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GOVERNMENT OF DUBAI

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DUBAI HEALTH AUTHORITY

DHA Health Facility Guidelines 2019

Part B – Health Facility Briefing & Design

220 – Laboratory Unit

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Executive Summary

This Functional Planning Unit (FPU) covers the requirements of a Laboratory Unit located within a hospital. The Laboratory Unit provides facilities and equipment for the examination of body tissues and fluids. The process involves receipt of patient specimens, testing and issue of reports. A Laboratory Unit may include specialist laboratories such as chemistry, haematology, microbiology, serology, cytology, anatomical pathology, and immunohematology.

Laboratory facilities may be provided as a unit within a hospital or an independent stand-alone facility. The Unit may be configured as a series of modular laboratories in an open-plan configuration. Specimen Collection may be located adjacent to the Laboratory Unit or at a satellite collection area within the hospital. The service plan and operational policies of the Unit determines the size of the Laboratory Unit.

The Laboratory Unit is arranged in Functional Zones that include Specimen Reception, Blood Bank, Laboratories, Support and Staff Areas. Laboratories may be open plan or enclosed specialist laboratories such as Microbiology that may require special air-conditioning.

The Functional Zones and Functional Relationship Diagrams indicate the ideal external relationships with other key departments and hospital services.

The Schedules of Accommodation are provided using references to Standard Components (typical room templates) and quantities for a Laboratory Unit suitable for Role Delineation Levels (RDL) 4 to 6. Further reading material is suggested at the end of this FPU but none are mandatory.

Users who wish to propose minor deviations from these guidelines should use the **Non-Compliance Report** (**Appendix 4 in Part A**) to briefly describe and record their reasoning based on models of care and unique circumstances.

The details of this FPU follow overleaf.

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220. Laboratory Unit

1 Introduction

The prime function of the Laboratory Unit is to provide facilities and equipment for the examination of body tissues and fluids. The process involves receipt of patient specimens, testing and issue of reports.

A Laboratory Unit may include specialist laboratories such as chemistry, haematology, microbiology, serology, cytology, anatomical pathology, and immunohematology.

1.1 Description

The Laboratory Unit may be divided into specialist disciplines including (but not limited to):

- General Pathology - involves a mixture of anatomical and clinical pathology specialties in the one Unit
- Anatomical Pathology – involves the diagnosis of disease based on the microscopic, chemical, immunologic and molecular examination of organs, tissues, and whole bodies (autopsy); Anatomical pathology is itself divided in subspecialties including Surgical Pathology, Cytopathology and Forensic Pathology
- Clinical/ Chemical Pathology involves diagnosis of disease through the laboratory analysis of blood and bodily fluids and/or tissues using the tools of Chemistry, Microbiology, Haematology and Molecular Pathology
- Haematology is concerned with diseases that affect the blood and the management of blood transfusion services
- Microbiology is concerned with diseases caused by organisms such as bacteria, viruses, fungi and parasites; clinical aspects involve control of infectious diseases and infections caused by antibiotic-resistant bacteria

- Genetics/ Clinical Cytogenetics - a branch of genetics concerned with studying the structure and function of the cell, particularly the microscopic analysis of chromosomal abnormalities; molecular genetics uses DNA technology to analyse genetic mutations
- Immunology - a broad discipline that deals with the physiological functioning of the immune system and malfunctions of the immune system such as autoimmune diseases, hypersensitivities, immune deficiency and transplant rejection

2 Functional & Planning Considerations

2.1 Operational Models

Service delivery models for a Laboratory Unit could be one of the following:

- On-site laboratory providing a wide range of tests and services
- On-site provision limited to Point of Care Testing (POCT) for a limited range of urgent tests
- Off-site laboratory with services provided by an external laboratory on a contracted or other basis; the external laboratory may be a separate private business unit
- Networking of hospital laboratories across an area or region with varying arrangements for specialisation between laboratories.

2.2 Hours of Operation

A Laboratory Unit generally operates 7 days a week, from 7am to 7pm. In hospitals, 24-hour service is highly recommended; in any other situation, 24-hour operation is permitted. The exact hours of operation should be determined by the Operational Policy.

3 Unit Planning Models

3.1 Planning Models

A Laboratory can be either:

- An independent and stand-alone facility
- Part of a larger Health Facility such as Hospital or Polyclinic

The Laboratory Unit may be configured as a series of modular laboratories in an open-plan configuration. Such configuration provides flexibility if changes are required in the function of a module. Each module should be sized to accommodate a specific specialty ensuring sufficient space is allow for equipment and its maintenance.

Specimen Collections could be located adjacent to the Laboratory Unit or at a satellite collection area within other Units of a facility. Travel distances between the Unit and the point of specimen collection should be considered when determining their locations.

If an automated delivery system such as Pneumatic Tube System (PTS) and satellite specimen collection zones are provided within the facility, the location of the Unit becomes less critical.

3.2 Functional Zones

The Laboratory Unit will comprise the following Functional Zones in accordance with the service plan of the Facility:

- Specimen Reception (SR) – to process specimen registration, sorting, data entry. It may also provide preliminary processing prior to delivery/ dispatch to other specialty laboratories off site
- Specimen Collection Area – this can be located remotely to the Laboratory Unit (e.g. Outpatient Unit) or collocated. If collocated, it should have separate public/ patient entry from the Staff entry to the laboratory area
- Blood Bank and Phlebotomy Area – provides storage of blood and blood products. If on-site blood collection is a requirement rather having them delivered from outside, there should be a separate area with phlebotomy bays. It may be combined with specimen collection area.

