

# Healthcare Waste Management Training Programme

## WELCOME

Please introduce yourself and what Ward or  
Department you work in

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# Overview of Programme

- Identify sources/examples of healthcare waste
- Recognise the hazards of healthcare waste
- Describe components of an effective occupational health and safety program
- Understand the principles and basic approaches for healthcare waste management and treatment
- Describe how to conduct a healthcare waste assessment in your facility
- Discuss how to develop plans for contingencies related to healthcare waste

# Environment Issues

- Environmental Pollution
  - Human well-being and health is closely linked with the health of the surrounding environment.
  - Any impact on the environment (eg., air, water, soil, biosphere) will have adverse effects on the health of individuals.
- Human health is dependent on the health of the environment

# Healthcare and Environment

- Healthcare facilities can impact on the environment from:
  - Resource use
  - Use of energy
  - Use of water
  - Disposal of wastewater/sewage
  - Waste management

# Waste Management Hierarchy



# Waste Management - Two Main Points

- Avoid/reduce as much as possible
- Manage correctly what you have

# **Healthcare Waste – Types and Sources**



# What is it

- Those wastes generated in healthcare facilities and other related sources
- Includes sharps, human tissue waste, laboratory waste, animal waste or any other waste arising from any source, as specified by an appropriate infection control officer
- Healthcare waste is that which has the potential to cause sharps injury or infection

# Sources

- Hospitals
- Clinics
- Laboratories
- Research activities
- Nursing homes
- Paramedic and ambulance services
- Animal research
- Blood banks
- Dental clinics
- Cosmetic piercing and tattooing
- Funeral services
- Home healthcare

# Healthcare Waste – Types and Sources

- Healthcare waste can be
  - Non-hazardous general wastes comparable to domestic waste (75-90% of healthcare waste in a health facility)
  - Potentially hazardous waste or waste that is associated with some health risks (10-25% of healthcare waste in a health facility)

***Healthcare waste is special in that it has a higher potential of infection and injury than any other type of waste.***

***Therefore, it has to be handled with sound and safe methods wherever generated.***

# Categories

- Sharps waste
- Infectious waste
- Pathological waste
- Pharmaceutical or cytotoxic waste
- Chemical waste
- Radioactive waste
- Non-hazardous/general waste

<b>Category</b>	<b>Examples</b>
<b>INFECTIOUS WASTE</b>	Laboratory cultures, waste from isolation wards, tissues (swabs), materials or equipment that have been in contact with infected persons, excreta.
<b>PATHOLOGICAL WASTE</b>	Body parts, blood, and other body fluids.
<b>SHARPS</b>	Needles, infusion sets, scalpels, blades, knives, broken glass, and broken plastic.
<b>PHARMACEUTICAL WASTE</b>	Pharmaceuticals that have expired or that are no longer needed, and bottles or boxes contaminated by or containing pharmaceuticals.
<b>CYTOTOXIC WASTE</b>	Waste containing cytotoxic drugs often used in cancer therapy, and waste containing genotoxic chemicals. Genotoxic waste is highly dangerous and may contain mutagenic, teratogenic, or carcinogenic properties.



## Discussion

- How does your facility manage the major categories of healthcare wastes (sharps, chemical, etc.)?

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# Hazards of Healthcare Waste

- Hazardous nature of healthcare waste may be due to one or more of the following characteristics:
  - It contains **infectious** agents
  - It contains **needles and other sharps**
  - It contains **cytotoxic** medication
  - It contains **toxic** or **hazardous** chemicals or pharmaceuticals
  - It is **radioactive**



# Risks

- Occupational – injuries
- Public – reuse of syringes
- Environment
  - Air emissions, water contamination
- Potential health effects
  - AIDS / Hepatitis (B & C)
  - Gastroenteritis / Respiratory / Blood stream / Skin infections
  - Effects of chemicals & radioactive wastes





## Discussion

- What are some of the ways in which we should manage hazards from healthcare waste?

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# Hazards of most concern

- Sharps
- Infectious waste
  - Why
    - Potential for spread by aerosol and contact
    - Tuberculosis spread in USA
- Need to be concerned about new/emerging diseases
  - By time of diagnosis – exposure and spread
  - Limited diagnostic tests
  - Lack of effective treatments

# Planning and Management

# Waste Management

- Waste management programs should provide a minimum standard for safe and efficient disposal of waste
- Each Health Care Facility should have a Waste Management Policy and Plan

# Waste Management Officer

## Duties

- Control internal waste collection
- Ensure correct storage
- Coordinate disposal operations
- Monitor on-site and off-site transportation of waste
- Liaise with department heads to ensure training is carried out
- Monitor waste generation, disposal, costs and public health aspects (e.g. injuries) of waste

# Waste Management Committee

- Assess present situation and carry out a waste survey
- Identify opportunities for minimization, reuse and recycling
- Identify handling, treatment and disposal options
- Evaluate options
- Prepare a management plan
- Establish a record keeping system
- Estimate related costs
- Prepare training program
- Prepare implementation strategy

