



DESIGNING FOR HEALTH CARE



**Presented by Arc Richard Nii DADEY, FGIA, FAAPM,
Ghana**

4th October 2021

INTERNATIONAL UNION OF ARCHITECTS



designing for health care

***‘As an architect, you design for the present, with an awareness of the past for a future that is essentially unknown’
– Norman Foster.***



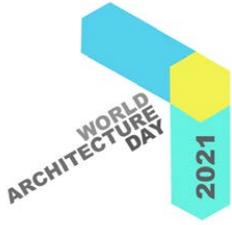
designing for health care

INTRODUCTION

Health facilities are first and foremost centers for healing and by extension must not be conduits for the spread of disease.

The big question is: Can we design for health care to reduce the spread of disease.

For me the answer is a resounding YES we can!



designing for health care

This presentation will focus on Design of Health Care Facilities in the context of Covid 19. I will attempt to cover the essentials within the 10 minutes that I have.

A large part of this paper is the result of research, consultations with epidemiologists, infection control specialists and Lessons learnt during the design, construction and equipping of the first purpose designed infectious diseases center in Accra.



designing for health care

According to the [US Center for Disease Control and Prevention](#), COVID-19 can be spread in three main ways:

1. Person-to-person via **direct contact**.
2. Person-to-person via **airborne respiratory droplets** produced when an infected person coughs or sneezes.
3. Surface-to-person via **contact with surfaces or objects that hold the virus**, followed by an individual touching their own mouth, nose, or eyes.



designing for health care

IMPORTANT AREAS THAT ARCHITECTS NEED TO FOCUS ON

- 1. Design of Open and More Adaptable spaces within the health facilities**
 - *Waiting areas should be designed to accommodate smaller groups of persons in the same space.*
 - *Hospital layouts to be designed with larger open green areas, large windows to let in sunlight as the virus does not appear to thrive well in bright sunlight.*
 - *Design of health facilities to enable patients have views and access to gardens, water fountains and other design interventions for therapeutic purposes.*
- 2. Use of Touchless Technology**
 - *increased use of voice activated elevators, doors with motion sensors, hands free light switches and ventilation/heating controls, taps and faucets with motion sensors*
- 3. Use of Anti-microbial material:**
 - *use of materials with antimicrobial properties which are effective in the elimination of harmful microorganisms on coated will cut down on indirect transmissions*



designing for health care

4. Ventilation of Buildings

- *design for increased fresh air intake as this dilutes air borne contaminants and decreases transmission rates.*

5. Use of Negative Pressure

- *negative pressure systems which draw in filtered air from the corridors into the rooms so that infections are not spread by patients*

6. Filtration of Indoor Air

- *High Efficiency Particle Air (HEPA) filters can remove 99.97% of particles that are 0.3 microns or larger. In addition, these filters remove dust, bacteria, fungi and vapors and are also known to capture viral particles spread by droplet nuclei*

7. Maintain Optimal Humidity

- *An optimal range of 40 to 60 % can immediately be attained though the use of portable humidifiers*

8. Provision of handwashing facilities with appropriate signage

- *handwashing facilities to be carefully designed and detailed with appropriate signage to encourage/force all to wash hands before entering public spaces*



designing for health care

9. Increased use of Telemedicine

design of health facilities must cater for increased use of telemedicine in order to reduce visits to hospital.

10. Provision for the elderly and aged in housing programmes

- *design for barrier free access for the disabled and the frail elderly in affordable housing programs will avoid non-essential visits to the hospitals*

11. Preparedness and Early Response to Disease Outbreak

- *Methods of rapidly constructing health facilities in response to an unexpected disease break out*
- *Education to increase number of architects actively involved in public health and design solutions*
- *Introduction of preventive measures in the areas of sanitation in the communities*

This list is not exhaustive and I wish to emphasize that we need to adapt to the virus as it continues to mutate.

designing for health care



**Ghana Infectious Disease Centre
ACCRA**



designing for health care

The Ghana Infectious Disease Centre was conceived,

- designed,
- built,
- equipped and
- commissioned for operation between March and June 2020.

It is a purpose built 108 bed facility for treating of infectious diseases

We initially set out to construct the facility in 6 weeks (42 days) but with scope creep and refining of the brief we completed it in 100 days. The project team referred to it as **100 beds in 100 days**

It was unique collaboration between professionals in the built environment, the Ghana Armed Forces, The Ministry of Health and the Ghana Health Service, the Noguchi Memorial Laboratory and the Private Sector Fund which provided 100% funding.