- Laboratories – examination and testing of human tissue and bodily fluids. It is commonly made up of a number of specialist laboratories
- Support Area – can be centralised to serve various specialty laboratories. In larger Unit, it may be more appropriate to have more than one support area serving one for two specialty laboratories only
- Staff Area – administrative area to be shared by the Unit between various specialty laboratories

The above zones are briefly described here:

3.2.1 Specimen Reception

The Specimen Reception area is where specimens for analysis are received, sorted and held temporarily prior to dispatch into each specialty laboratory. In the case if this Unit is a part of a larger Facility, specimens collected from other Units may be transported by pneumatic tube system or by delivery staff. For a stand-alone facility, delivery will be by courier.

The Specimen Reception should handle all registration of specimens; such as through provision of a computerised/ barcode systems, sorting benches as well as a specimen holding area including refrigerated holding.

Once specimens are registered and sorted, they will be delivered to the relevant laboratory area for processing, testing and reporting.

Separate Waiting Areas for male and female to be provided if Specimen Collection Area is available in the Unit.

3.2.2 Specimen Collection Area

This area is where collected specimens are taken for laboratory testing, generally for outpatients. For inpatients, specimens are often collected at the point of care. There should be an enclosed room with toilet and handbasin provided.

3.2.3 Blood Bank

Blood bank is commonly a dedicated storage facility by a separate service provider with blood and blood products delivered to the health facility as needed; note that Blood Bank is solely for storage of blood products and not a location for blood donation. Blood Donation and Phlebotomy are restricted to certain facilities as determined by the DHA.

Temperature and humidity-controlled refrigerators and freezers with alarmed system should be supervised and monitored by laboratory staff. Blood and blood products must be stored in a secure and strictly controlled environment in accordance to Part E of this Guidelines.

3.2.4 Laboratories

Access to the Laboratories should be strictly limited to laboratory personnel. Laboratories can be configured open plan or as enclosed specialist laboratories in accordance with the service plan.

- Open Plan Laboratories - these usually makes up the core of a Laboratory Unit for main stream processing. These may include Clinical Chemistry, Haematology etc.
- Enclosed Specialist Laboratories – a controlled and segregated environment is required where hazardous materials will be processed including Microbiology, Anatomical Pathology or Virology/ Serology. Special air-conditioning and exhaust arrangements from open plan areas are common requirements to these enclosed specialist laboratories.

The specimen work flow proceeds in an orderly path from Specimen Reception, to Sorting and initial processing, and then to specific laboratories for testing, analysis and reporting. Results may be

automated and matched to the patient's electronic medical record or printed and delivered to the various units by courier or automated delivery system.

The following considerations for laboratory planning:

- Provide adequate and sufficient workbench space for laboratory equipment including microscopes, incubator/s, centrifuge/s, chemical analysers etc.
- Provisions of vacuum, gases, electrical and data outlets at workbench and on walls for free-standing equipment
- Sinks where provided, should have access to hot and cold water and may be used for disposal of non-toxic fluids
- Provide basin/s with paper towel and soap dispensers for staff hand-washing
- Emergency showers and eye wash stations should be provided to suit the service plan. Drainage from these are to be connected to a separate holding area
- The size of the laboratory needs to be appropriate to the functions defined in the service plan as well as providing a safe working environment for the staff

3.2.5 Support Areas

Support Areas include:

- Cleaner's room
- Clean-up room(s) for washing re-usable items used in processing and analysing specimens
- Handwash basin(s), Emergency shower(s) and eyewash station(s) distributed within the Unit which are readily accessible from all processing areas.
- Personal Protective Equipment Bay(s) with eye protection, personal protective clothing and equipment. These should be distributed within the Unit where they are readily accessible from all processing areas.

- Sterilisation area
- Storage areas including refrigerated storage, flammable liquids, reagent, general and consumable supplies. Ideally, there should be multiple storage areas distributed within the Unit.

3.2.6 Staff Areas

Staff Areas will consist of:

- Offices and/or workstations for clerical/ administrative procedures. Ideally this area should be away from the main operational area of the Unit where visitors do not need to transit through the laboratory area
- Meeting Room for staff meeting and training purposes (can be shared with adjacent Unit)
- Staff Room for refreshments, meals and breaks
- Change rooms including toilets, showers, basins and lockers

4 Functional Relationships

4.1 External Relationships

The Laboratory Unit will have a close relationship with the following units for urgent tests and results unless point of care testing devices are installed within critical units or a rapid transport system is in place:

- Emergency Unit
- Intensive Care Unit/ Coronary Care Unit
- Operating Unit and Day Surgery/ Procedures Units
- Birthing Unit and Neonatal Nurseries
- Inpatient Units

- Outpatient Units
- Oncology Units including Radiotherapy and Chemotherapy
- Day Patient Units such as Renal Dialysis Unit and medical day chairs.