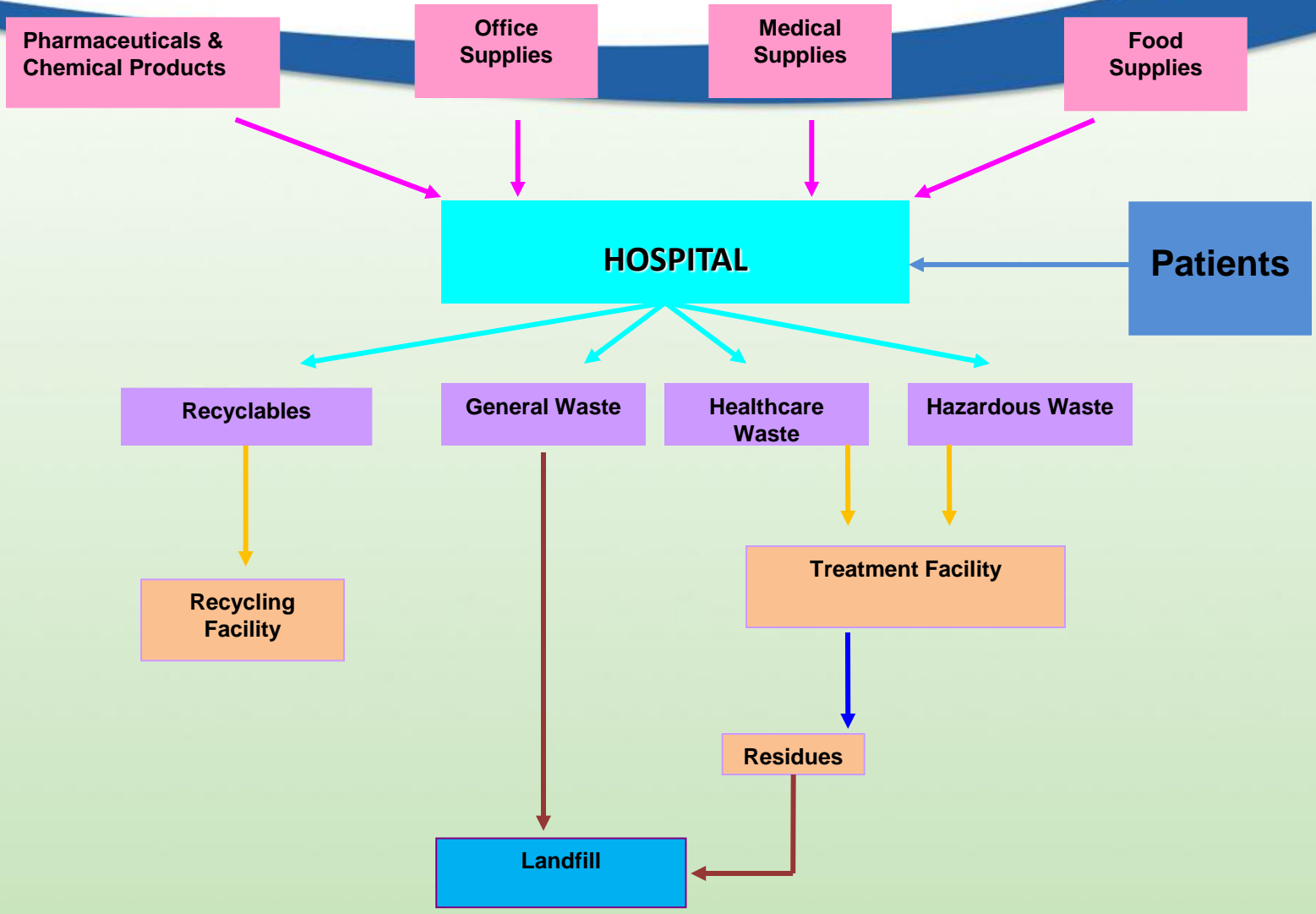


# Waste Management Controls

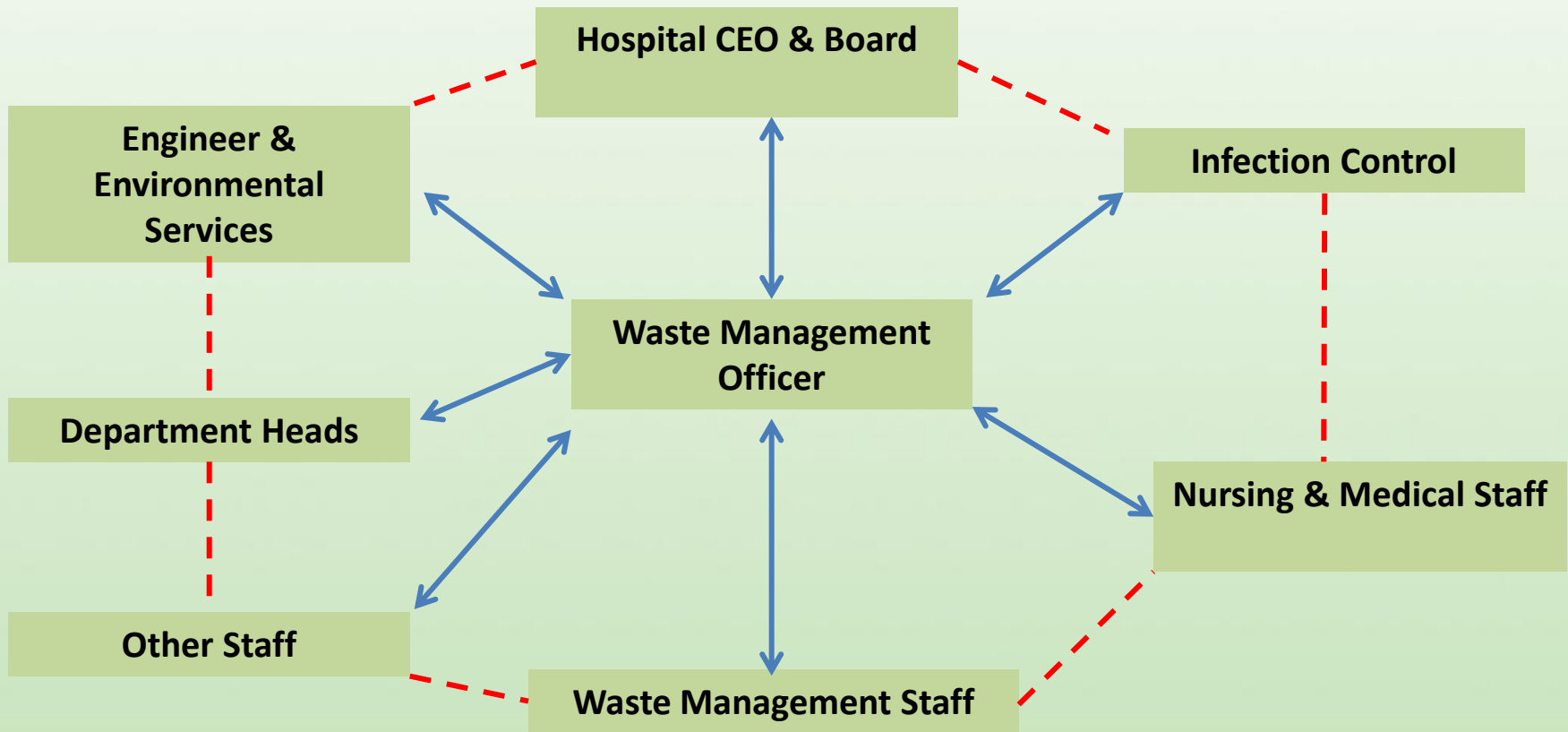
- Who/What can control how wastes are managed?
  - Legislation
  - Government policies
  - Codes of practice
  - Hospital procedures
  - Waste management plans



