

Innovating in Healthcare While Keeping the Lights On

Juan Antonio Javellana, MD
HIMSS Community Event
July 20, 2017

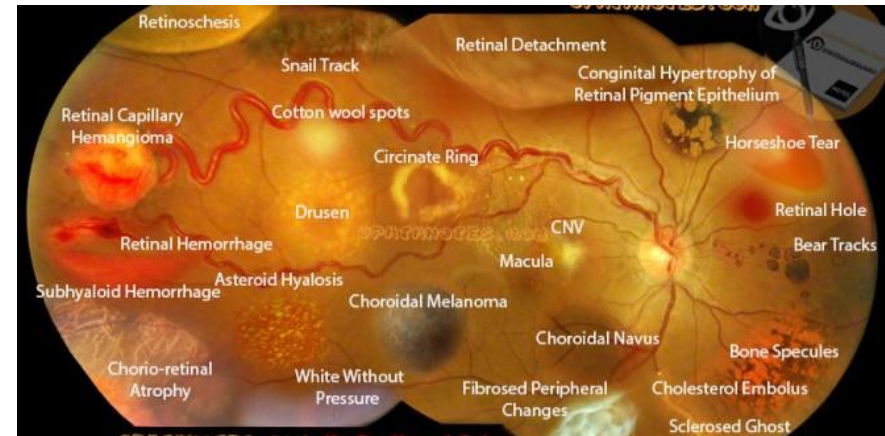


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Background

- Ophthalmologist
- Retina Surgeon
- Started in the Quality Management Committee
- Utilization Committee
- Medical Informatics Committee



Medical Informatics

- Defined by the U.S. National Library of Medicine, health informatics is the interdisciplinary study of the design, development, adoption, and application of IT-based innovations in healthcare services delivery, management, and planning



Medical Informatics

- The defacto IT department of Asian Hospital
 - Hospital Information Systems
 - Infrastructure
 - Applications
 - Roadmap to EMR and Digitalization



Expectation



Reality



Keeping the lights on

- Firefighting
- Storage Issues
- Aging Equipment
- Downtime

Keeping
The Lights
On

(CC BY-NC 2.0)
<https://flic.kr/p/8nz8uW>

*refers to that
portion of
I.T. expenditure
a company has to
perform on
daily operational
tasks*

(Bridgewater, 2013)



raptor_02n



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The Marching Orders

- Build a strong IT foundation
- Go Digital
- Do that EMRAM thing
- Comply with JCI Standards
- Engage the Customer /Patients
- Real Time Data with Dashboards/Analytics



Build the Foundation First

- Systems Audit
- Gap Analysis
- Create the Policies
- Build a Business Case
- Management Buy-in

ASIAN HOSPITAL AND MEDICAL CENTER
POLICY & PROCEDURE

DOC CODE: PL-MED-019
Issue Date: 12/20/12
Revision Date: 02/22/15 - Revision No. 1
Page No. 1 of 4

TECHNOLOGY REQUISITION

Prepared by: *Arnelo J. Pineda*
President / CIO
Senior Manager, Medical Informatics

Reviewed by: *Arnelo J. Pineda*
President / CIO
Senior Manager, Medical Informatics

Approved by: *Arnelo J. Pineda*
President / CIO
Senior Manager, Medical Informatics

MEDICAL INFORMATICS

1.0 PURPOSE:
This policy aims to standardize the process of ensuring that the installed hardware and software for mission critical systems are able to perform with the highest reliability and efficiency.

2.0 SCOPE:
This policy covers all Asian Hospital and Medical Center staff.

3.0 POLICY STATEMENT:
This policy is intended to outline the institution's technology refreshment plan. Typically, the term "computer" implies any device containing or operated by a micro chip. A computer, computer hardware and software are essential to the delivery of information. Further, rapid changes in technology require that a well-managed institution have a systematic plan for upgrading and replacing computers, peripherals and other technologies to ensure that support the required process. Additionally, having an equipment replacement policy in place can assist in allocating available resources and maximizing the best use of existing resources.

