320 MBIO
Microbial Diagnosis

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❖ What are Microbes ?

- Microbes are creatures that are not directly visible to the eye.
- Viruses , bacteria, fungi, protozoa and some algae are all in this category.
- All with the exception of plants and animals.

❖ Distribution of microorganisms

- Air
- Soil
- Water
- Animals
- Human body.

Microorganisms and Human Beings

Beneficial activities

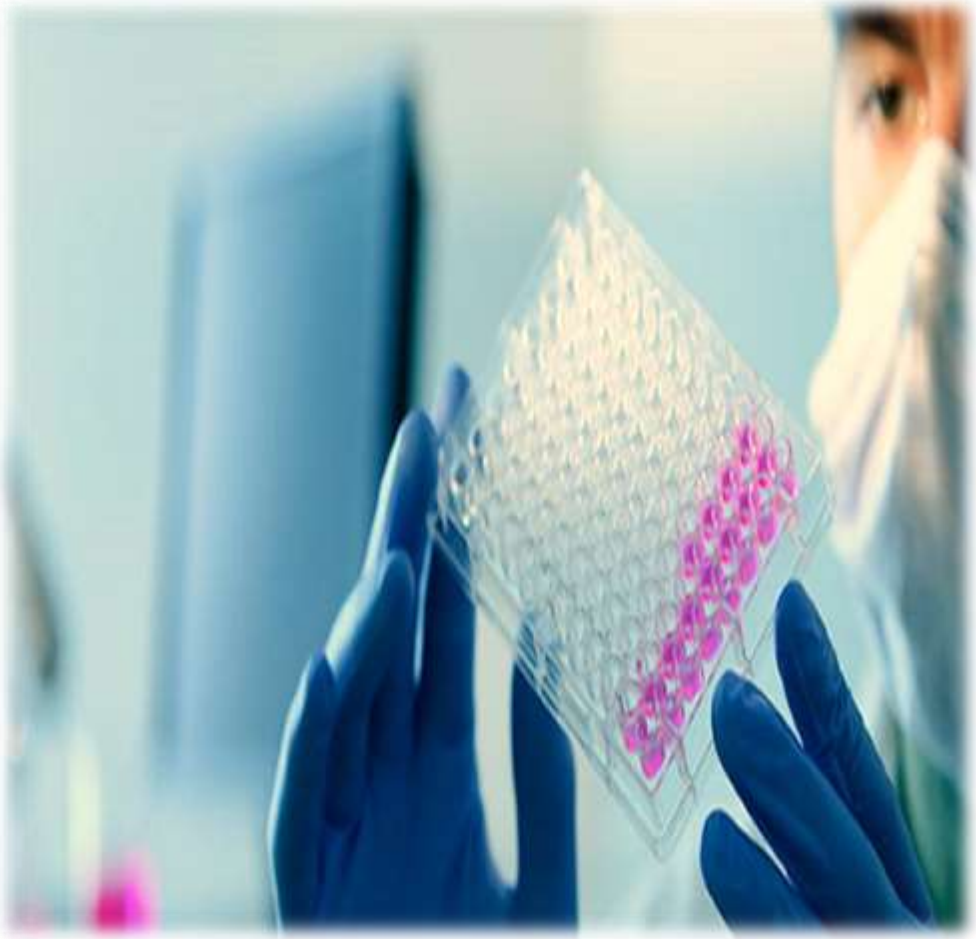
Most microbes are of benefit to human beings, some are necessary(nitrogen, carbon cycles, etc.)

Harmful activities

A portion of microbes cause diseases and are poisonous to human, and these are really that concern us in the study of medical microbiology, etc.