The key external functional relationships are demonstrated in the diagram below including:

- Access from Outpatients and Day Patient units to Specimen Collection through a public corridor
- Specimen Collection area may be located adjacent to Laboratories or in a remote location
- Indirect relationships between Laboratory Unit all Inpatient and Critical Care areas through public corridors; specimen transit may be automated
- Access through a staff/ service corridor for Supplies and Housekeeping including waste

4.2 Internal Relationships

Internally, the Laboratory unit will be arranged in zones with a clear flow of processing from Specimen Reception to the various Laboratories required for specific specimen testing. Support areas will be ideally located with ready access from all laboratory areas. Staff areas may be located in a discreet staff accessible zone, away from processing areas.

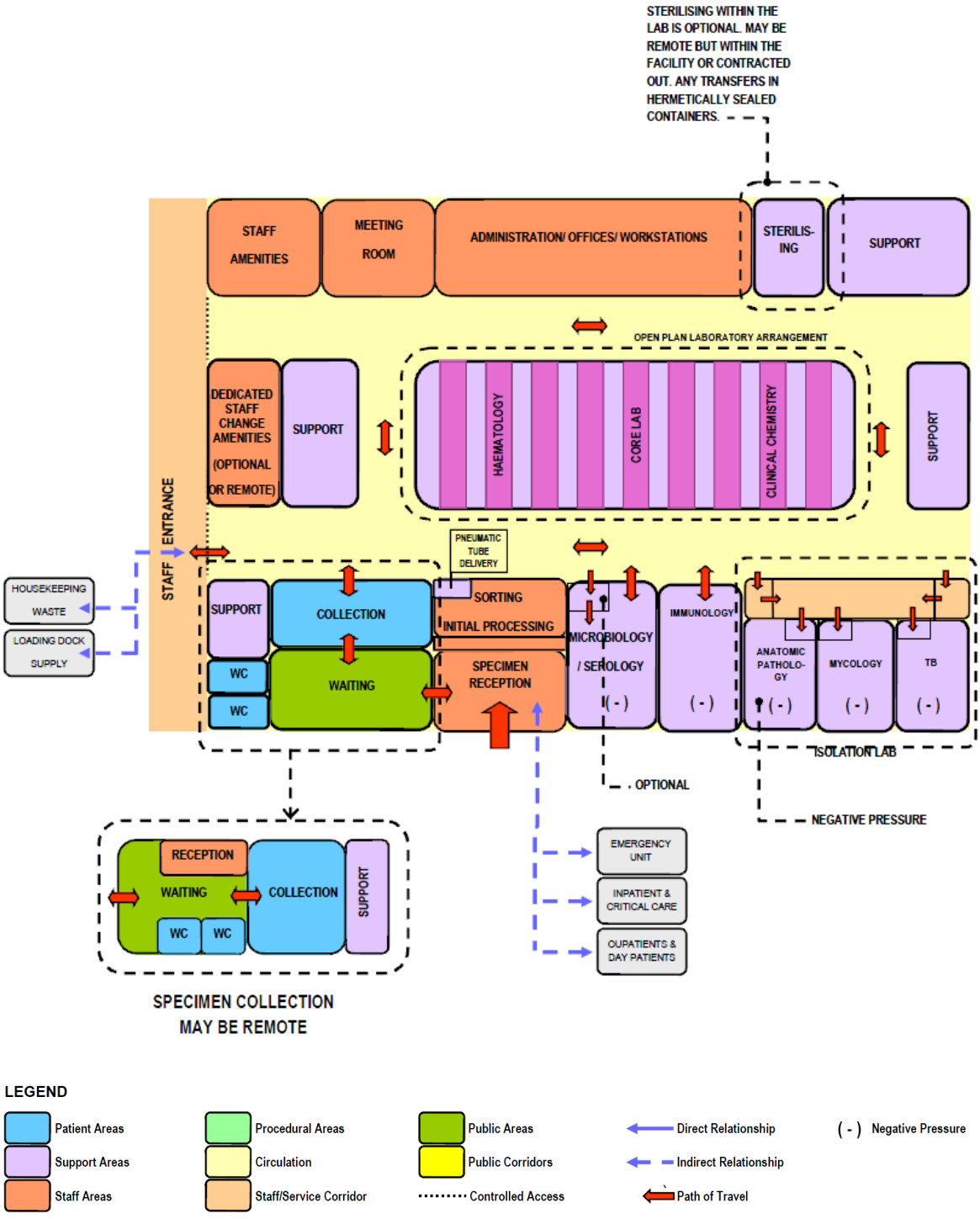
The preferred internal relationships are demonstrated in the diagram below and include:

- Specimen Reception at the Entry
- Controlled access at entry points to staff and Laboratory areas
- A specimen work flow from Specimen Reception, to Sorting/ Initial Processing, then to Laboratories
- Support areas located centrally to Laboratories at the point of use, and also at the perimeter for supplies and shared areas

- Staff areas including Offices and Meeting Room located in a staff zone accessible without traversing laboratory areas.
- Staff Change Areas located closer to the entry to the Unit for staff to put on protective attire on entry and remove on exit.

4.3 Functional Relationships Diagram

The functional relationship of a Laboratory with various zones is demonstrated in the diagram below. Some zones may not be applicable depending on the service plan. Specimen Collection zone may be decentralised and provided in the Outpatient Unit.



