SMART HEALTH CARE FACILITIES

November 2018

Shalini Jagnarine
M.Sc., CEng, MIStructE, D.I.C.
PAHO SMART HOSPITALS

SAFE
Resiliency

GREEN
Environmentally Sound

MAINTAINED
Sustainability

= SMART

Improve resilience to hazards

Reduce impact of Climate Change & Reduce operational costs

Conservation & Planned Preventative Maintenance
PAHO SMART HOSPITALS

• 5-year Project funded by DFID, UK
• 7 countries: Grenada, St. Lucia, St. Vincent and the Grenadines, Dominica, Guyana, Belize and Jamaica
• Over 400 Health facilities assessed (safe & green)
• Smart App created with database
• “SMARTing” of at least 4 facilities in each country
• Improved Technical material/ Tools
• Develop National & Regional Capacity
Why Smart?

Majority HF’s = HSI B or C

Only 2 HF’s are SMART

[Chart showing distribution of categories B and C]
Making Healthcare Facilities in the Caribbean SMART

A platform for integrating Disaster Risk Reduction, Climate Change Adaptation, Environmental Management, and Conservation Efforts

**SAFE**
- Sound Roof & Foundation
- Improved Security & Signage
- Secured Equipment & Fuel Storage
- Protected & Efficient Doors and Windows
- Good Drainage
- Back-up Power
- Water Reserve
- Disaster Management Plans
- Comprehensive Maintenance Planning
- Disability Access

**GREEN 70+**
- Water Efficiency
- Waste Minimization & Management
- Pollution Reduction
- Rain Water Harvesting
- Alternative Power Using Renewable Energy
- Efficient Lighting & Cooling
- Improved Indoor Air Quality

**SUSTAINABILITY**
- Reduced Downtime
- Resilient Structure
- Reduced Operating Cost
- Improved Safety
- Satisfied Patients and Staff
- Environmentally Sound Operations
- Improved emergency care and services for the community

**RESILIENCY**

SMART HOSPITAL

Hospital safety Index – Score A
Green checklist – Scores above 70%

Smart Healthcare Facilities in the Caribbean
Providing safer greener health facilities to deliver care in disasters
Health Care Facilities

Electrical usage at health care facilities by equipment

IN-PATIENT FACILITY

- % of total electricity from Lighting: 20
- % of total electricity from AC: 32

OUT-PATIENT FACILITY

- % of total electricity from Lighting: 22
- % of total electricity from AC: 46
Health Care Facilities

ESTIMATED SAVINGS FROM ELECTRICAL RETROFIT TO LIGHTS & AC ONLY

- **Average Annual Electricity Usage (KWH)**
  - Out-Patient Facility: 62,840
  - In-Patient Facility: 74,636

- **Average Annual Electricity Saved (KWH)**
  - Out-Patient Facility: 16,096
  - In-Patient Facility: 13,618

- **Average Annual Savings (US$)**
  - Out-Patient Facility: $5,749.36
  - In-Patient Facility: $4,864.11

- **Energy Savings**
  - Out-Patient Facility: 26%
  - In-Patient Facility: 18%
Health Care Facilities

HVAC: Average payback period = 5.6 years

Lighting: Average payback period = 9.2 years
Energy retrofit: 

Sounds EASY!
Integrating disaster risk reduction into investment decisions is the most cost-effective way to reduce these risks; investing in disaster risk reduction is therefore a precondition for developing sustainably in a changing climate.
Designing for Resilience

PAY ATTENTION TO GEOMETRY AND SITING!

• No risk if facility located in safe location
• Avoid building in flood planes
Geometry

Use simple geometry rather than complex geometry

Simple

Complex

Plan Geometry

Elevation
Favourable Roof Geometry

- Hip Roof with pitch ≥ 20°
- Gable Roof with pitch ≥ 20°
- Hip Roof with parapet, pitch ≥ 15°
- Gable Roof with parapet, pitch ≥ 20°
Correct geometry
PV panels, post-Maria

Parapet walls
Smart Energy Retrofit

• Solar shading versus increased lighting
• Include insulation, small capital cost = big operational savings
Smart Energy Retrofit

• Incorporate natural ventilation

Ref. windowmaster.com
Comfort Bay Senior Citizens Home, Saint Lucia

Smart HF Retrofit

Natural Wind flow

Mechanical vent
Smart Energy Retrofit

- Include natural lighting
- Include occupancy sensors for conservation
- Regular maintenance for optimal efficiency
- Use energy efficiency fixtures: lights, AC and appliances
- Supplement with renewable energy

- Safety first!
Smart HF Retrofit

Georgetown Hospital, St Vincent and the Grenadines

BEFORE

17/5/2012

AFTER

11/7/2013

Natural lighting transoms

Pan American Health Organization

World Health Organization

Regional Office for the Americas
Smart Health Care Facilities

INFORMATION

AWARENESS

LEADING BY EXAMPLE

TRANSFORMATION

• Belize - EU Smart Hospitals retrofit
• Jamaica - WB Health Section Vulnerability Assessment
• BVI – Smart schools & hotels
• Grenada – partial retrofits other donors
Smart Hospitals:
http://www.paho.org/disasters