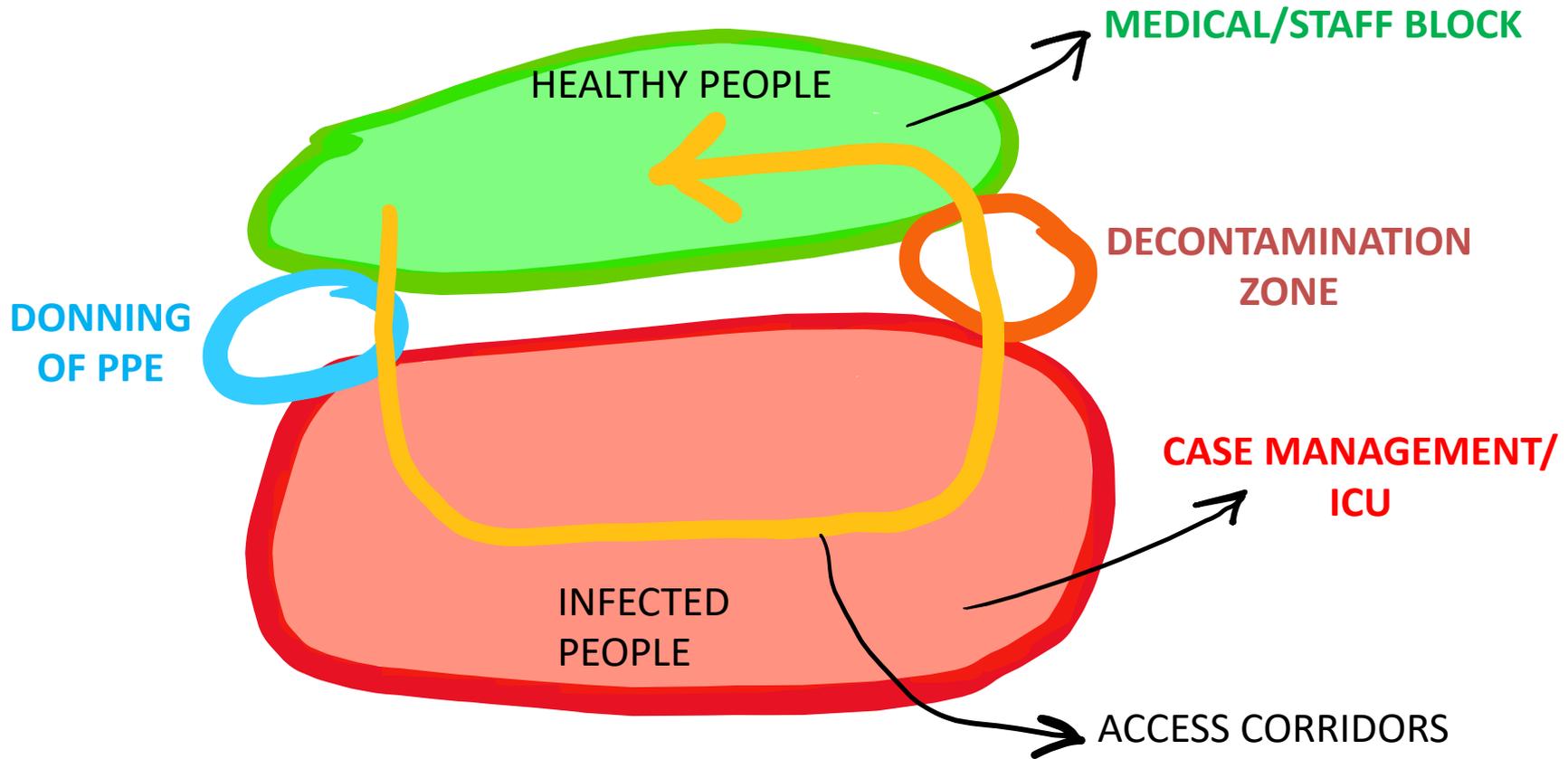
The land was made available by the Government of Ghana

