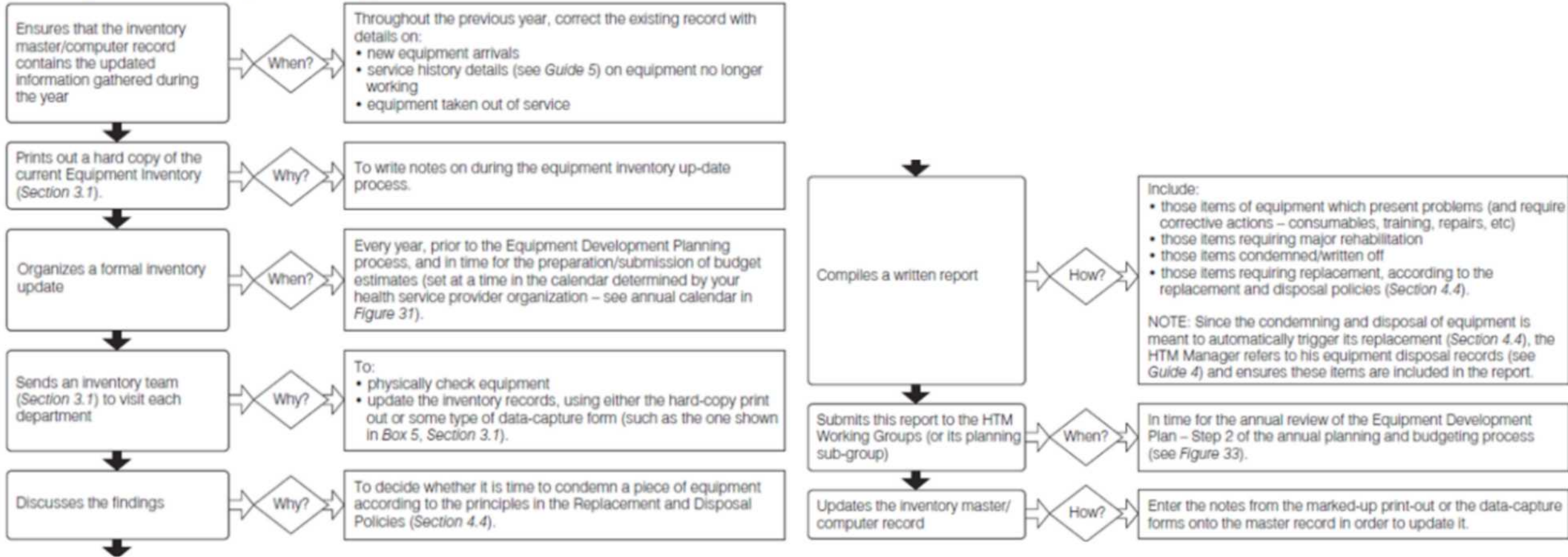
- When new equipment purchases and donations arrive: when the equipment is commissioned and the 'Acceptance Test Logsheet' is completed
- Whenever equipment is serviced or repaired throughout its life
- Whenever equipment is taken out of service
- Every year there should be a formal annual updating process

The HTM Teams should use the many opportunities during their work throughout the year to regularly gather data for updating the Equipment Inventory

Without a good equipment inventory, there can be no professional HTM service

Updating the inventory

HTM Manager and his/her Team (from a workshop):



Using the Inventory: Identifying service and training gaps

You can check the equipment log sheet to see the next service date

If you add up preventive maintenance requirements per equipment, you have a good estimate of the total time / manpower to execute this in a quarter/year and make a planning for the different persons who have to carry out the PPM.