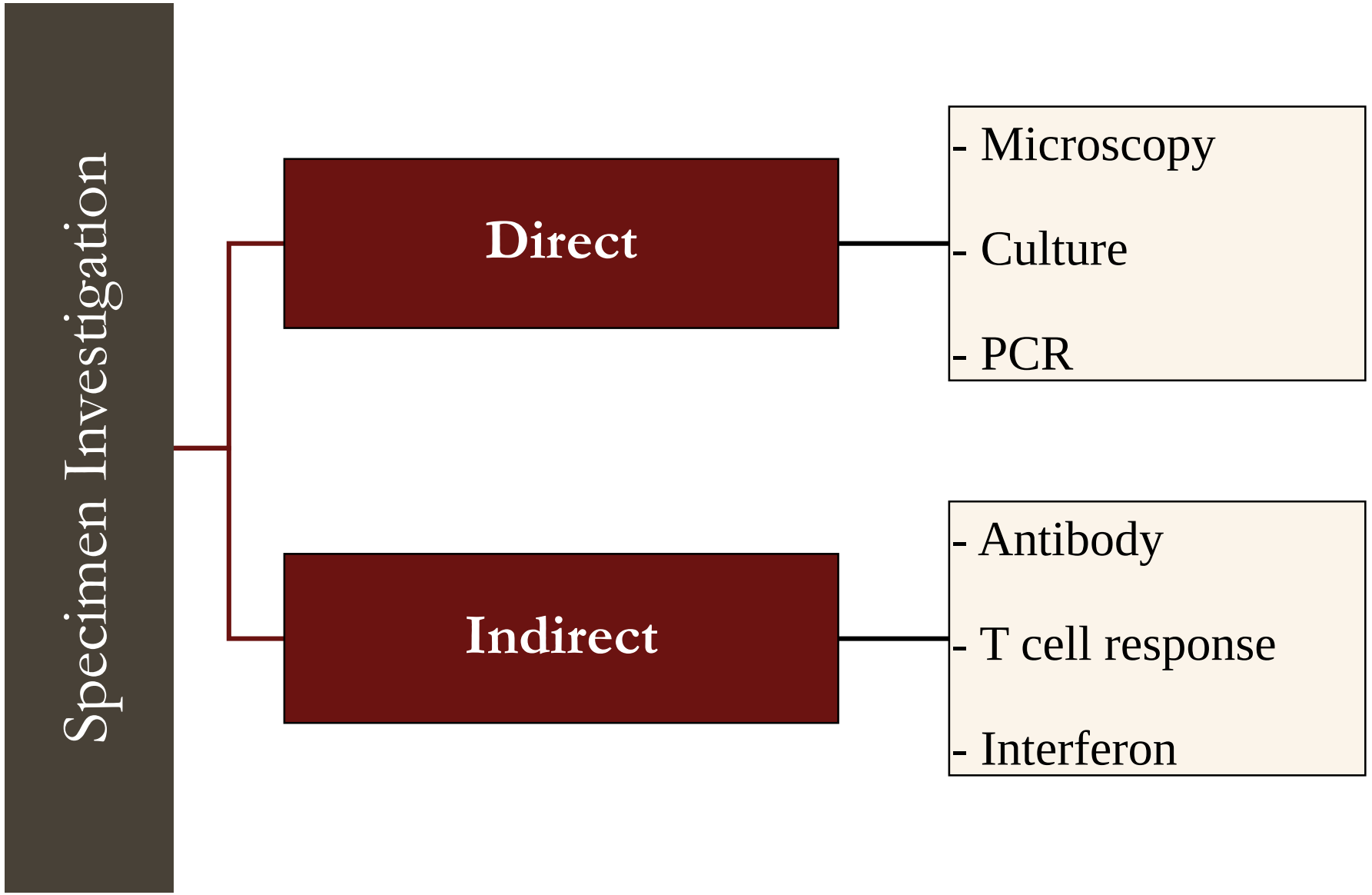
❖ Clinical Diagnostic Microbiology

- All aspects of infection
- Initial isolation/diagnosis
- Treatment
- Infection control
- Surveillance (Infection, Antimicrobial)
- Clinical management
- Public health



