

# MANUAL ON TECHNICAL GUIDELINES FOR HOSPITALS AND HEALTH FACILITIES PLANNING AND DESIGN

VOLUME 1 - INTRODUCTION AND INSTRUCTION FOR USE

DEPARTMENT OF HEALTH  
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VOLUME 1 - INTRODUCTION AND INSTRUCTION FOR USE

VOLUME 3 - SCHEMATIC PLANS AND TECHNICAL REQUIREMENTS OF  
A 25-BED HOSPITAL

VOLUME 5 - APPENDICES

Department of Health  
HEALTH INFRASTRUCTURE SERVICE  
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## **1.0 INTRODUCTION**

It is the policy of the Department of Health (DOH) to provide both preventive and curative health care that are available, accessible, acceptable and affordable to the people. Such policy determines to a large extent the provisions of hospitals and other health facilities.

The provision of hospitals and other health facilities involves a significant amount of capital investment and operational expenditure. It is then imperative to give utmost attention and concern to hospital planning and design considering the country's socio-economic, cultural, political and technological condition; the rapid advance in medical and design technology; the limited number of Filipino Architects specializing in hospital planning and design; and the country's limited resource.

### **1.1 Purpose of the Guideline**

The primary objective of the technical guideline is to serve as a tool for health facility planning and design.

### **1.2 Format of the Guideline / Design Brief**

The guideline is presented on a per room basis. Every room is discussed in three different types of Room Data Sheet (RDS). The Room Data Sheet A: FUNCTIONAL DESIGN REQUIREMENTS provides information on functional design requirements stating the facilities (equipment, furniture, engineering terminals, etc.) provided to support the activities of the room user. The Room Data Sheet B: TECHNICAL DESIGN DATA gives the technical design data stating the ideal environmental conditions that must be maintained in a room. The Room Data Sheet C: TECHNICAL DESIGN DATA AND LAYOUT OF ROOM AND SPACE COMPONENTS gives additional technical design data specifying direct services provided in the room and direct demand on floor and wall that shall help designers identify finishing materials to be used. This RDS also provides the room layout and area requirement for the room being discussed.

### **1.3 Function of the Guideline**

These standard briefs and prototypes shall serve as tools and reference guide for hospital planning and design and not as dogmatic documents to be used for specific projects.

It is the intention of this guideline to provide users basic information on the functional and technical requirements for the planning and design of hospitals under the primary, secondary and tertiary categories.

### **1.4 Updating the Guideline**

It is envisioned that the further improvement of the guideline shall be from the result of continued use and cross-referencing of the design brief.

Comments and results from test-case applications of the guideline shall be evaluated. The final outcome of the evaluation will determine the corresponding revisions to be made in the guideline. These shall be the inputs used in updating the guideline.

### **1.5 Need for Minimum Standards**

In writing about using a selection of existing techniques and tools for planning health facilities, Dr. Montoya-Aguilar of SHA/WHO Headquarters says, "Subject to an understandable range of nuances,

people agree that rigid standards are to be excluded and that typical plans and modules are useful, but only as references or examples of approaches. Indeed, along with alternative reference plans designed for typical situations, planners should also formulate guidelines on how to adapt them for more specific circumstances. Certain technical norms are, of course, necessary and statutory. But, even these must be revised from time to time." Truly there are a lot of these guidelines and typical plans but these are however scattered and not thoroughly explained nor set in the proper context of our setting. There is therefore a need for selecting and if possible, formulating a set of tools for health facility planning and design appropriate for our milieu.

It is generally conceived that the technical requirements set by the Bureau of Licensing and Regulation (BLR) is an extremely large effort to upgrade and sustain DOH's health facilities current standards and needs. This readily addresses the "norms and standards which are necessary and statutory." What this study seeks to achieve is to address the challenge of hospital planning and go beyond what has been achieved by BLR. It seeks to provide "examples of approaches" and as a reference and a guideline on hospital design and planning. However, in the final analysis, each project will and should remain novel and unique in its adaptation to the unique range of socio-cultural, physical, and other characteristics of the community it seeks to serve.