You can see how many people have certain training requirements and you can plan those trainings

- update for new users
- update for new equipment

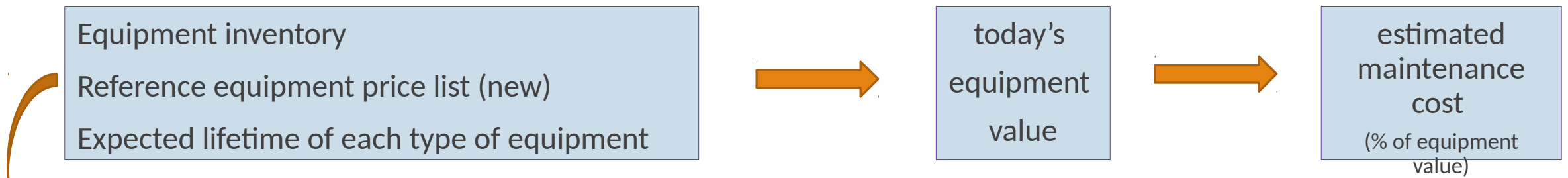
Using the inventory: evaluation of specific equipment

You can see which equipment breaks down often; estimate the cost of maintenance of this equipment and determine the time for replacement

You can see how much of your equipment is up and running a certain percentage of time and use this to measure the quality of the maintenance services.

Using the inventory: budgeting maintenance cost

What is the current value of your equipment ?



A Reference Equipment Price List is useful as you can look up the typical approximate prices for any type of equipment.

You can build it up locally:

- starting slowly with the prices of recent and known purchases
- building it up over time as you get further quotes
- researching current prices over time, for example on the internet

Using the inventory: depreciation and end-of-life estimates

example

Item	Years	Item	Years
Image intensifier	5	Nebulizer	
Immunodiffusion equipment	10	Pneumatic	10
IMX analyzer	7	Ultrasonic	10
Incubator, laboratory	10	Nephroscope	7
Inhalator	10	Neurological surgical table headrest	10
Intraarterial shaver	10	Neutron beam accelerator	8
Iontophoresis unit	8	Noninvasive CO2 monitor	7
Isodensitometer	7	Optical readers	5
Isolation chamber	12	Orthotron system	10
Isotope equipment	7	Orthourological instruments	10
Isotope scanner	7	Oscilloscope	7
Kiln	10	Oven	
K-pads	5	Paraffin	10
Kymograph	10	Sterilizing	10
Lamp		Oximeter	10
Deep-therapy	10	Oxygen analyzer	7
Infrared	10	Oxygen tank, motor, and truck	8
Mercury quartz	10	Pacemaker, cardiac (external)	5

depreciation
per year...

Using the inventory: budgeting depreciation and maintenance costs

today's
equipment
value

Example of Equipment stock
values for a 120-bed District
Hospital (in 2003)

Medical Equipment	US\$
X-ray machines (one suite, one mobile) and film processors	250,000
Anaesthetic machines with vaporizers, and anaesthetic ventilators (three theatres)	110,000
Laboratory equipment, assorted	120,000
Operating tables (one each for three operating theatre suites)	90,000
Operating lights (one each for three operating theatre suites)	50,000
Infant incubators (six)	40,000
Transport incubators (one)	15,000
Monitors (one each for three operating theatre suites)	60,000
Defibrillators (one)	20,000
Diathermy units (one each for three operating theatre suites)	45,000
Ultrasound scanner (one for maternity cases)	15,000
Beds (120) and hospital furniture	200,000
All other medium to low technology medical equipment and instruments	200,000

Using the inventory: budgeting depreciation and maintenance costs

Example of Equipment stock values for a 120-bed District Hospital (in 2003)

Plant	
Autoclaves (two large units)	25,000
Laundry equipment (one small set)	165,000
Incinerator (one)	70,000
Kitchen equipment (one small set)	45,000
Air-conditioning (10 individual units)	25,000
Mortuary (nine-body capacity)	20,000
Refrigeration (eight individual units, one cold room)	10,000
Electrical generator (one small set covering the whole facility)	50,000
Electrode boiler (one small set)	45,000
Water storage and treatment tanks	20,000
All other various plant items such as geysers, pumps, compressors	100,000
Assorted	
All other furniture and office equipment	250,000
Vehicles (three)	90,000
Communication equipment (telephones or radios)	10,000
Total	2,140,000
There will also be the buildings, and service installations such as the plumbing, sewage, and electrical distribution routes.	