<p>Environmental Management Act 2005</p>	<p>Part 5 of the Environmental Management Act 2005 sets out the framework for Waste Management and Pollution Control in the Fiji Islands.</p>
<p>Environmental Management (Waste Disposal and Recycling) (Amendment) Regulations 2011</p>	<p>The purpose is to prevent environmental pollution by controlling the discharge and disposal of solid wastes, air emissions, and hazardous substances. It also prescribes permitting conditions for landfills</p>
<p>National Solid Waste Management Strategy 2011 - 2014</p>	<p>Key objectives of this strategy:</p> <ul style="list-style-type: none"> <li>▪ reduces the amount of waste that each community generates</li> <li>▪ make best use of the waste that is generated</li> <li>▪ improve and upgrade existing waste management and disposal systems</li> <li>▪ encourage /provide waste management practices, which minimise the environmental risk and harm to human health</li> </ul>
<p>Public Health Act 2005</p>	<p>Requires persons engaged in carrying or removing garbage to apply for a permit from the local authority</p> <ul style="list-style-type: none"> <li>- Allows local authorities to formulate bylaws in respect of the storage, collection and disposal of garbage</li> <li>- Regulates (i.e., garbage dumps, and incineration of garbage or refuse)</li> <li>- Health Care management Policy and Guidelines</li> </ul>



# Management Structure



# Management Needs ....

- Universal acceptance of guidelines on healthcare waste management (including definitions);
- Correct classification of all hospital wastes;
- Appropriate treatment facilities; and
- Significant efforts to reduce the actual quantity of wastes generated.

# Effective management

- Clear definition based on facts
- Appropriate segregation
- No manual handling
- Appropriate storage and handling
- Appropriate transport
- Appropriate treatment and disposal
  - If waste is not released from containers, and there are no emissions, then risks to the environment and human health are low

# Management

- Must include detailed requirements for:
  - Education
  - Segregation
  - Containers
  - PPE
  - Spill management
  - Transport
  - Treatment



## Discussion

- What do you consider as the most important aspects when creating an effective healthcare waste management plan?
- What are some of the essential steps that need to be taken for implementing a waste management plan?
- What are some of the obstacles to successful implementation of a WMP that you see in your facility?



# Training Programs

- HCWM cannot be effective unless it is applied carefully, consistently, and universally
- Training must be tailored towards the audience
- Training is critical for a HCWM program to be successful
- This will ensure acceptance of the program



# Suggested Topics

- Definitions, Sources and Characteristics of Healthcare Waste
- Health and Environmental Impacts of Healthcare Waste
- Health and Safety
- Classification and Segregation of Healthcare Waste
- Healthcare Waste Minimization
- Healthcare Waste Handling and Collection
- On-Site and Off-Site Transport and Storage of Healthcare Waste
- Treatment and Disposal of Healthcare Waste
- Management of Specific Wastes Streams
- Contingency Planning & Emergency Response to Healthcare Waste Spills
- Hospital Hygiene, Infection Control and Healthcare Waste

# Education

- All staff involved
  - All hospital personnel
  - Medical doctors, nurses, laboratory staff, other health professionals, cleaning staff, ward staff, waste handlers, administrative / clerical staff, hospital volunteers
- Relevant to wastes generated
- Use of aids such as posters
- Provide feedback on progress
- Provide update sessions

# Frequency

- Induction programs for new employees
- Orientation for existing employees with new responsibilities
- Update knowledge in line with policy changes
- Periodic refresher training

# Internal Management

- Containers
  - No manual handling once waste placed in bin
  - Disposable/reusable sharps containers
- Colour coding
- Signage



# External Management

- Transport
  - Appropriate vehicles
- Storage
  - Meets standards of security and preventing environmental impacts
- Treatment
- Disposal
- Responsibility is with generator to ensure requirements are met – due diligence

# Waste Segregation

Waste segregation is the practice of classifying waste and placing it into the appropriate waste container immediately after the waste is generated







# Why Segregate

- To reduce the amount of waste that must be treated as hazardous waste
- To reduce the risks of exposure to hazardous healthcare waste for workers
- To lower the cost of treatment and disposal of healthcare waste
- To make possible the recycling of non-hazardous general waste

# Common Waste Segregation in Hospitals

- Healthcare/Infectious (incl. Sharps Containers) - *hazardous*
- Cytotoxic - *hazardous*
- Pharmaceutical - *hazardous*
- Chemical - *hazardous*
- Radioactive - *hazardous*
- Organic
- Liquid
- Recyclable Products
- General Waste



Waste Classification	Colour		Symbol
Healthcare/Infectious	Yellow		
Sharps	Yellow		
Cytotoxic	Purple		
Radioactive	Red		
General	Black	Green	None