## 1.6 Limitation of the Study

This study is limited to primary, secondary (district) and tertiary (provincial) hospital categories only.

Due to lack of local reference materials, this study relied mostly on foreign sources for data, namely:

- Time Saver Standards for Building Types by Joseph de Chiara and John Callendar
- Hospital Planning and Administration by R. Llewelyn Davies
- Schematics Plans of General Hospital by Col. F. Ehardt
- VNR Metric Handbook by Leslie Fairweather and Jan A. Sliwa
- IEEE Standard Dictionary of Electrical and Electronics Terms by the Standard Committee of the Institute of Electrical and Electronics Engineers, Inc.
- American Electricians' Handbook (Eleventh Edition) by Terrell Croft and Wilford Summers
- Standard Handbook for Electrical Engineers (Eleventh Edition) by Donald G. Fink and H. Wayne Beaty
- Mechanical and Electrical Equipment for Buildings (Sixth Edition) by William J. McGuinness, Benjamin Stein and John S. Reynolds

Other indispensable sources of data are the Philippine Electrical Code by the Code Committee of the Institute of Integrated Electrical Engineers, the DOH Administrative Order No. 68-A, s. 1989, otherwise known as the Rules and Regulations Governing the Registration, Licensure and Operation of Hospitals in the Philippines, the Standard Manpower and Equipment Listing by the former Bureau of Medical Services, training and learning opportunities and interactions and consultations with experts from the different medical fields and from other DOH offices (HOMS, BLR, HMS, RHS and BRL).

## 2.0 INSTRUCTION FOR USE

The following text contains detailed explanation, definition of terms and a general background of the design manual framework. As earlier indicated, the design manual is not intended to be used as a dogmatic or absolute document for any particular project. It basically provides general information on functional design requirements, technical design data and suggested standard planning layout of some health facilities. It shall aim to lead users in designing a more practical and functional structure that shall be in conformity with the standards set by the DOH. The general data provided in the design manual intends to help designers come up with the most suited health facility design, planning and material finishing.



The framework of the design manual is presented in the following Room Data Sheet format:

## 2.1 Room Data Sheet A : FUNCTIONAL DESIGN REQUIREMENTS

This pertains to the essential design considerations which include listing of facilities required and user related data involved to support and achieve the intended function of the room. These essential design considerations are the following:

2.1.1 **Activities Involved** - a listing that provides a clearer understanding of the activities done within the designated area of the room. The specific description of the activities involved gives information on the room users and information on the type and number of the furnitures and equipment needed to support the listed activities. As these essential informations are converted into spatial dimensions, area quantification can now be done.

2.1.2 **People Involved** - a listing that provides the number of occupants or users of the room at any one time. This may refer to the specific regular office period/hour or any other one work period or shift. Through anthropometrics, space quantification can be done to identify the size of work areas to be provided to support the activities of the room occupants. This shall also help in determining the number of particular furnitures and equipment needed.

This listing may however vary in accordance with existing official and projected plantilla or organizational set-up in any particular Health Service Facility.

2.1.3 **Planning Relationships** - this indicates the areas and services that are to be located adjacent/ close or at least immediately and easily accessible to the room being discussed or referred to in the manual.

2.1.4 **Equipment and Accessory Checklist** - may indicate any of the following: tools, implements, apparatus, appliances, devices, accessories, attachments and gadgets.

2.1.5 **Furniture and Fixture Checklist** - may indicate either movable or non-movable articles and fixtures found in a room that may or may not significantly occupy floor areas.

2.1.6 **Additional Equipment and Engineering Terminals** - indicates other accessories and fixtures that do not necessarily occupy a particular floor area within the room but must be recognized for their functional importance. These fixtures are usually wall or ceiling mounted.