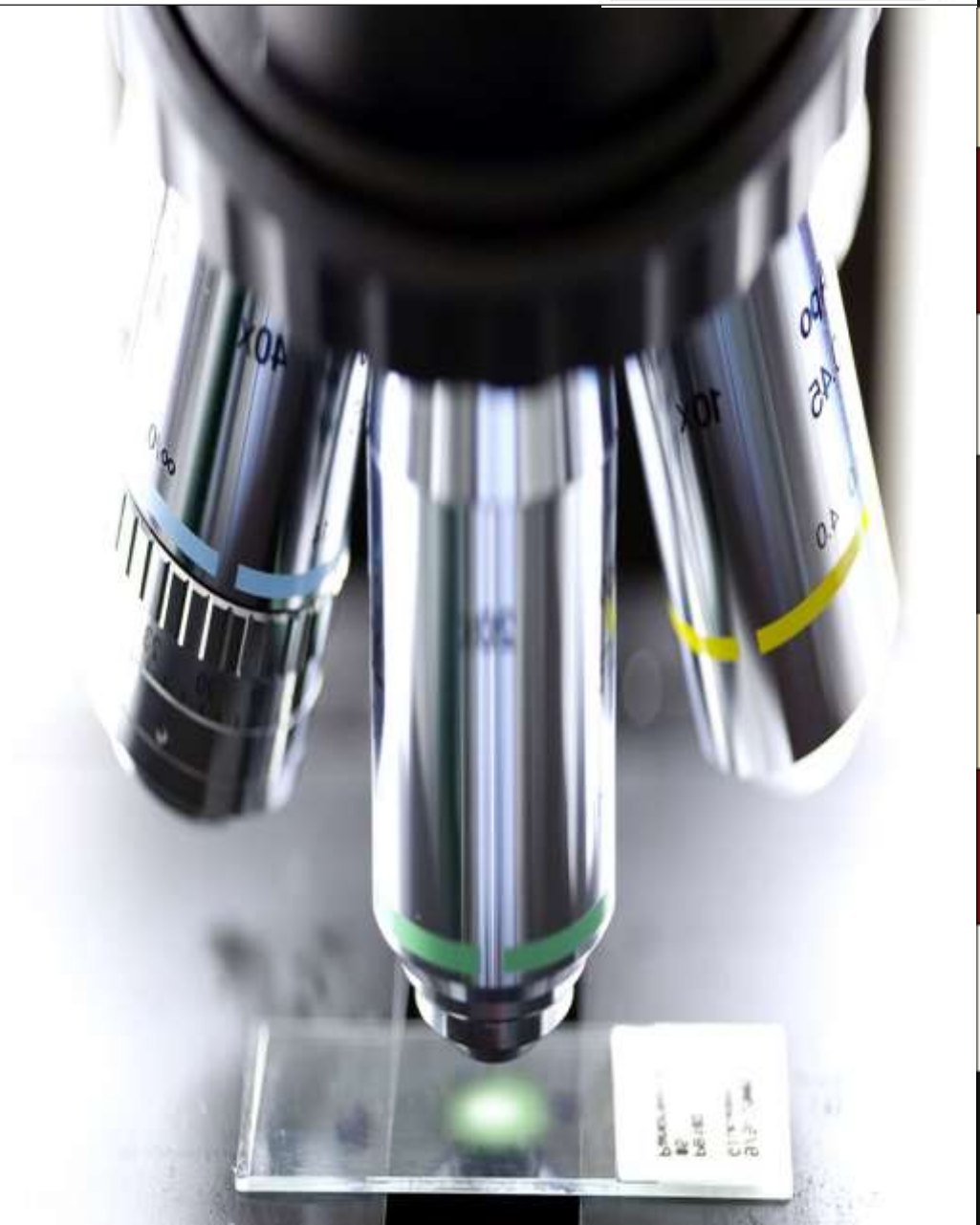
❖ What is the Specimen ?

- A specimen is a sample of something, like a specimen of blood or body tissue that is taken for medical testing. The noun specimen comes from the Latin word specere, meaning “to look.” Biologists collect specimens so they can get a better look at something to study it.