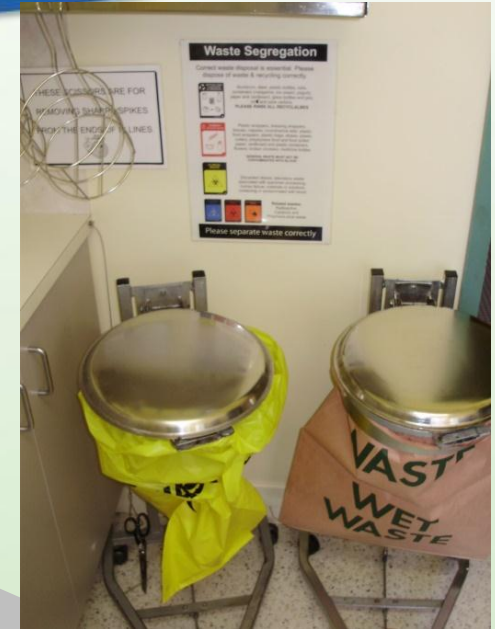
# Management

- Sharps
  - The opening should be wide enough to allow sharps to be dropped into the container by a single hand operation
  - Never be over filled
  - Containers  $\frac{3}{4}$  full, sealed and check for protrusions
  - Be securely sealed with a lid before disposal
  - Placement! Children should not be able to access sharps containers
- Cytotoxic waste
  - Procedures, Containers, PPE

# Containers

- Sharp waste should be collected when the container is  $\frac{3}{4}$  filled
- Ideally infectious waste containers are those that have
  - Lids that remain closed except when waste is discarded
  - Pedal-operated devices to open the lids
  - Color-coded bags inside the containers

# Types of Containers





# Placement





# Discussion

## Overfilling sharps containers

- Why does this happen?
- How can it be prevented?



# Signage

- Visual aid to encourage and remind about correct segregation





# Containers and Signage



# Collection

- Establish a routine program for collection
- Collect ward waste daily
- Waste bags should be sealed
- All containers and bags should be labeled
- Full containers should be immediately replaced with empty containers or bags

# Internal Transport

- Dedicated trolleys
  - Not used for other purposes
  - Contain spills
- Minimise transport when staff, patients visitors present
- Don't temporary store waste near clean materials or food
- Use correct PPE





# Storage

- Hard floor
- Good drainage
- Easy to clean
- Secure and lockable (can be a container)
- Good lighting and ventilation
- Proofed against rodents, insects and birds
- Recommended storage times
  - 24 hours in hot season – 48 hours in cool season



# Storage



# Transport







# **Hospital Inspection**

# Hospital Inspection

Look at:

- Types of waste generated
- Containers
- Signage
- Correct segregation
- OHS issues
- Storage
- Treatment

## Note ....

- Observe waste segregation practices.
- Are the bins properly color-coded or marked?
- Look into open bins and note the contents.
- Are bins overflowing or are they no more than 3/4 full?
- Are there enough bins in the ward/department?
- Are the bins or combination of bins in the right locations?
- What is the general condition of the bins?
- Think of suggestions for improvement.

# Storage

Evaluate:

- Waste storage area
- Location, surroundings, access
- Overall cleanliness
- Marking, signs
- Cleaning and disinfection
- Think of suggestions for improvement.



## Discussion

- ✓ What did you notice
- ✓ Specific issues
- ✓ Solutions

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**What are the issues with these photos?**



# **Infection Control and OHS Issues**



# Standard Precautions

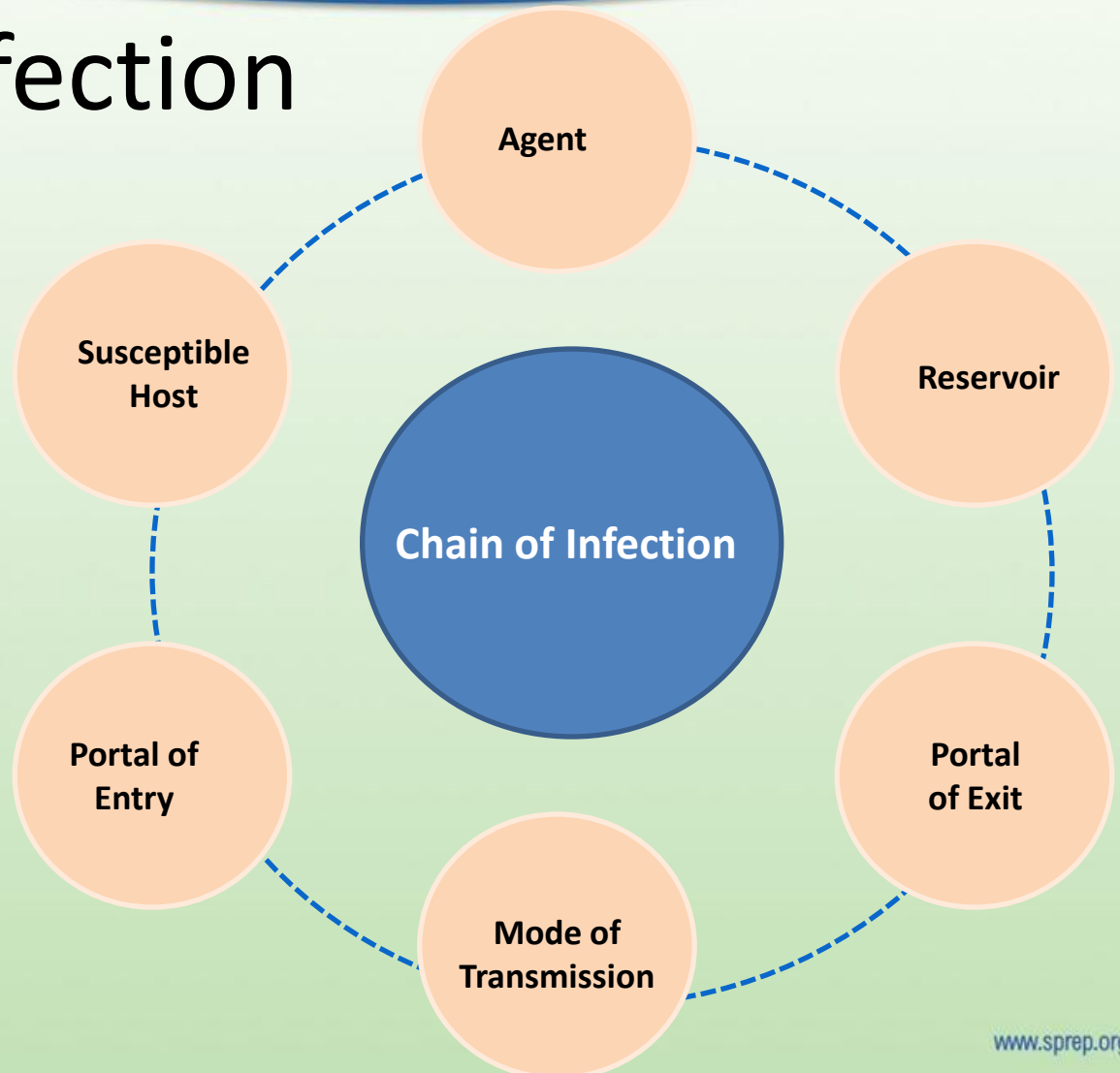
Basic level of infection control to be used in the care of all patients