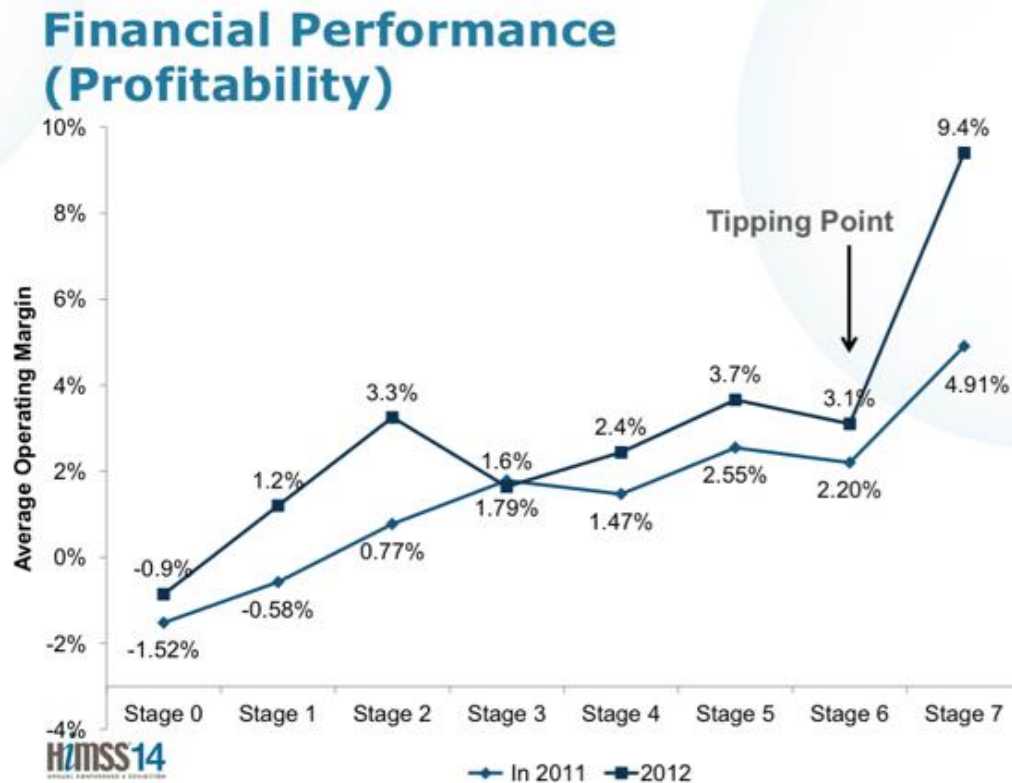
4.0 DEFINITIONS:
4.1 PACS: Picture Archiving and Communication System
4.2 PACS: Picture Archiving and Communication System
4.3 LIS: Laboratory Information System
4.4 Hardware
4.4.1 Servers - mission critical servers are those that are vital to the function of the institution, which includes the:
4.4.2 Computer - is a device that accepts information (in the form of digitalized data) and manipulates it for some task based on a program or sequence of instructions on how the data is to be processed.
4.4.3 Peripherals - hardware attached to computer systems such as monitors, keyboards, mouse, scanners, printers also includes projectors, networks and mobile devices.
4.5 Software
4.5.1 Standard Productivity Software - required software installed in end-user computers to allow system and productivity. Includes an operating system, Microsoft office, share point and mail.
4.5.2 Non-Standard Software - software required only by certain units of the institution such as CAD and Audio Production.