5 Design Considerations

5.1 Environmental Considerations

5.1.1 Acoustics

Acoustic treatment to be provided for noise reduction from processing equipment such as specimen analysers, washer/ decontaminators, sterilisers, refrigerators and freezers. This may include special floor coverings, wall insulation, acoustic ceilings, window coverings.

Acoustic privacy should be provided to Offices, Staff Rooms and Meeting Rooms.

5.1.2 Natural Light/ Lighting

Natural lighting encourages positive morale and working environment for the staff. It also aids visual inspection and is important in certain type of laboratories and staff areas within the Unit.

For areas not located on the perimeter of the floor and access to natural lighting is difficult, internal glazed walls should be considered. The same is also recommended for automated specimen processing areas for open visibility.

Internal and task lighting must be sufficient for safe operation of equipment, use of computer screens and provide good visibility for digital displays on equipment.

5.1.3 Privacy

Visual and acoustic privacy must be provided where confidential conversations will take place. For example, in offices, meeting rooms.

Specimen and blood collection areas, when provided, must have screen curtains to each cubicle if they are not in an enclosed room with a single collection bay.

5.2 Space Standards and Components

5.2.1 Clearance

Configuration of laboratory benches, furniture, fixtures and equipment must not impede emergency access to an exit. A pathway, leading to the face of an exit must have minimum 900mm clearance.

The space between laboratory benches and adjacent workstations should be 1.5m or greater to provide ease of access.

5.2.2 Accessibility

Accessibility must be considered with appropriate design to suit both staff and visitors in wheelchairs in the public and patient areas including Reception, Offices, Meeting rooms, Waiting areas and Specimen/ Blood Collection areas.

Also Refer **Part C – Access, Mobility, OH&S** in these Guidelines.

5.3 Doors

Door openings must be sized adequately to accommodate laboratory equipment such as fume hoods, automated processing analysers, refrigerators, freezers and incubators.

Also Refer **Part C – Access, Mobility, OH&S** in these Guidelines.

5.4 Size of the Unit

The size of the Laboratory Unit will be determined by the Service Plan and Operational Policies.

Schedule of Accommodation (SOA) included and provided in this FPU is for typical hospital based units for Role Delineation Level (RDL) 4 to 6 facilities.

Sufficient space around laboratory equipment for maintenance must be considered during the design phase. Structural design should consider for heavy equipment if provided.

5.5 Ergonomics/ OH&S

Workstations are recommended to be height adjustable. Laboratory benches, sinks and processing workstations should be provided at suitable working heights and no less than 750mm deep.

The following occupational health and safety issues should be addressed during planning and design for staff safety and welfare:

- Chemical agents used in analysers and cleaning/ decontamination processes and flammable liquids that involve specific chemical handling requirements (Refer to local regulations)
- Electrical and fire hazards related to equipment in use
- Biological hazards of contaminated material undergoing processing, which requires stringent infection control management.

Also Refer **Part C – Access, Mobility, OH&S** in these Guidelines.

5.6 Safety and Security

Safety provisions in the Laboratory Unit will include:

- Access control to prevent unauthorised entry to the laboratory areas
- After-hours security for staff working in the Unit
- Suitable non-slip floor finishes where water and chemicals are in-use, e.g. homogenous non-slip vinyl flooring

5.7 Finishes

The following factors should be considered in the selection of finishes:

- durability
- ease of cleaning
- fire safety
- heat resistance
- infection control
- movement of equipment

Provide smooth, monolithic, chemical resistant and impervious to moisture finishes to work surfaces. Standard laminated benchtops are not suitable. Benchtops should be seamless to prevent contamination from spillage. Splashback or coved upturns must be provided when the benchtop abuts a wall.

Floor and walls should be anti-static, heat resistant, anti-bacterial, anti-fungal and chemical resistant. All joints in flooring must be sealed and coved at the edges (against walls or fixed joinery) where possible. Water and chemical resistant are also important characteristics of selected flooring. Walls shall be painted with lead free paint.

Refer to **Part C - Access, Mobility, OH&S** and Standard Components of these Guidelines for more information on wall protection, floor finishes and ceiling finishes.

5.8 Window Treatment

It is advisable to provide window treatment to external windows to control sunlight and glare to working areas of the Laboratory Unit.

5.9 Building Services Requirements

This section identifies unit specific services briefing requirements only and must be read in conjunction with **Part E - Engineering Services** of these Guidelines for the detailed parameters and standards applicable. All Laboratory Units must comply to technical details in **Part E - Engineering Services**.

5.9.1 Information and Communication Technology

Unit design should address the following Information Technology/ Communications issues:

- Electronic Health Records (EHR) which may form part of the Health Information System (HIS)
- Paging and personal telephones replacing some aspects of call systems

- Intercom system between positively or negatively pressurised rooms and their adjacent spaces
- Data entry including results and reporting
- Bar coding of specimens collected within the Unit
- Data and communication outlets, servers and communication room requirements
- Optional availability of Wi-Fi for staff

5.9.2 Heating Ventilation and Air-conditioning (HVAC)

The Laboratory Unit shall have appropriate air conditioning that allows control of temperature and humidity for the proper handling of specimens and equipment functioning.

Special air-conditioning systems that provide either negative pressure or positive pressure will be required in some laboratories. In addition, exhaust should be considered to minimise odours and prevent aerosol contamination of adjacent areas where applicable.