Specimen Investigation
Direct
- Microscopy
- Culture
- PCR
Indirect
- Antibody
- T cell response
- Interferon

❖ Direct Method

- Microscopic examination
  - Direct.
  - Stain.
- Rapid tests
- Molecular methods
- Specimen Culture



Microscopy

Direct

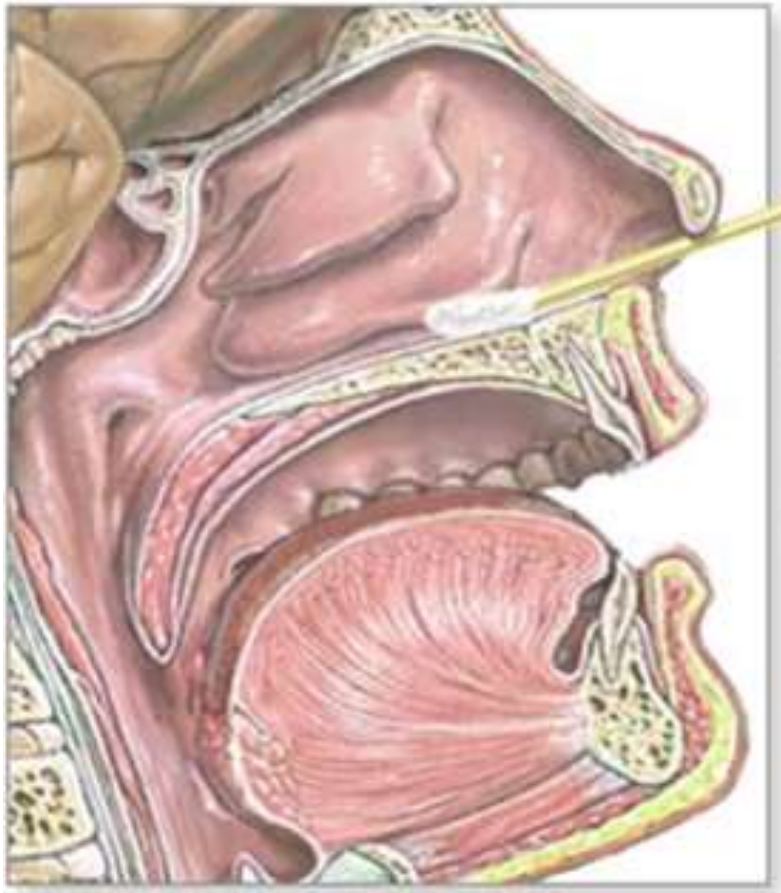
- WBC
- Parasites
- Bacteria

Stain

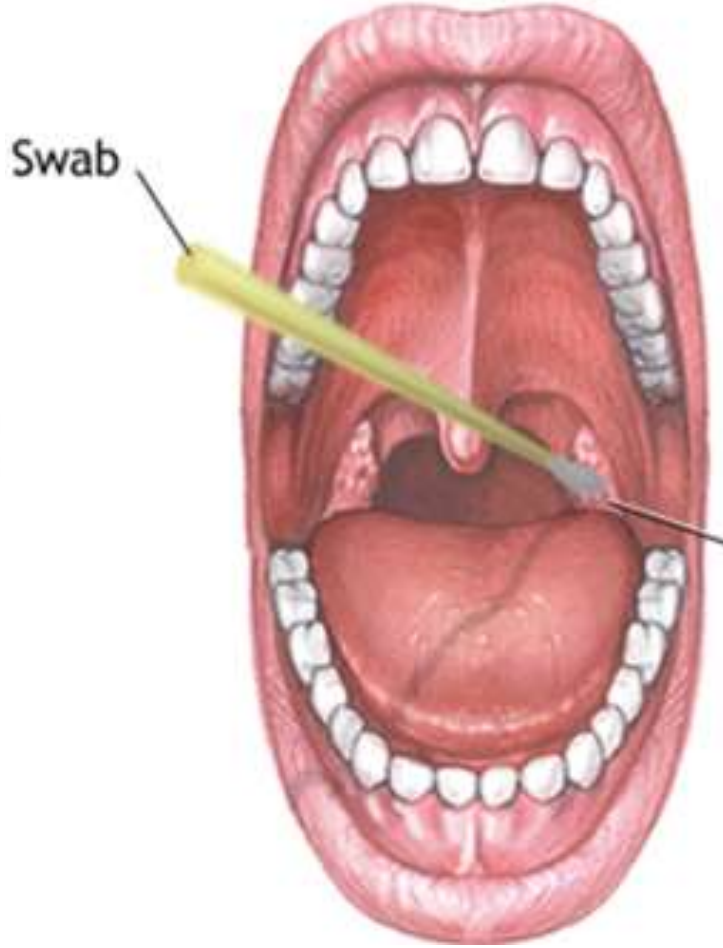
- Simple
- Differential
- Structural
- Fluorescent

❖ Specimen Collection

- Depends on the sources of the sample collection, it may be :
  - Endo cervical swabs for GC
  - Per nasal swabs for pertussis
  - Whole EMU for TB
  - Sputum , not saliva
  - Blood culture bottles, not clotted blood
  - Pus, not swabs.