- Key components
  - Hand hygiene
  - Use of PPE (gloves, face protection, gown)
  - Safe injection practices
  - Respiratory hygiene and cough etiquette
  - Safe handling of contaminated equipment and surfaces in the patient environment
  - Environmental cleaning
  - Handling and processing of used linens
  - Proper waste management

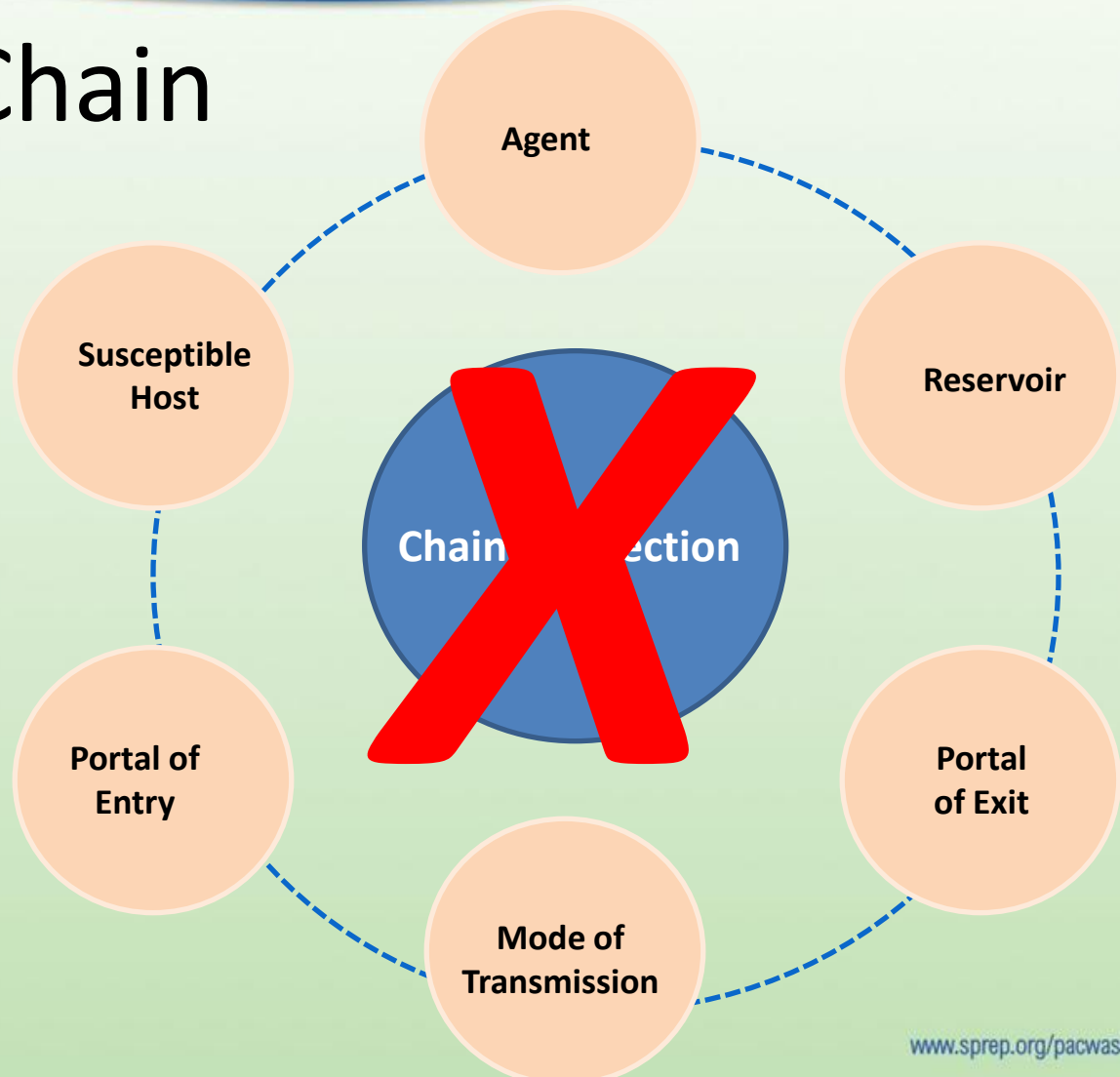
# Infection Control Program

- Role of the Infection Control Committee
- Annual work program of activities for surveillance and prevention
- Periodic review of epidemiological surveillance data and identification of areas for intervention
- Review of risks of new technologies, devices, and products
- Review of antibiotic use and antibiotic resistance
- Promotion of improved practices
- Provision of staff training in infection control and prevention
- **Integration of healthcare waste management**
- Response to outbreaks

# Chain of Infection



# Breaking the Chain



## Discussion



- What are the main hazards associated with healthcare wastes?
- What should we be concerned about?
- What are the ways in which we can manage these hazards?