All HVAC units and systems are to comply with services identified in Standard Components and **Part E – Engineering Services**.

5.9.3 Pneumatic Tube Systems

The Laboratory Unit may include a pneumatic tube station for connecting the key clinical unit with the main support units as determined by the facility Operational Policy. If provided the station should be located in the Specimen Reception under direct staff supervision.

5.9.4 Public Health

Hot and cold water should be supplied to hand wash basins, eye-wash stations and emergency shower. Hot and cold water should be supplied to sinks.

Refer to **Part E – Engineering Services** for design requirements.

5.9.5 Radiation Shielding and Safety

If radioactive reagents and materials are used, they should be stored and disposed of in appropriately shielded containers and room. No special provisions will normally be required for waste specimens from most patients receiving low level isotope diagnostic material.

5.10 Infection Control

Infection Control measures applicable to the Laboratory Unit will involve proper handling of specimens to prevent contamination of staff. Standard precautions apply to the Laboratory Unit areas and Personal Protective Equipment (PPE) including protective clothing, gloves, masks, and eye protection will be readily available are all processing areas.

5.10.1 Hand Basins

Handwashing facilities shall be required in laboratories and other rooms as specified by the Standard Components. Taps to Hand Basins in laboratories should be either elbow-action taps or automatic taps (sensor/foot operated).

Hand-washing facilities shall not impact on minimum clear corridor widths.

Hand basins are required in the following area as a minimum:

- Specimen Collection areas
- At each laboratory sub unit
- Automated processing areas
- Clean-up rooms

5.10.2 Antiseptic Hand Rubs

Antiseptic hand rubs should be located so they are readily available for use at Specimen Reception and in staff circulation areas.

The placement of antiseptic hand rubs should be consistent and reliable throughout facilities.

Antiseptic hand rubs are to comply with **Part D - Infection Control**, in these guidelines.

Antiseptic Hand Rubs, although very useful and recommended, cannot fully replace Hand Wash Bays.

5.10.3 Emergency Shower and Eye-wash Station

Each laboratory unit must have access to at least one emergency shower and eye-wash station.

In areas where radioactive materials are being handled, there must be emergency shower and eye-wash station provided in close proximity.

5.10.4 Chemical Storage

Storage for chemicals and reagents should be physically separated from other storage in the Laboratory Unit with designated cabinets. Chemicals and reagents should not be stored in cabinets if they are fixed above a sink/s.

5.10.5 Containment of Bio-Hazardous Materials

Where bio-hazardous materials are handled, Bio-Safety Laboratories (BSL) must be provided. BSL are divided into four levels from 1 to 4. Each BSL can be described as below:

5.10.6 BSL Level 1

Laboratories which handle low-risk microbes that pose little to no threat of infection to laboratories personnel. Basic level of containment that relies on standard microbiological practices with no special physical barriers.

5.10.7 BSL Level 2

Laboratories which work with human diseases including pathogenic and infections organisms that pose a moderate health hazard. Enhanced level of protection. Access doors into a BSL Leve 2

laboratories must be self-closing, lockable doors. Bio-Safety Cabinets must be provided for procedures that can cause infection from aerosols or splashes.

5.10.8 BSL Level 3

Laboratories where indigenous or exotic microbes are handled and could cause serious or potentially lethal disease through inhalation. Biological Safety Cabinets must be provided. Access to a BSL-3 should be restricted and controlled with self-closing set of locking doors.

5.10.9 BSL Level 4

Laboratories with maximum containment and protection from exposure to lethal pathogens and life-threatening diseases. Class III biological safety cabinets (glove box) and staff needs to be in a full-bodies suit with positively pressured air supply. BSL Level 4 facilities should be isolated.

Refer to Section 30 of DHA - Clinical Laboratory Regulation for full details.

6 Standard Components of the Unit

Standard Components are typical rooms within a health facility, each represented by a Room Data Sheet (RDS) and a Room Layout Sheet (RLS).

The Room Data Sheets are written descriptions representing the minimum briefing requirements of each room type, described under various categories:

- Room Primary Information; includes Briefed Area, Occupancy, Room Description and relationships, and special room requirements)
- Building Fabric and Finishes; identifies the fabric and finish required for the room ceiling, floor, walls, doors, and glazing requirements
- Furniture and Fittings; lists all the fittings and furniture typically located in the room; Furniture and Fittings are identified with a group number indicating who is responsible for

providing the item according to a widely accepted description as follows:

Group	Description
1	Provided and installed by the builder
2	Provided by the Client and installed by the builder
3	Provided and installed by the Client

- Fixtures and Equipment; includes all the serviced equipment typically located in the room along with the services required such as power, data and hydraulics; Fixtures and Equipment are also identified with a group number as above indicating who is responsible for provision
- Building Services; indicates the requirement for communications, power, Heating, Ventilation and Air conditioning (HVAC), medical gases, nurse/ emergency call and lighting along with quantities and types where appropriate. Provision of all services items listed is mandatory

The Room Layout Sheets (RLS's) are indicative plan layouts and elevations illustrating an example of good design. The RLS indicated are deemed to satisfy these Guidelines. Alternative layouts and innovative planning shall be deemed to comply with these Guidelines provided that the following criteria are met:

- Compliance with the text of these Guidelines
- Minimum floor areas as shown in the schedule of accommodation
- Clearances and accessibility around various objects shown or implied
- Inclusion of all mandatory items identified in the RDS

The Laboratory Unit consists of Standard Components to comply with details described in these Guidelines. Refer also to Standard Components Room Data Sheets (RDS) and Room Layout Sheets (RLS) separately provided.