Healthcare Technology Management: organizational terminology

Healthcare Technology Management Service (HTMS)

The organization that manages the equipment, including central, regional and facility levels

Healthcare Technology Management Team (HTM team)

Teams that carry out equipment management, either with or without the presence of a local workshop. This team is led by an **HTM Manager**.

HTM Working Group (HTMWG)

A committee – at each level - which regularly considers all equipment-related matters, and ensures decisions are made that are appropriate to the health system as a whole. It advises the Health Management Teams on all equipment issues; it prepares annual plans for equipment purchases and prioritizes expenditure across the facility/district as a whole. Its members could include the following:

- Head of medical/clinical services, Head of support services, Purchasing and supplies officer, Finance officer, Representatives from both medical equipment and plant maintenance, Representatives of equipment users from a variety of areas (medical/clinical, nursing, paramedical, support services, etc).

Identifying equipment planning stake holders

HTM (Equipment) Working Group holds major stake holders and may install sub-groups for specific tasks, e.g.

HTM WG	Equipment Inventory
general manager	
HTM manager	x
finance manager	
maintenance manager	x
purchasing manager	
nursing manager	
relevant users of equipment	x
Health Information Officer	x
Stores controller	



not regular members
of HTM WG

Different inventory systems

Paper record or **computerized**?

The inventory can consist of a manual paper record or a computerized file. It does not matter which, because the sort of data that you must record is the same whether you are designing the layout of a card or the fields on your computer screen.

The master copy of the Equipment Inventory can be stored on a computer, so that data manipulation and updating is easy. However, for daily referral to the inventory, hard copy print-outs can be used.



What is the status
in Zambia ?

Zambia Equipment Inventory Form

Equipment Inventory Checksheet (Hospitals)						Checked by :													
Facility Name :			Facility Code :			Day/Month /Year		Sheet of: / (e.g. 1/12)											
Department	Item (Equipment name)	Manufacture	Model	Serial No.	Country	Manufacturing Year	Commission Year	Manuals (Mark (x), if available.)		Condition (Mark (x) for applicable status.)					Frequency of usage			Temporary Inventory No.	
								Service Manual	Operation Manual	Working	Minor repairer	Major repairer	Not working	Uncommissioned	Everyday	Few times per week	Few times per month		Not used (Choose the reasons from the list in the instruction.)

Zambia Medical Equipment Management Guidelines September 2012

The Equipment Inventory has a single line per equipment item

Zambia Equipment Inventory Form

Equipment Inventory Checksheet (Hospitals)					Checked by :
Facility Name :			Facility Code :		
Department	Item (Equipment name)	Manufacture	Model	Serial No.	Country

Zambia Equipment Inventory Form

Day/Month/Year		Sheet of: / (e.g. 1/12)												
Manufacturing Year	Commission Year	Manuals (Mark (x), if available.)		Condition (Mark (x) for applicable status.)					Frequency of usage				Temporary Inventory No.	
		Service Manual	Operation Manual	Working	Minor repairer	Major repairer	Not working	Uncommissioned	Everyday	Few times per week	Few times per month	Not used (Choose the reasons from the list in the instruction.)		

Medical Equipment Development Plan

The Healthcare Vision can include an equipment development plan.

This is based on the equipment inventory.

It indicates for each (major) piece of equipment what its future / destination is.

The format (next sheet) is completed during the creation of the Vision.

Medical Equipment Development Plan

Name of facility :

Short term : 1-2 years

Date of draft :

Middle/long term : 3-5 years

No.	Information of Equipment							Technical team advice		Judgement by MEMC					
	Department/HC/HP	Equipment name	Manufacturer	Model	S/No.	Condition of equipment	Commissioning year (estimate)	Short term action	Middle term action	Short term action			Middle term action		
										Cost	Action decided by MEMC	Expected source of funds	Cost	Action decided by MEMC	Expected source of funds

END

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