## 2.2 Room Data Sheet B : TECHNICAL DESIGN DATA

This pertains to the essential technical data that must be considered in establishing and maintaining quality and ideal set-up for any health facility in relation to the four environmental conditions:

### 2.2.1 Air

2.2.1.1 **Outdoor air temperature (deg. C)** - the average prevailing atmospheric temperature of a locality in degrees Centigrade. As the outdoor temperature increases the desirable room temperature in an air conditioned space increases.



#### 2.2.1.1a Temperature ranges:

Cold	- below 10 deg. C.
Cool	- 10 deg. C to 15 deg. C.
Temperate	- 15 deg. C to 27 deg. C.
Hot	- 27 deg. C to 38 deg. C.
Very Hot	- above 38 deg. C.

- 2.2.1.2 **Room temperature (deg. C)** - the ideal temperature of a conditioned space for employees or hospital staff to work with ease or for a patient to be comfortable. This is sometimes referred to as the effective temperature. Effective temperature is an empirically determined index which combines into a single value the effect of temperature, humidity and air movement on the sensation of warmth or coolness felt by the human body. The numerical value is that of the temperature of still saturated air which could induce an identical sensation. The wide range of effective temperature is indicated on graphical representation of comfort zone.
- 2.2.1.3 **Mechanical ventilation** - the process of supplying air or removing air by mechanical means for or from any space. Such air may or may not have been conditioned. To minimize odors and to maintain freshness of the air, a quantity of outdoor air should be supplied continually to any space occupied by people. The quantity of outdoor required to control body odors satisfactorily decreases as the volume space per occupant increases.
- 2.2.1.3a **Volume (cu.m./hr.-person)** - the quantity of outside air ventilation requirement in cubic meter per hour per person.
- 2.2.1.3b **Velocity (m./hr.)** - the speed of outside air ventilation requirement in meter per hour.
- 2.2.1.4 **Pressure** - in all infectious rooms, bacteriology laboratory and rooms using toxic chemicals, the following are required:
- 2.2.1.4a **Exhaust (psi)** - amount of pressure for an exhaust fan required to force the contaminated air out of the room.
- 2.2.1.4b **Inlet (psi)** - amount of pressure for an equivalent inlet fan needed to normalize the room air pressure.
- 2.2.1.5 **% Dust filtration** - the quality of indoor air should be clean and dust free. Dust and other heavily contaminated tiny particle of pollutants should be removed from the air to prevent respiratory ailments and other diseases.
- 2.2.1.6 **Humidity (%RH)** - unless otherwise stated will mean the relative humidity in percent (%RH). This is the ratio of the actual (measured) partial pressure of the water vapor in the air mixture to its saturation pressure at the same dry bulb temperature. This is also the ratio of the actual weight of moisture per cubic meter of mixture to the weight of the saturated water vapor per cubic meter of mixture at the same dry bulb temperature.

#### 2.2.1.6a Relative Humidity Ranges (%RH):

Very dry	- 0-25%
Dry	- 25-50%
Humid	- 50-75%
Very Humid	- 75-100%

#### 2.2.1.7 Cooling load (TR) - the total calculated heat and moisture of a room in Tons of Refrigeration (TR) equivalent to 12,660 KJ/HR.

The following are the major sources of load:

- Product load in cooling and maintaining low temperature of a product;
- Solar transmission through walls, ceiling, floor, doors, ducts and pipes - a process of conduction;
- Radiation and conduction through windows;
- Occupants - sensible heat given off by people;
- Electrical equipment - heat from lights, motors and other appliances;
- Infiltration - exchange of conditioned air with outdoor air through door openings and cracks;
- Ventilation - the controlled replacement of conditioned air with outdoor air; and
- Latent load - condensation by the air conditioner of moisture from such sources as people, cooking appliances and outdoor air.