A sterile swab is passed gently through the nostril and into the nasopharynx



Throat is swabbed in the area of the tonsils

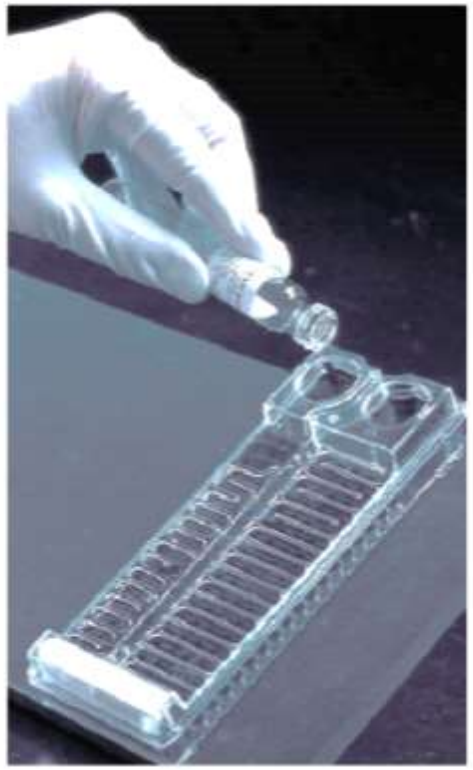
Order of Draw

Tube Closure Color	Collection Tube	Mix by Inverting	Min. Clot Time
	Blood Cultures – SPS	8 to 10 times	N/A
	Citrate Tube (Light Blue)	3 to 4 times	N/A
	Serum Separator Tubes (Gold and Tiger)	5 times	30 minutes
	Serum Tube (Red)	5 times (plastic) None (glass)	60 minutes
	Rapid Serum Tube (Orange)	5 to 6 times	5 minutes
	Plasma Separator Tube	8 to 10 times	N/A
	Heparin Tube (Green)	8 to 10 times	N/A
	EDTA Tube (Lavender)	8 to 10 times	N/A
	PPT Separator Tube (Pearl)	8 to 10 times	N/A
	Fluoride Tube (Gray)	8 to 10 times	N/A

Order of Draw	Tube Stopper Color	Additive	Dept.	Tests	Liquid Part post - centrifugation
1	Yellow 	Sodium polyethanol sulfonate (SPS)	Microbiology	Blood Culture	Plasma
2	Light Blue 	Sodium Citrate	Coagulation	PT, PTT	Plasma
3	Red (plain) 	No additive	Tube Blood Bank	Type, RH, antibody screen, type & crossmatch	Serum
4	Red & Grey or Gold 	Clot Activator	Routine Chemistry	All STAT tests + Iron, folate	Serum
5	Green 	Heparin	STAT Chemistry	BMP, CMP, Glucose, K, Troponin, Bilirubin	Plasma
6	Lavender 	K2EDTA	Hematology	CBC, ESR	Plasma
7	Pink 	EDTA	Gel Blood Bank	Type, RH, antibody screen, type & crossmatch	Plasma
8	Gray 	Sodium Flouride (inhibits glycolysis)	Chemistry	Lactic Acid, Gluc (not run right away)	Plasma

❖ Blood culture

❖ Phoenix Automated Microbiology System



Labeling Specimen

- Use pre-printed barcode labels:
  - On specimen container
  - On field data collection form
  - In log book
- Label each specimen with:
  - Subject’s unique identification number

Field Data Collection Form

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General patient information
Name:
Address:
Country:
County:
City/town/village:

Tracking record number
Date of Birth (dd/mm/yyyy):
Sex: M [ ] F [ ]
Nationality:
Occupation:

Date of onset of illness (dd/mm/yyyy):

Clinical specimens

Unique ID No.	Type	Date of collection	Clinical diagnosis	Health status when specimens collected	Remarks