# Goal

To promote health care worker safety in the healthcare environment through appropriate use of:

- Safe work practices
- Management
- Proper use of PPE.

# Infections from needlestick and sharps injuries

- HIV
- Hepatitis
- Tuberculosis
- Staphylococcus aureus
- Diphtheria
- Ebola fever



# World wide experts estimate sharps injuries cause:

Affect HCWs each year

- 66,000 HBV
- 6,000 HCV
- About 5000 HIV

Source: In SafeHands network (June 2008)

Web: <http://www.uow.edu.au/health/safehands/index.html>

# PPE

- Stands for Personal Protective Equipment
- Acts as a physical barrier to contamination or infection



# Choice of PPE

- What pathogen?
- Route of Infection
- Risk of Infection
- Degree of Contamination
- Proximity to source
- Type of Task
- Environment – inside or outside, climate
- Cost
- Comfort and fit – putting on and taking off
- Social issues
- Discarding PPE

# Types of PPE

- Gloves
- Gowns/aprons
- Masks and respirators
  - Mask protect from droplet infectious agents
  - Respirators protect respiratory tract from airborne infectious agents
- Goggles
- Face shields

# PPE



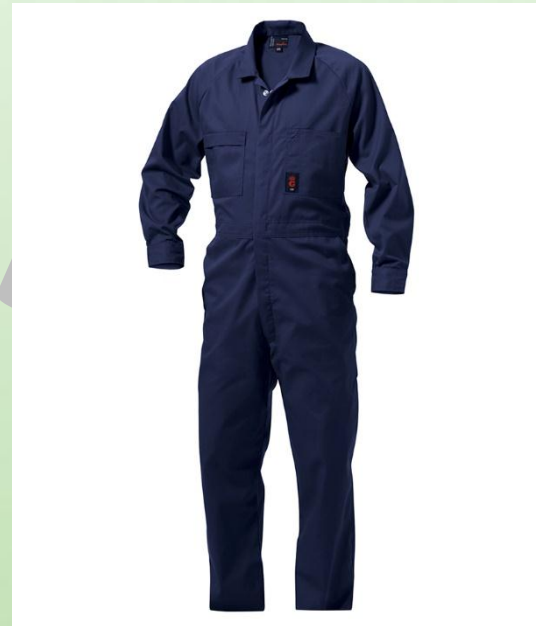


# PPE





# PPE



# Occupational Exposures

- Sharps injury needlestick, suture needle, cut with a sharp medical object or device eg scalpel, glass slide, burr, dental equipment
- Mucous membrane exposure mouth, eye, nose
- Contact with non intact skin dermatitis, eczema, acne, cuts

# First Aid

- Blood or body substance exposure to intact skin:
  - Wash well with soap and water
- Blood or body substance exposure to non-intake skin:
  - Wash the area well with soap and water – do not use strong detergent
  - Allow wound to bleed a little
  - Report the incident

# First Aid

- Blood or body substance exposure to eye:
  - Irrigate eye thoroughly with normal saline or water
  - Evert lids for optimal cleansing
  - If wearing contact lenses, irrigate eye, then remove contact lenses and clean in the usual manner
- Blood or body substance exposure to mouth:
  - Spit out the substance, rinse mouth several times with normal saline or water and spit out.
- Blood or body substance exposure to nose or ear:
  - Rinse thoroughly with normal saline or water

***ALWAYS REPORT INCIDENTS!***



# **Contingency Planning and Spill Response**

# Contingency Planning - Issues

- Contingencies related to waste handling
- Lack of color-coded bags, bins or sharps containers
- Lack of PPE (gloves, face masks, etc.)
- Overfilled storage; lack of capacity
- Contingencies related to waste treatment/disposal
- Downtime due to maintenance or repair of treatment technology or lack of spare parts
- Temporary closure of the landfill



# Contingency Planning - Issues

- Contingencies related to spills
  - Spills of blood, breakage or leaks of infectious waste bags or containers, spills of chemicals (e.g., chemicals or pharmaceuticals)
- Contingencies related to labor
  - Lack of human resources, impact of illness among waste workers or waste collectors
- Exposure incidents
  - Needle-stick injuries, exposure to blood splashes, exposure to pathogenic aerosols from infectious waste, acid burns

# Planning

- Identify events or scenarios that could disrupt the normal function of healthcare waste management in the facility
- Assess the likelihood of those events or scenarios and the risks they pose
- Prioritize the contingencies based on their probabilities and risk impact
- Prepare contingency plans

# Spill Management

- Ensure all personnel are kept away
- Cleaning process:
  - Staff wear protective equipment
  - Contain the spill
  - Neutralise by applying disinfectant or other material depending on waste type
  - Collect – careful not to disperse
  - Containerise
  - Send for treatment

# Spill Management

## Small spills

- Can be handled by a small group of trained employees and when spills are not immediately hazardous

## Large spills

- Remove personnel from immediate danger and bring in properly trained first responders to clean spill up

# Spill Management

- To reduce the number of employees at risk of exposure:
  - Restrict access to the spill area
  - Provide warnings of hazards and advice about special requirements
  - Ensure staff is trained to respond to these spills
- You may clean up small spills if you:
  - Have the supplies to absorb and bag the spilled material
  - Are familiar with the properties of the spilled material
  - Have the proper personal protective equipment
  - Are trained to respond to a biohazard spill

# Spill Management

- Cover spilled area with absorbent pad or paper towels
- Decontamination - use bleach, diluted to 1:10 with water:
  - to decontaminate the spill area
  - to clean/decontaminate equipment used in spill response
  - pour diluted bleach over towels, let stand for 30 minutes