### 2.2.2 Sound

#### 2.2.2.1 Acceptable sound level (db) - the sound level that must be observed in a particular area to achieve the acoustical requirements in order that activities involved may proceed unhampered.

The following tables provide information on the acceptable sound level (db) for a particular area:

#### 2.2.2.1a Table I - Recommended Category Classification for Background Noise Levels

Type of Space	Acoustical Requirements	Acceptable Equivalent Noise Level Range (db)
- intensive care areas, recovery areas	- quiet surrounding must be maintained  - for listening to faint musical sound	20-30

Type of Space	Acoustical Requirements	Acceptable Equivalent Noise Level Range (db)
- large meeting and conference rooms, executive offices and conference rooms for 50 people	- for good listening	35-40
- bedrooms, sleeping quarters	- for sleeping, resting and relaxing	35-45
- private and semi-private offices, small conference rooms, classrooms, libraries	- for good listening conditions	40-45
- lounging areas and similar spaces	- for conversing or listening to radio and TV	45-55
- large office, reception areas, waiting areas, dining areas, cafeterias	- for moderately good listening conditions	45-60
- lobbies, laboratory work spaces, general secretarial areas	- for fair listening conditions	50-55
- light maintenance shops, office and computer equipment rooms, kitchens and laundry areas	- for moderately fair listening conditions	55-70
- shops, garages, power-plant control rooms	- for just acceptable speech and telephone communications	70-110

2.2.2.1b Table II - Common Noise Levels

Type of Sound	Subjective Impression	Sound Level (db)
- siren at 100 ft.	- deafening, threshold of pain	120
- wood working shop - accelerating motorcycle	- threshold of discomfort	110
- loud street noise - power lawn mower - car/truck unmuffled - kitchen blender	- very loud	90



Type of Sound	Subjective Impression	Sound Level (db)
- noisy office	- loud, intolerable	80
- average street noise	- for phone use	70
- quiet typewriter		
- average radio		
- average office	- usual background	60
- normal conversation		
- general office		50
- quiet radio		
- quiet street		
- private office	- noticeably quiet	40
- quiet bedroom		30
- quiet conversation		
- whisper	- very quiet	20
- human breathing		10
- complete silence	- intolerably quiet	0
	- threshold of audibility	

2.2.2.1c **Table III - Average Ambient Noise Level of Interior**

Area	Average Ambient Noise Level (db)
- television or radio station, church, synagogue	20-34
- offices, residence, night school	26-30
- library, reception or reading rooms, school study hall	31-36
- noisy office, doctor's or dentist's office, classroom	37-42
- stores and factories	43-49

2.2.2.2 **Speech privacy** - levels that indicate extent of acoustical limits and identify areas where application of acoustical provisions are necessary.

2.2.2.3 **Quality which cannot be tolerated** - the presence of noise characterized as tonal impacts which are incompatible with the required acceptable sound/noise level and may also hinder in achieving and performing the desired activities involved in a particular area.

## 2.2.3 Lighting and Visual

- 2.2.3.1 **General illumination (LUX)** - is a method of illumination that provides an approximately uniform level of illumination on the work plane over the entire area. The luminaries are usually arranged in a symmetrical plan fitted into the physical characteristics of the area and blend well with the room architecture. They are relatively simple to install and require no coordination with furniture or machinery that may not be in place at the time of the installation. Perhaps the greatest advantage of using this system of illumination is that it permits complete flexibility in task location.

In this system of illumination, lighting units are supported fairly close to the ceiling or at least at a considerable distance above the working plane. They are spaced uniformly throughout the area without special regard to the location of equipment, machinery, furniture, etc., and at such a distance from one another as to give nearly uniform illumination.