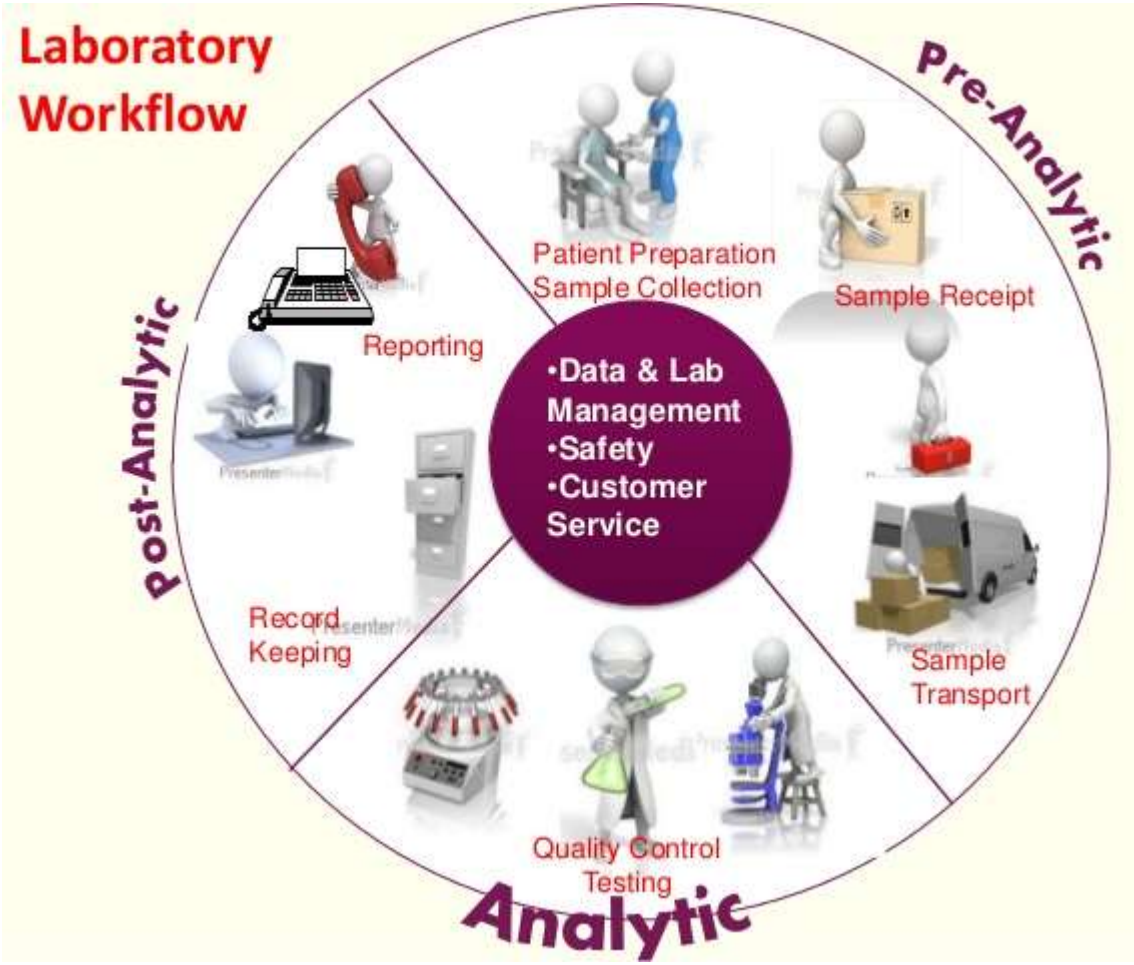
Post-mortem specimens

Date of death(dd/mm/yyyy): ____/____/____

Name of person completing form:_____
Institutional affiliation: _____
Contact details: _____
Date(dd/mm/yyyy): ____/_____/_____