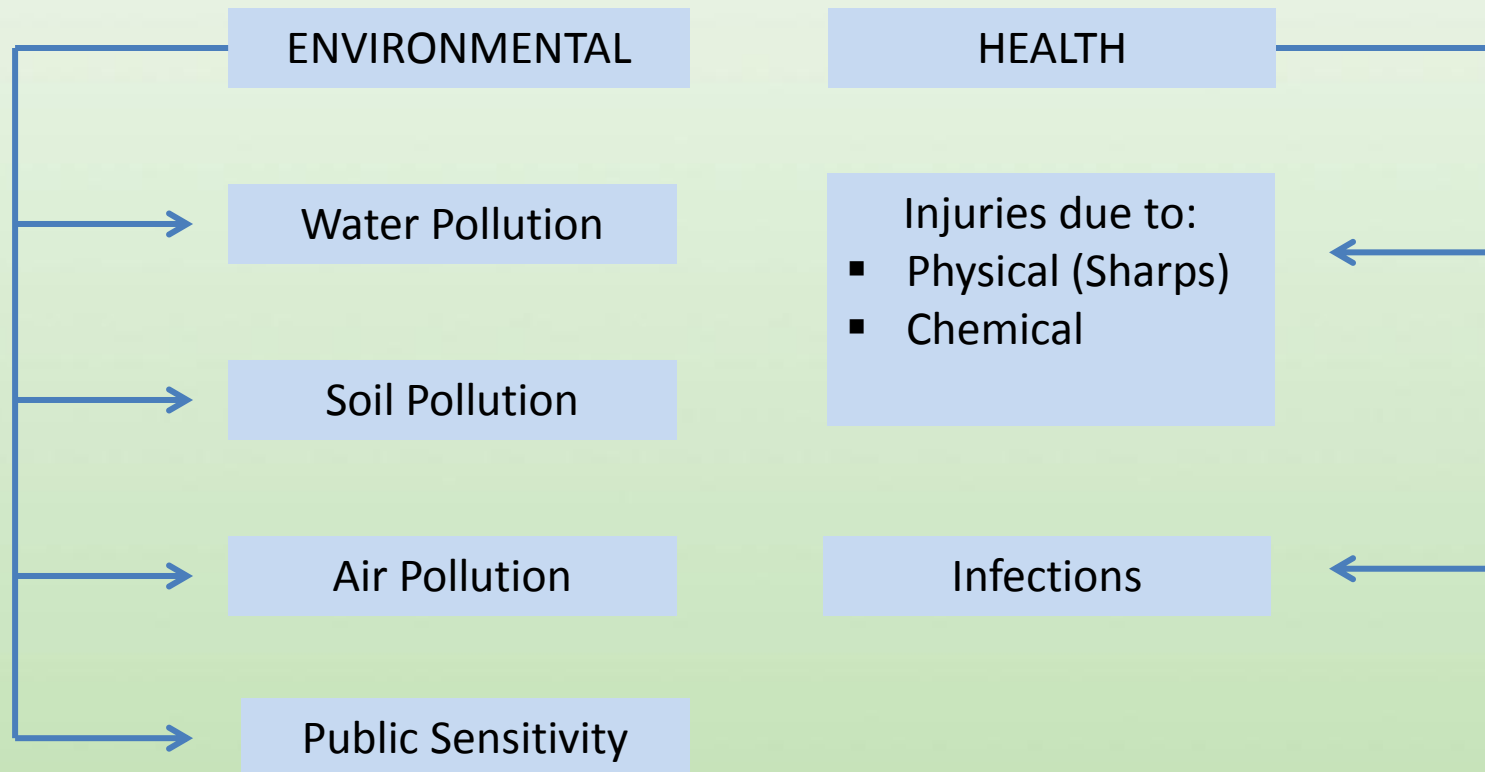
# Waste Treatment

# Treatment Objectives

Limit public health and environment impacts by

- transforming the waste into non-hazardous residues by treatment
- containing the waste/ residues to avoid human exposure
- containing the waste/ residues to avoid dispersion into the environment.

# Effects of Improper Disposal



# Processes

Five basic processes are used for the treatment of hazardous healthcare wastes, particularly sharps, infectious and pathological waste:

- Thermal
- Chemical
- Irradiation
- Biological
- Mechanical (used to supplement the other processes)

# Incineration

- High temperature (200°C to 1000°C), dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter, resulting in a significant decrease in overall waste volume
- Organic matter is chemically and physically broken down mainly through the process of combustion