GHANA INFECTIOUS DISEASE CENTRE- DESIGN CONCEPT

FACILITY USERS - **HEALTHY PEOPLE** AND **INFECTED PEOPLE**

NEED TO ZONE THE SPACES

DEFINED CIRCULATION PATHS-HEALTH STATUS OF THE USER



STAFF ENTRY

PATIENT ENTRY

MEDICAL ZONE

- GREEN
- ORANGE
- RED
- YELLOW



Personal Protective Equipment

All items per MIN-0060 Contract





TYPICAL 6 BED WARD



designing for health care



NURSES STATION



designing for health care

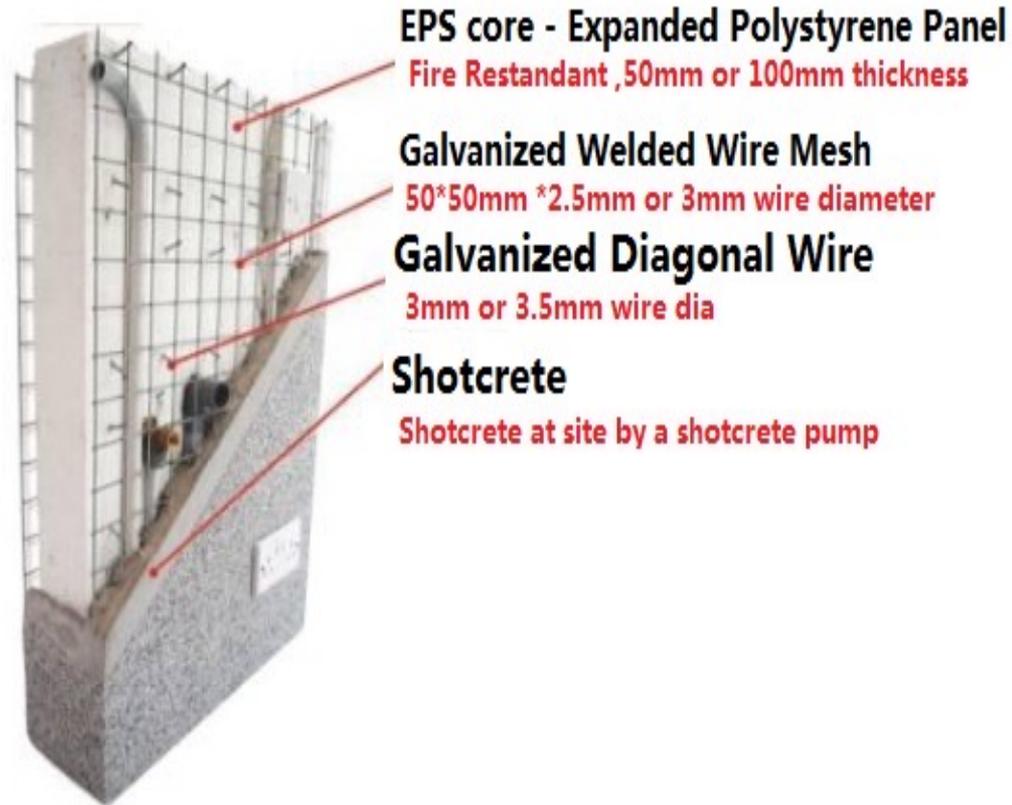


GHANA INFECTIOUS DISEASE CENTRE- CONSTRUCTION TECHNOLOGY

EVG 3D CONSTRUCTION SYSTEM

Expanded polystyrene sandwiched in wire mesh and finished with micro concrete

- ✓ Fast and Simple to erect
- ✓ Materials are recyclable
- ✓ No formwork needed
- ✓ Simple installation of utilities
- ✓ Elimination of additional beams and columns
- ✓ Less heavy components(easy handling)
- ✓ Provides Excellent thermal insulation
- ✓ Design flexibility
- ✓ Monolithic structure
- ✓ Better Earthquake resistance
- ✓ Lower Construction Costs



GHANA INFECTIOUS DISEASE CENTRE- CONSTRUCTION TECHNOLOGY



MATERIALS

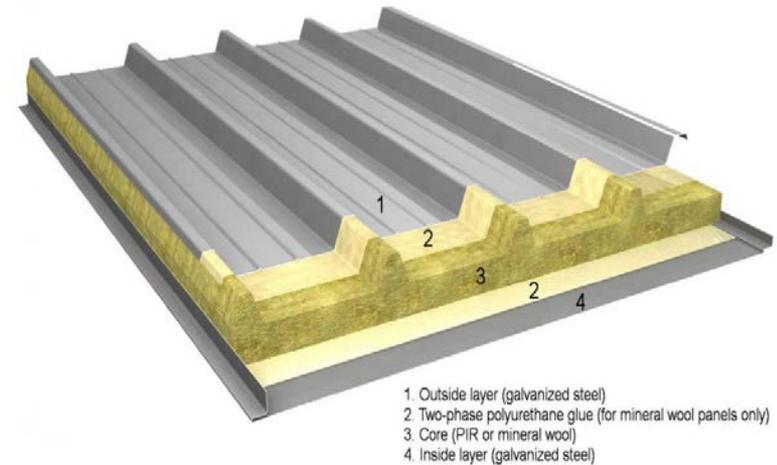
Floor Slabs - In-Situ Reinforced Concrete Slab

Roof Construction - Concrete Filler Slab with Polystyrene

Roof Construction - Steel Sheets on Timber Rafters

Walls - 3-D Wire Panel with 'Shot-Crete' Both Sides

Flooring - Epoxy Flooring



ENERGY MEASURES

Insulation of Roof

Insulation of External Walls

Air Conditioning with Air Cooled Chiller

Energy-Saving Light Bulbs- Internal Spaces

GHANA INFECTIOUS DISEASE CENTRE- SNAP SHOT

- **Green Building- Edge Certified**
Exemplary Achievement in
 - 23%** Energy Savings
 - 28%** Water Savings
 - 31%** Less Embodied Element in Material
- Negative Pressure Within the Building
- One way traffic for Patients and for staff
- Antimicrobial paints
- Hands free sensor faucets and doors in certain areas.

TOTAL PROJECT COST = \$7,500,000.00

Building Foot Print = 3,870 Sqm

- Building Structure
- Medical Equipment
- All other running cost expenses.





designing for health care



THANK YOU FOR YOUR ATTENTION