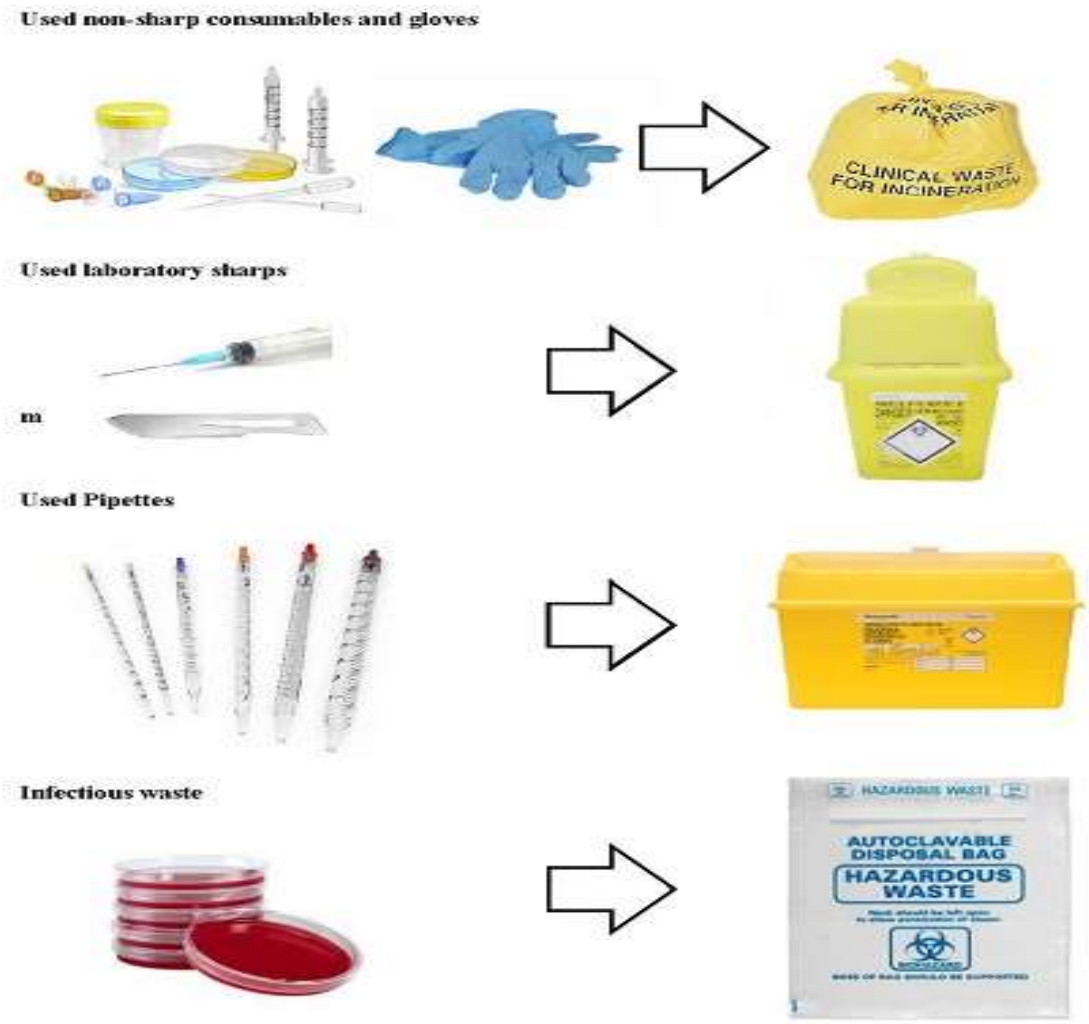
❖ Specimens & Infection Control

- Don't send specimens to the lab without proper packing
- Leaking or blood-stained specimens are not acceptable !!!
- Label hazardous specimens



❖ Waste Disposal and Decontamination

- Infectious blood, body fluids.
- Disposable needles and syringes.
- Disposable or non-reusable protective clothing.
- Disposable or non-reusable gloves
- Used laboratory supplies
- Used disinfectants