5.0 PROCEDURES:
5.1 Creating the technology refreshment
5.1.1 Aggregate technology
5.1.2 Out-of-office technology
5.1.3 Staff and storage
5.1.4 Compliance
5.1.5 Cost reduction
5.1.6 Standardization
5.1.7 Innovation
5.1.8 Vendor stability

Order ID	FWORSMF02	Model Type	Network Load Balancer	Physical	Est 5000	August 30, 2008	Windows Server 2008 Standard
	FWORSMF01	Model (FWORSMF02) (FWORSMF01)	45 TB Server	Virtual	24886.0132.48.16.32	January 17, 2012	Windows Server 2008 Standard
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Business Case



EMRAM

	Electronic Medical Records Adoption Model EMRAM
Stage 7	Complete EMR, CCD Transactions to share data; Data Warehousing, Data continuity with ED, ambulatory and OP
Stage 6	Physician Documentation, full CDSS, (variance & compliance), closed loop medication administration
Stage 5	Full Complement of Radiology PACS
Stage 4	CPOE must be used by any clinicians added to Nursing CDR Environment, CDS (Clinical Protocols)
Stage 3	Nursing/Clinical Documentation installed and integrated with the CDR for at least one service in the hospital. CDSS (Error Checking) PACS available outside Radiology
Stage 2	Clinical Data Repository, Controlled Medical Vocabulary, Clinical Decision Support, Document Imaging, HIE Capable
Stage 1	Ancillaries, Lab, Rad, Pharmacy Installed
Stage 0	All Three Ancillaries Not Installed



Challenges

- Manpower
- Skillsets
- Budgets



The Approach

- Consolidate Plans
- Leverage on new technologies
 - Hyperconverged solutions
 - Cloud
 - Software Upgrades
- Project Charters
- Scare Them



Microsoft
Azure

NUTANIX™



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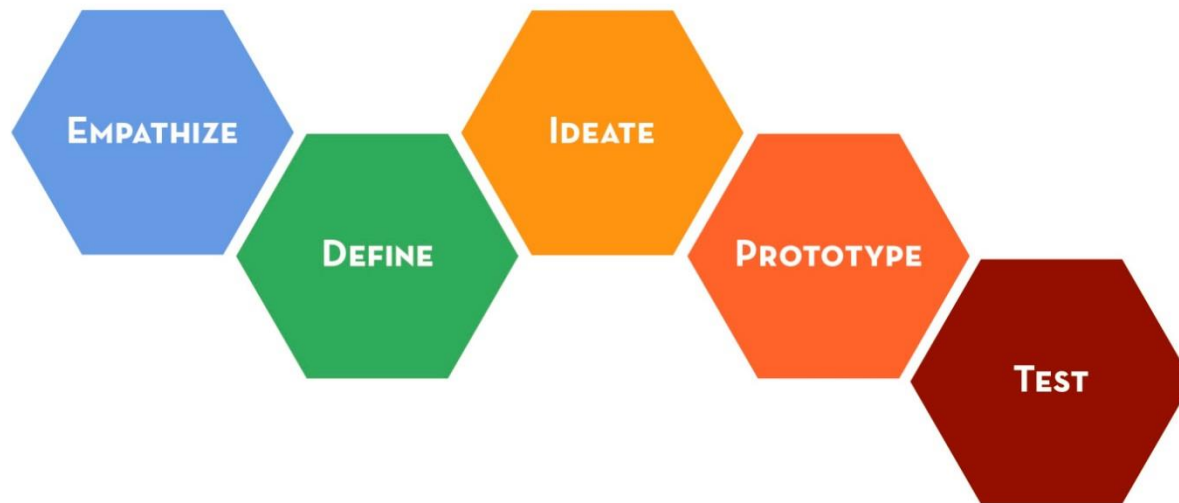


How to Innovate?

- Learn to say "No"
- Learn to say "No" many times
- Allow your team to think with you
- Allow them to fail
- Fail fast, and get up again



Design Thinking



Design Thinking

Quotes & Defining Words

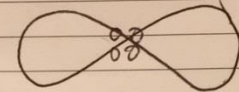
Thoughts & Beliefs



Actions & Behaviors

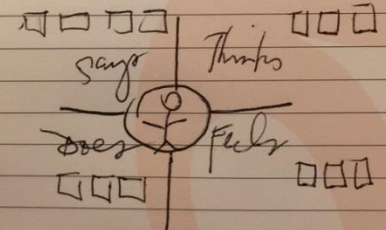
Feelings & Emotions

Design thinking



Obscene belief make
- get to know people
- uncover their
needs, & your idea

Empathy maps



Discharge Barcode scanner iPhone

Resorts World Sentosa | 8 Sentosa Gateway, Sentosa, Singapore 098269 | T +65 6577 8888 | www.