6.1 Non-Standard Rooms

Non-standard rooms are rooms are those which have not yet been standardised within these guidelines. As such there are very few Non-standard rooms. These are identified in the Schedules of Accommodation as NS and are separately covered below.

6.1.1 Sorting / Processing

The Sorting area within the Laboratory includes labelling of specimens, sorting by specialty and laboratories, initial scanning or copying of requests.

Processing includes temporary holding in refrigeration, holding and packaging specimens for transfer to laboratories.

The Sorting/ Processing area is located adjacent to the Specimen Reception and with easy access to the laboratories

The area requires:

- Workstations for data entry
- Holding areas for specimens awaiting transit to specialist internal laboratories or remote laboratories
- Scanning equipment
- Refrigerators and freezers in close proximity
- Incubator for microbiology samples
- Hand basin and sink within the initial processing area

- Clinical waste disposal

Extraction for odours and fumes may be required.

6.1.2 Laboratory - High volume analyser

The High-volume Laboratory analyser is an automated analyser, consisting of multiple modules, depending on the required function that may process hundreds of specimens per hour. The analyser may be located in a large open plan area within the Laboratory Unit; the space required will be determined by the equipment selected. The Processor should be located with convenient access to Specimen Reception for efficient sample processing.

The equipment is automated and will require a temperature-controlled environment along with services and data connections according to manufacturer's specifications. Access for installation and servicing should be available.

6.1.3 Laboratory - Physical Containment, high risk

The Physical Containment Laboratory is a fully enclosed, strongly negatively pressured, HEPA filtered laboratory with entry via a dedicated airlock. The Airlock is moderately negative pressured with air flow towards the Laboratory. Doors between the Airlock and Laboratory are interlocking - only one can be open at one time. The Physical Containment laboratory is used for handling infective organisms such as viruses, viral hepatitis and other infective agents and genetically modified organisms. Work inside the Laboratory will be undertaken in a biological safety cabinet. Physical containment Laboratories are classified according to risk of the agents used in them from lowest biosafety level 1 to highest biosafety level 4. These laboratories must be constructed to standards and are certified by an appropriate authority.

Requirements include:

- Air pressurisation to be monitored with a display and alarmed

- Walls, floors and ceiling finishes that are smooth, impervious to water chemical resistant and easily cleaned
- A hand basin and PPE within the laboratory
- Eye wash equipment within the laboratory
- All fittings within the laboratory must be able to be decontaminated and fumigated
- An autoclave
- A fail-safe communication system within the laboratory

6.1.4 Pneumatic Tube Station

The Pneumatic Tube Station should be located at the Specimen Reception under the direct supervision of staff for urgent arrivals. The location should not be accessible by external staff or visitors.

Requirements include:

- The bay should not impede access within reception areas
- Racks should be provided for pneumatic tube canisters
- Wall protection should be installed to prevent wall damage from canisters

7 Schedule of Accommodation

The Schedule of Accommodation (SOA) provided below represents generic requirements for this Unit. It identifies the rooms required along with the room quantities and the recommended room areas. The sum of theroom areas is shown as the Sub Total as the Net Area. The Total area is the Sub Total plus the circulation percentage. The circulation percentage represents the minimum recommended target area for corridors within the Unit in an efficient and appropriate design.

Within the SOA, room sizes are indicated for typical units and are organised into the functional zones. Not all rooms identified are mandatory therefore, optional rooms are indicated in the Remarks. These guidelines do not dictate the size of the facilities, therefore, the SOA provided represents a limited sample based on assumed unit sizes. The actual size of the facilities is determined by Service Planning or Feasibility Studies. Quantities of rooms need to be proportionally adjusted to suit the desired unit size and service needs.

The Schedule of Accommodation are developed for particular levels of services known as Role Delineation Level (RDL) and numbered from 1 to 6. Refer to the full **Role Delineation Framwork** (**Part A - Appendix 6**) in these gduielines for a full description of RDL's.

The table below shows a typical, hospital-based Laboratory Unit at RDL 4 to 6. All laboratory areas are to be based on the functionality of the labs, equipment requirements, level of automation, etc.

Any proposed deviations from the mandatory requirements, justified by innovative and alternative operational models may be proposed and record in the **Non-Compliance Report** (refer to **Part A - Appendix 4**) with any departure from the Guidelines for consideration by the DHA for approval.