- 2.2.3.2 **Night illumination (LUX)** - reduced lighting levels for periods of low or minimal activity usually observed during night time.
- 2.2.3.3 **Task illumination (LUX)** - provides lighting only over a relatively small area occupied by the task and its immediate surround. The illumination may be from luminaries mounted near the task or from remote spotlights. This system also is sometimes called local lighting. It is an economical means of providing higher illumination levels over a small area, and it usually permits some adjustment of the lighting to suit the requirements of the individual. Improper adjustments may, however, cause annoying glare for nearby workers. Local lighting, by itself, is seldom desirable. To prevent excessive changes in adaptation, it should be used in conjunction with general lighting or illumination that is at least 20% of the local lighting level; it then becomes supplementary lighting.
- 2.2.3.4 **Colour rendering** - is a general expression for the effect of a light source on the color appearance of objects in conscious or subconscious comparison with their color appearance under a reference light source. For example, a case of the fish looking red or fresh under pink light. It is defined as the degree to which perceived colors of objects illuminated by a test source conform to the colors of the same objects as illuminated by a standard source. The standard is always daylight at that color temperature. Therefore, the colour rendering index of a light is really a measure of how closely it approximates daylight of the same color temperature.
- 2.2.3.5 **Standby light** - the installed reserve lighting equipment in excess of that required which is a reliable support or source to carry peak load.
- 2.2.3.6 **Emergency light** - lighting designed to supply illumination essential to the safety of life and property in the event of failure of the normal supply. It is required when the normal source is interrupted for any of the following reasons:

- Interruption of current flow through operation of a circuit disconnect. For example, inadvertent de-energizing of a circuit at a panel or switchboard.
- Failure of the building's electrical system.
- General power failure.



- 2.2.3.7 **Daylight** - the cheapest (insofar as energy is concerned), most abundant and, in many ways, most desirable form of lighting available. The presence of daylight in interior spaces is made possible by windows and other similar openings. When daylight enters through windows (side lighting, as opposed to toplighting), its horizontal directivity provides good modeling shadows, minimal veiling reflections, and excellent vertical surface illumination. Furthermore, the continual variation of daylight which is one of its prominent characteristics, provides a constantly changing pattern of space illumination; one that is unattainable with artificial light. Since these changes are gradual, the eyes adapt easily and the effect is one of visual restfulness and interest.

On the other hand, no ill effects have conclusively been demonstrated to have been caused by lack of daylight, that is, by working in an artificially lighted space. An artificial lighting system must be installed in any event, to furnish interior illumination during periods when daylight is insufficient.

Since daylight is variable, it creates special problems of glare control, direct sunlight control, and heat gain limitation. In large measure the science and art of daylighting is not so much how to provide daylight but how to do so without the attendant undesirable effects. It is thus imperative to adopt the technique of permanent supplementary artificial lighting in interiors. This design approach/technique views artificial lighting as supplementary to daylight and not vice versa. For structures that are extracted to be in use at night, artificial lighting must be designed to furnish all of the required lighting.

- 2.2.3.8 **View out** - the provision of openings, for example windows, in interior spaces that will create visual contact with the outside and the resultant effect providing a bright, pleasant and airy ambience to the room.
- 2.2.3.9 **Privacy** - as opposed to being public; not exposed; not open; seclusion; isolation; separateness.
- 2.2.3.10 **Black out** - deliberate exclusion of unwanted light necessary in the performance of specific activities involving special procedures that may require special low level lighting or the complete absence of some specific type of lighting.

## 2.2.4 Safety

- 2.2.4.1 **Accessible hot surface** - identifies heat generating equipment whose surfaces may reach temperature of dangerous levels that users may possibly come in contact with.
- 2.2.4.2 **Accessible hot water** - identifies the source and location of accessible hot water with its allowable maximum temperature for safe use.
- 2.2.4.3 **Access limit** - identifies the authorized room or facility users in order to identify the proper security measures to be adapted.
- 2.2.4.4 **Fire risk** - identifies the level (quantity and quality) of fire risk and hazards present in the space being discussed in order that proper fire prevention measures may be applied.
- 2.2.4.5 **Other risks** - identifies other health hazards that may be present in the room other than what is previously listed that may pose as some danger to room users.