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Design Thinking



Gartner Hype Cycle for Emerging Technologies, 2016



gartner.com/SmarterWithGartner

Source: Gartner
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Gartner.



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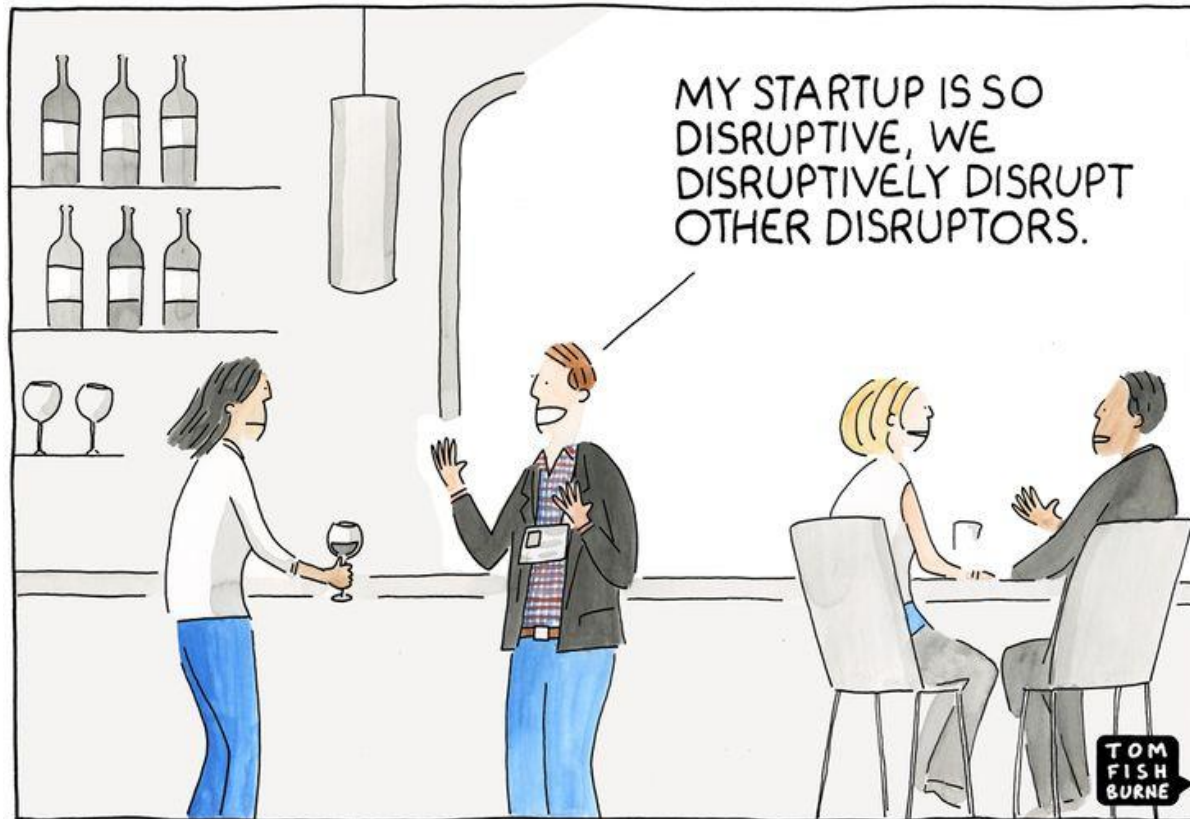
Figure 1. Hype Cycle for Healthcare Providers, 2016



Source: Gartner (July 2016)



Disrupt Yourself



© marketoonist.com



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“It is often easier to ask for forgiveness than to ask for permission”

-Grace Hopper

- US Navy Rear Admiral
- Computer Scientist



Hopprlab

- Our “startup” concept
- The incubation hub for all our great ideas



Hopprlab



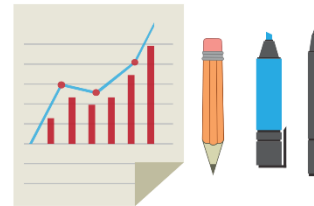
WEB MOBILE ANALYTICS IoT



WEB

Offers wide range of timely applications deployed and maintained in the cloud that are accessible with your browser anywhere from desktop to mobile screens.