7.1 Laboratory Unit

ROOM/ SPACE	Standard Component Room Codes							RDL 4 Qty x m²			RDL 5/6 Qty x m²			Remarks
Entry/ Reception														
Specimen Reception/ Registration	sprec-d similar							1	x	12	1	x	20	Receiving, data entry for tracking
Pneumatic Tube Station	NS							1	x	1	1	x	1	
Sorting/ Processing	NS							1	x	10	1	x	15	Preliminary processing includes dispatch area
Laboratory - General														
Laboratory - General	pthlb-mod-d similar							1	x	50				Clinical Chemistry, Haematology, Blood bank processing combined; RDL 5/6 separate labs
Haematology														
Specimen Reception	sprec-d similar										1	x	15	Receiving, sorting & preliminary processing
Laboratory - High Volume analyser	NS										1	x	80	
Laboratory - Manual Testing	pthlb-mod-d										1	x	25	
Lab Workstations - Microscopy	pthlb-mod-d similar										1	x	30	
Store - General	stgn-8-d similar										1	x	10	
Clinical Chemistry														
Specimen Reception	sprec-d similar										1	x	15	Receiving, sorting & preliminary processing
Laboratory - High Volume analyser	NS										1	x	50	
Lab Workstations - Chemistry	pthlb-mod-d										1	x	25	May include manual processing stations
Bay - Storage	bs-2-d										1	x	2	Equipment that needs to be located in the zone
Microbiology/ Serology														
Specimen Reception	sprec-d similar							1	x	10	1	x	30	Receiving, sorting & preliminary processing
Laboratory - Blood Culture	pthlb-mod-d similar							1	x	15	1	x	15	Enclosed, Negative Pressure; to comply to **Part E - Engineering Services**
Laboratory - Physical Containment	NS										1	x	25	Negative Pressure, includes biological safety cabinet/s; to comply to **Part E - Engineering Services**
Anteroom - Physical Containment Laboratory	anrm-d										1	x	6	For pressurisation; with PPE provisions; to comply to **Part E - Engineering Services**

ROOM/ SPACE	Standard Component Room Codes							RDL 4 Qty x m^2			RDL 5/6 Qty x m^2			Remarks
Cool Room/ Refrigerator	corm-d similar										2	x	6	Separate clean and dirty cool storage; walk-in cool room or bay with refrigerator or freezer, alarmed
Laboratory - Incubators	pthlb-mod-d similar										1	x	15	
Lab Workstations - Microscopy, Specimen reading	pthlb-mod-d similar										1	x	40	Enclosed, Negative Pressure; to comply to **Part E - Engineering Services**
Laboratory - Mycology, Microscopy	pthlb-mod-d similar							1	x	15	1	x	25	Enclosed, Negative Pressure; to comply to **Part E - Engineering Services**
Anatomical Pathology														
Specimen Reception	sprec-d similar										1	x	15	Receiving, sorting & preliminary processing
Laboratory - Cytology	pthlb-mod-d similar										1	x	20	
Laboratory - Immunochemistry (IHC)	pthlb-mod-d similar										1	x	15	
Lab Workstations - Blocking & Embedding	pthlb-mod-d similar										1	x	15	
Lab Workstations – Chemical Prep & Staining	pthlb-mod-d similar										2	x	20	
Lab Workstations - Microscopy	pthlb-mod-d similar										1	x	40	
Laboratory - Cutting room	pthlb-mod-d similar										1	x	40	
Laboratory - Tissue processing	pthlb-mod-d similar										1	x	15	
Laboratory - Cryostat	pthlb-mod-d similar							1	x	10	1	x	15	Frozen sections; temperature controlled and alarmed
Store – Samples, Slides & Specimens	stgn-20-d										1	x	20	
Bay - Storage	bs-2-d										1	x	2	Equipment that needs to be located in the zone
Clinical Immunology														
Specimen Reception	sprec-d similar							Shared			1	x	15	RDL 4 shared with main Specimen Reception
Laboratory - Antibody	pthlb-mod-d										1	x	25	
Laboratory - Proteins, Allergy	pthlb-mod-d							1	x	25	1	x	25	
Bay - Refrigerators/ Freezers	bmeq-4-d similar										1	x	6	Temperature monitored, alarmed
Blood Bank														
Specimen Reception	sprec-d similar							Shared			1	x	4	RDL 4 shared with main Specimen Reception

ROOM/ SPACE	Standard Component Room Codes							RDL 4 Qty x m²			RDL 5/6 Qty x m²			Remarks
Laboratory - Processing Area	pthlb-mod-d										1	x	25	For compatibility testing. RDL 4 processing done in Lab-General
Blood Products Cool Room/ Refrigerator	corm-d similar							1	x	2	1	x	6	Walk-in cool room or bay with refrigerator/s to suit; temperature monitored and alarmed
Blood Products Freezer	blst-d similar							1	x	1	1	x	6	Walk-in freezer room or bay with freezer to suit; temperature monitored and alarmed
After-hours Blood Store	blst-d similar							1	x	3	1	x	3	
Bay - Storage	bs-2-d										1	x	2	Equipment that needs to be located in the zone
Specimen Collection														
Reception	recl-10-d recl-15-d							1	x	10	1	x	15	
Waiting (Male/ Female)	wait-10-d wait-20-d similar							2	x	10	2	x	25	Separate Male/ Female waiting
Specimen Collection Bays	specc-d							2	x	9	4	x	9	
Toilet - Patient	wcpt-d							2	x	4	2	x	4	Separate Male/ Female
Toilet - Accessible	wcac-d							1	x	6	1	x	6	Optional
Bay - Pneumatic Tube Station	NS							1	x	1	1	x	1	Optional; locate at Reception
Bay - Mobile Equipment	bmeq-4-d							1	x	4	2	x	4	Phlebotomy trolleys
Dirty Utility	dtur-s-d dtur-12-d							1	x	8	1	x	12	
Store - General	stgn-8-d stgn-14-d similar							1	x	8	1	x	12	Consumables, sterile stock
Support Areas														**Shared between Laboratories**
Bay - Emergency Shower and Eyewash	bese-1-d							1	x	1	5	x	1	Locate in each separate laboratory
Cleaner's Room	clrm-6-d							1	x	6	2	x	6	
Clean-up Room	clup-7-d clup-p-d							1	x	7	1	x	12	
Cool Room	corm-d similar							1	x	6	2	x	10	
Disposal Room	disp-8-d similar							1	x	5	1	x	10	
Bay - Freezer	blst-d similar							1	x	3	1	x	10	
Sterilising Room	NS							1	x	7	1	x	12	Adjacent to Clean-up
Store - Bulk	stbk-20-d similar							1	x	20	1	x	60	
Store - Chemical	stcm-d similar							1	x	4	1	x	8	
Store - General	stgn-8-d stgn-14-d similar							1	x	8	1	x	16	General supplies & consumables