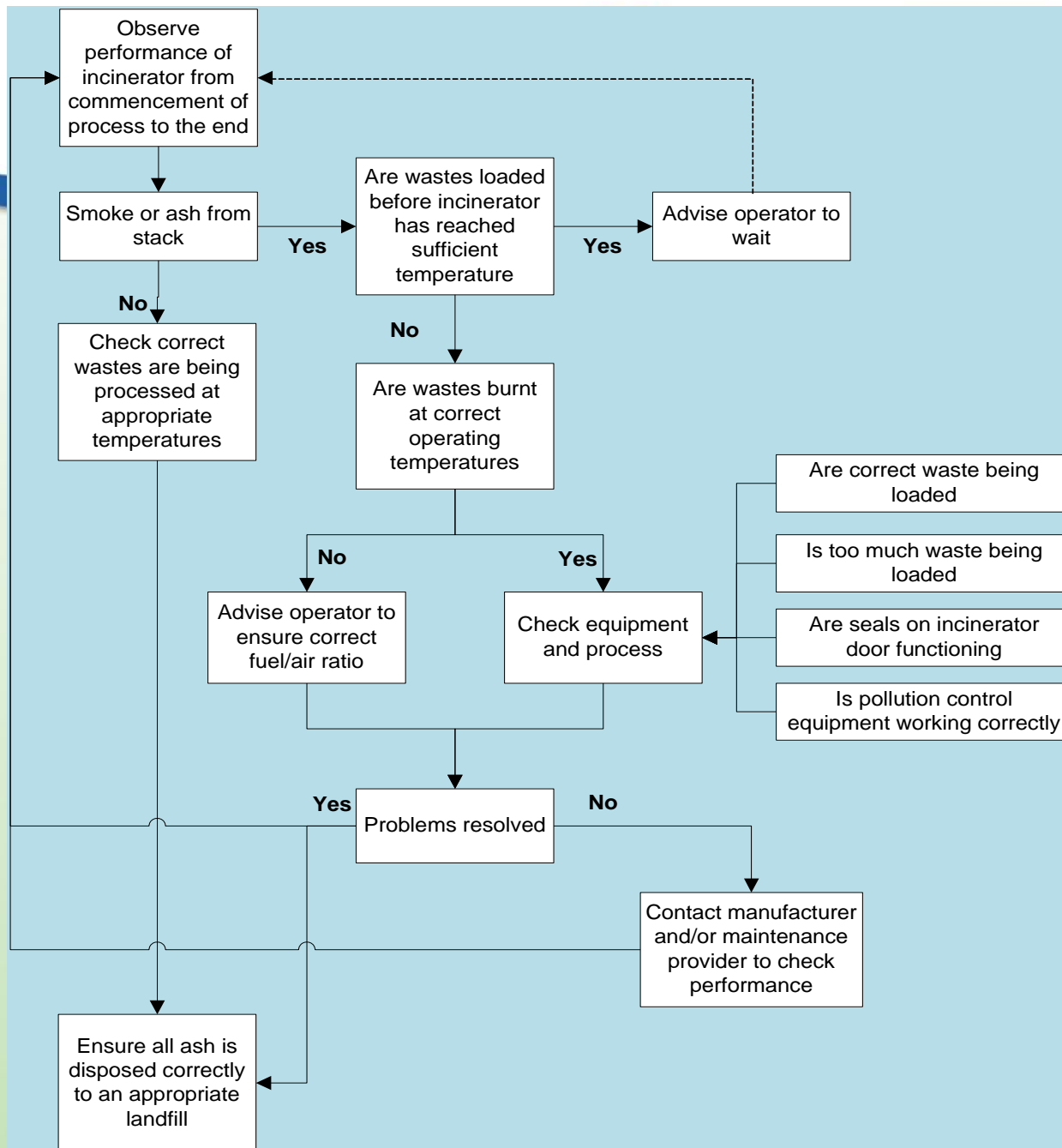




# Operation

## General operational procedures

- Waste charging
- Segregation of inappropriate wastes
- Combustion
- Air pollution control
- Ash removal



# Disposal of Residues

- Landfill disposal
  - Leachate management
  - Disposed of in a pre-prepared pit
- Waste inert/pathogen free
- Covered immediately
- No scavenging



## Discussion

- What are some public health and environmental impacts of mismanaged healthcare wastes, both within and beyond the facility?
- How might people outside of the immediate healthcare setting be exposed to healthcare waste hazards?



# Implementation

# Implementation – Walk Through

- Note what you would change
- When would you make the changes
- Where would you get the resources
- What else should be undertaken





# Implementation Discussion

- Where there any issues
- Would you do anything different
- What other resources would you need

# Monitoring and Auditing

## 2 key questions

1. Where is the organisation at – what is the waste management system and components.....
1. Where does the organisation want to be? – what are there objectives/targets. What do they actually want to achieve? Compliance? Cost reduction? Waste reduction? .....

# Waste Assessment Process

- Need to determine types, quantities and source of wastes
- Need to be aware of hazards with the waste
- Measure by visual assessments
  - Correct segregation
  - Volumes being generated
- Data compared to develop benchmarks
- Information used to guide waste management strategy
- Continual to ensure compliance

# When to conduct

- Regularly – weekly/monthly
- Ward handover meetings
- When policies or legislation change
- New wards
- Any changes
- To check on identified issues

# Purpose of Site Analysis

- Identify key waste issues – identify the “low fruit”
- Inspect waste management systems – are they working effectively? Are they suited to the waste/client? Issues of contamination/leakage?
- Review other issues eg., signage / litter
- Identify any barriers that may impact on change ie space
- Note potential sources of waste generation – not all waste will be visible



# Visual Inspections

Look for:

- Items being discarded in significant volume
- Costly/unused/valued items being discarded
- Contamination of streams and leakage ie recyclables in general waste
- Housekeeping – waste on floor/near drains
- Variations in waste stream between departments/shifts
- Opportunities to divert/reduce

# Items in the Waste Stream

***Always assume that all waste bags or containers may contain hazardous materials***

***NEVER PLACE HANDS INTO A WASTE/RECYCLING CONTAINER.***

***Never try to move a waste container***

# Issues

Correct segregation



# Site Analysis







## Discussion

- Develop a plan to conduct a waste assessment
- Why would you have a plan?
- What are the sections of this plan?

# Finding The Right Answer

- A sustainable and effective Waste Management Plan is dependent on identifying the right solutions
  - What is really causing the waste to be generated?
  - What is really leading to contamination/leakage of the recycling system?





# Conclusion

# Effective Waste Management

## Requires

- |   |  |
|---|--|
| <ul style="list-style-type: none"><li>• <b>Effective leadership</b></li><li>• <b>Policy and objectives</b></li><li>• <b>Management of change</b></li><li>• <b>Communication</b></li><li>• <b>Organisation</b></li></ul> | <ul style="list-style-type: none"><li>• <b>Resources</b></li><li>• <b>Employee involvement</b></li><li>• <b>Implementation</b></li><li>• <b>Monitoring</b></li><li>• <b>Review - Improvement</b></li></ul> |
|---|--|

# Best-Practice Management

- Generator responsibility
- Education programs
- Correct segregation
  - Containerisation – colour coding
  - No manual handling
- PPE
- Trolleys

# Best-Practice Management

- Storage
- Treatment must manage appropriate wastes
  - Incineration for: anatomical, pharmaceutical and cytotoxic
- Contingency planning
- Waste audit program

# Remember

- Responsibility does not cease at the point of generation
- Other people beyond your staff have to manage the wastes so systems must ensure that they are safe
- The more variable the management systems, the more likely the mistakes
- Management does not have to be complicated