## 2.3 Room Data Sheet C - TECHNICAL DESIGN DATA AND LAYOUT OF ROOM AND SPACE COMPONENTS

- 2.3.1 **Direct Services** - this refers to the required basic utilities and other convenient necessities that must be provided in a specific area.
- 2.3.1.1 **Disposal** - identifies the type of waste generated in an area, treatment of which must conform with the approved operational programs for solid waste management as established by the Department of Health.
  - 2.3.1.2 **Hot water** - identifies fixture source and location of this particular utility.
  - 2.3.1.3 **Cold water** - identifies fixture source and location of this particular utility.
  - 2.3.1.4 **Drainage** - identifies fixtures and areas to be provided with this utility. Treatment of sewage materials must also conform with the approved operational programs for liquid waste management as established by the Department of Health.
  - 2.3.1.5 **Gas** - identifies areas to be provided with this utility (may either refer to medical or non-medical). Type of which, whether supplied in portable cylinders or through wall outlets, must be determined according to the capacity to supply and safely maintain such a system.
  - 2.3.1.6 **Compressed air** - (see 2.3.1.5)
  - 2.3.1.7 **Steam** - identifies location where required.
  - 2.3.1.8 **Others** - indicates other necessary utilities not previously listed.
- 2.3.2 **Direct Demands on Floor and Wall** - the extent of usage and other factors, such as the activities involved, affecting the performance of materials to be used as finishing for floor and walls.
- 2.3.2.1 **Loading** - type of loads, whether light moving loads or heavy stationary loads must always be taken into consideration so that ample structural support must be provided.
  - 2.3.2.2 **Spillage** - the floor and wall finishing materials must conform to the type and frequency of spillage present in the area.
  - 2.3.2.3 **Foot traffic** - the floor finishing materials to be used must be able to support the expected maximum level of traffic that can be observed in a particular area. The finishing material must be durable enough to withstand the traffic with the least need for maintenance and upkeep.
  - 2.3.2.4 **Wheel traffic** - (see 2.3.2.3)
  - 2.3.2.5 **Impacts** - the force of collision where either floor or wall is subjected to when equipment or other bulky items are being moved or transported.
  - 2.3.2.6 **Abrasion** - scraping or wearing away by friction in either floor or wall brought about by foot and wheel traffic and the movement and transportation of equipment and other load bearing items.

- 2.3.2.7 **Easy maintenance** - where the practice and observance of cleanliness or sanitation can be maintained and achieved with a minimum involvement of work and effort.
- 2.3.2.8 **Vibration free** - maintaining the constant absence of vibratory disturbances, both physical and auditory, that may originate from machines, equipment and other obvious sources. The absence of these disturbances may be necessary to maintain a good and pleasant room atmosphere.
- 2.3.2.9 **Door sets** - identifies the type of door, its size and material finish, so that equipment and other listed items may be provided easy access, smooth transfer and movement from one area to another.
- 2.3.2.10 **Windows** - classifies the quality of the interior atmosphere that must be maintained in a room that will determine the type, size and material finish of the window.
- 2.3.2.11 **Internal glazing** - identifies the type of glass finishes to be used, whether clear, opaque, etc.
- 2.3.3 **Layout of Room and Space Components** - indicative room plans showing the space components and the required equipment and furnishings to be installed in the room.
- 2.3.4 **Space Demands** - the quantity or the number of each space component and its standard minimum area requirement that shall comprise the total minimum area requirement of the room.
- 2.3.5 **Regulations and Notes** - special rules, directives and instructions that must be applied during the design process to improve and standardize the health facility design and planning.

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This Manual on Technical Guidelines for Hospitals and Health Facilities Planning and Design is a culmination of efforts and significant contributions from various health agencies and individuals whose main concern is to constantly upgrade the status of health in the country by continually developing technical standards for the planning and design of hospitals and other health facilities.

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