Managing Contamination or Accidents

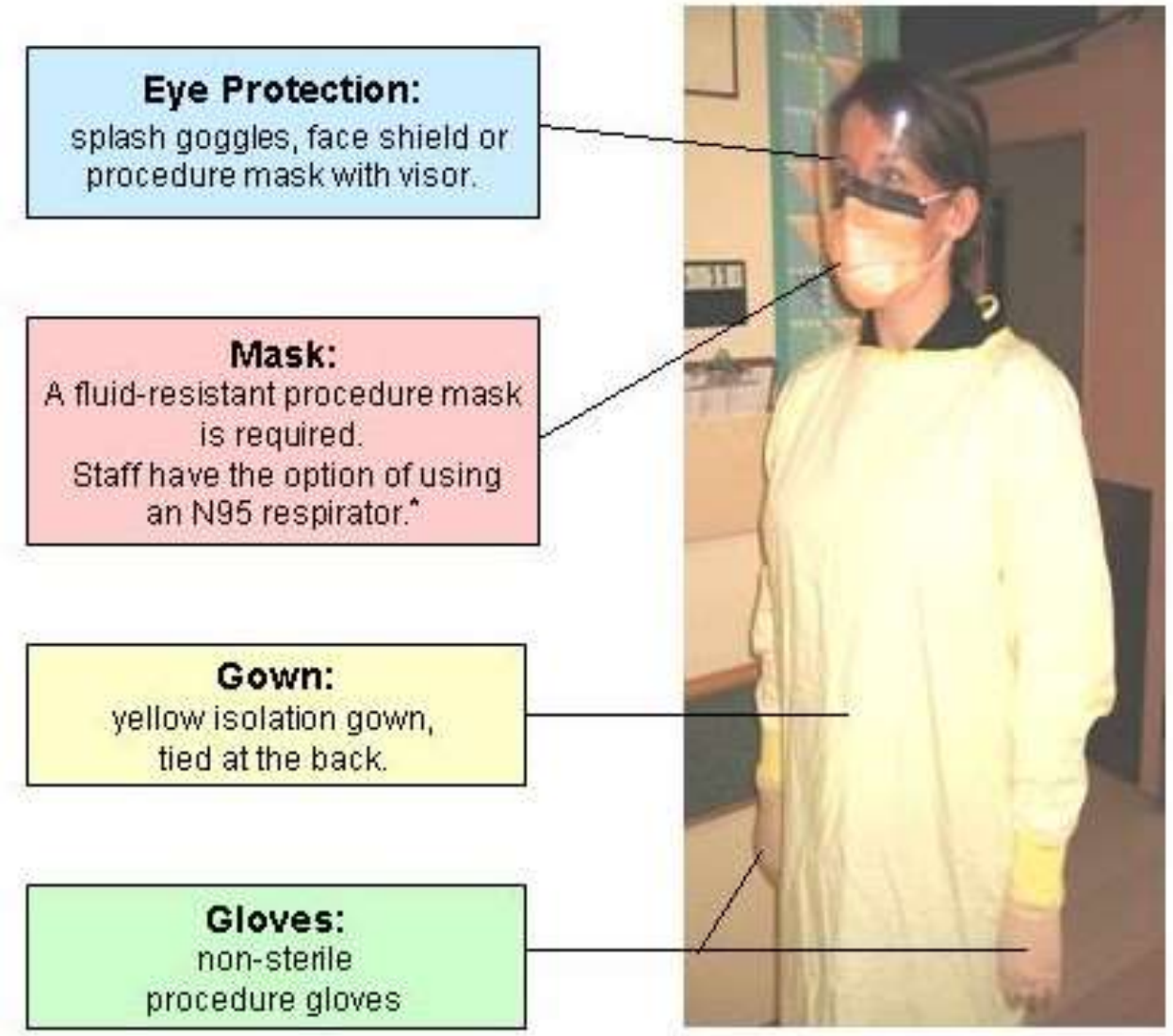
Contaminated work surface:	Exposed laboratory worker:
• Use 5% bleach solution for at least 5 minutes • Make bleach solution fresh daily • 70% ethanol, 5% Lysol is also adequate	• Remove infected clothing • Wash any exposed areas

❖ Data Management Rules

- Double check data entry accuracy
- Include unique identification numbers
- Keep subject names confidential
- Track testing dates and results
- Back up the database

❖ Personal Protective Equipment

- Masks (N-95 or N/P/R-100)
- Gloves
- Protective eye wear (goggles)
- Hair covers
- Boot or shoe covers
- Protective clothing (gown or apron)



Any Questions