ROOM/ SPACE	Standard Component Room Codes						RDL 4 Qty x m^2			RDL 5/6 Qty x m^2			Remarks
Store - Photocopy/ Stationery	stps-8-d similar						1	x	8	1	x	10	optional
Store - Files	stfs-10-d similar						1	x	8	1	x	10	optional
Offices & Staff Areas													
Meeting Room - Medium/ Large	meet-l-15-d meet-l-30-d similar						1	x	15	2	x	25	
Office - Single Person	off-s12-d						1	x	12	1	x	12	Head of Unit
Office - Single Person	off-s9-d									4	x	9	Pathologists, include microscope station
Office - 2 Person Shared	off-2p-d						1	x	12	2	x	12	Clerical support
Office - 2 Person Shared	off-2p-d									6	x	12	Lab Managers & Supervisors, Senior Technician
Office - Workstation	off-ws-d						3	x	5.5	10	x	5.5	Technical staff for each specialty
Staff Room	srm-25-d						Shared			1	x	25	
Property Bay - Staff	prop-3-d similar						2	x	2				Lockers, separate M/F areas
Change Room - Staff (Male/ Female)	chst-20-d									2	x	20	Includes Toilet, Shower and Lockers
Shower – Staff (Male/ Female)	shst-d						2	x	3				Separate M/F
Toilet – Staff (Male/ Female)	wcst-d						2	x	3	2	x	3	Separate M/F
Sub Total									**391.5**			**1463**	
Circulation %									**25**			**25**	
Total Areas									**489.3**			**1828.7**	

Please note the following:

- Areas noted in Schedules of Accommodation take precedence over all other areas noted in the Standard Components
- Rooms indicated in the schedule reflect the typical arrangement
- All the areas shown in the SOA follow the No-Gap system described elsewhere in these Guidelines
- Exact requirements for room quantities and sizes will reflect Key Planning Units (KPU) identified in the Clinical Service Plan and the Operational Policies of the Uni.
- Room sizes indicated should be viewed as a minimum requirement; variations are acceptable to reflect the needs of individual Unit
- Office areas are to be provided according to the number of approved full-time positions within the Unit

8 Further Reading

In addition to Sections referenced in this FPU, i.e. **Part C- Access, Mobility, OH&S, Part D - Infection Control** and **Part E - Engineering Services**, readers may find the following helpful:

- Building Type Basics for Research Laboratories, Daniel Watch. New York, NY: John Wiley & Sons, Inc., 2001
- CDC (Center for Disease Control) US. Guidelines for Environmental Infection Control in Health-Care Facilities, US, refer to website: http://www.cdc.gov/hicpac/pubs.html
- CLSI QMS 04 Laboratory Design Guidelines. Refer to: www.clsi.org
- CRC Handbook of Laboratory Safety, 5th Edition, A. K. Furr. Boca Raton, FL: CRC Press, 2000 refer to: https://www.crcpress.com/CRC-Handbook-of-Laboratory-Safety-5th-Edition/Furr/p/book/ 9780849325236
- Dubai Health Authority Health Regulation Sector Clinical Laboratory Regulation 2012 https://www.dha.gov.ae/Documents/Regulations/Clinical%20Laboratory%20Regulation.pdf
- Dubai Universal Design Code 2017 https://www.dha.gov.ae/Documents/HRD/RegulationsandStandards/Polocies/Dubai%20Universal%20Design%20Code%20Final%20Feb%202017.pdf
- DHA (Ministry of Health – UAE), Unified Healthcare Professional Qualification Requirements, 2017: https://www.haad.ae/HAAD/LinkClick.aspx?fileticket=2K19llpB6jc%3d&tabid=927
- International Health Facility Guideline (iHFG) www.healthdesign.com.au/ihfg
- ISO/IEC 17025 General requirements for the competence of testing and calibration laboratories, 2005, refer to: https://www.iso.org/standard/39883.html

- Laboratory Design Guide, 3rd Edition; Brian Griffin, Architectural Press, Elsevier UK, 2005
- The Clinical Biochemist Reviews, Clinical Chemistry Laboratory Automation in the 21st Century, David A Armbruster, David R Overcash and Jaime Reyes, 2014 Aug; 35(3): 143–153, refer to: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4204236/
- The Facility Guidelines Institute (US), Guidelines for Design and Construction of Hospitals, 2018. Refer to website: www.fgiguidelines.org