[Explore](#)



ANALYTICS

Organize, visualize and analyze data to meet dashboards, reports and share insights that will measure your organization's performance.

[Explore](#)



WEB MOBILE ANALYTICS IoT



MOBILE

Engage customers with simpler and more efficient applications that will provide similar services to those accessed on the web while taking advantage of the unique features a mobile device can offer.

[Explore](#)



IoT

System of physical things embedded with sensors, software, electronics and connectivity to allow better performance by exchanging data between interconnected devices.

[Explore](#)



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Web and Mobile



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Application Development Projects – AHMC Portal



Asian Hospital and Medical Center

LOGIN

USERNAME

PASSWORD

FORGET YOUR PASSWORD?

LOGIN



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Application Development Projects – AHMC Portal

Laboratory Results

Asian Hospital and Medical Center

Welcome Labetoria, Ejel Yim

RESULTS

Laboratory

Radiology

Diagnosis

REPORTS

OTHERS

All Laboratory Results

Search

Service Category	Lab Order	Name	Date	
Clinical Microscopy	URINALYSIS, ROUTINE	Labetoria, Ejel Yim	8/5/2016 1:17:36 PM	View Result
Clinical Microscopy	FECAALYSIS (ROUTINE STOOL EXAMINATION)	Labetoria, Ejel Yim	8/5/2016 1:17:36 PM	View Result
Hematology-IH	(CBC) COMPLETE BLOOD COUNT WITH PLATELET COUNT	Labetoria, Ejel Yim	8/5/2016 1:17:36 PM	View Result
Clinical Microscopy	URINALYSIS, ROUTINE	Labetoria, Ejel Yim	9/23/2016 1:26:41 PM	View Result

Out Patient Medical Care Profile

Asian Hospital and Medical Center


Welcome Labetoria, Ejel Yim

REPORTS

OMCP

OTHERS

Search Hospital Number

Retail Pharmacy 1 Test Patient
000000001 | Female | 12/7/2005

Allergies

Diagnosis

Medications

Previous Surgeries

Previous Hospitalizations

Allergen	Allergy Status	Adverse Reaction
Chicken	Active	Itchiness
Dust mites	Active	Difficulty of Breath
Egg	Active	Itchiness, Rashies
Ibuprofen	Active	Numbness
Milk	Active	Dizziness
Paracetamol	Active	Rashies
Seafood	Active	Rashies
Tooth	Active	Itchiness, Rashies

1

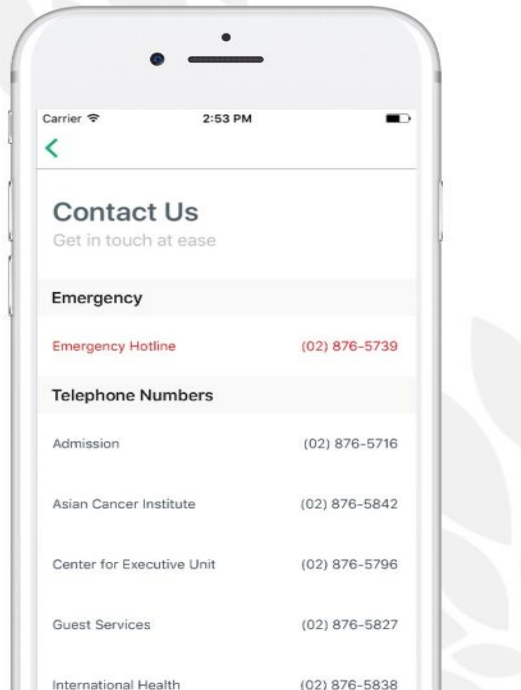
Page 1 of 1

Generate Report

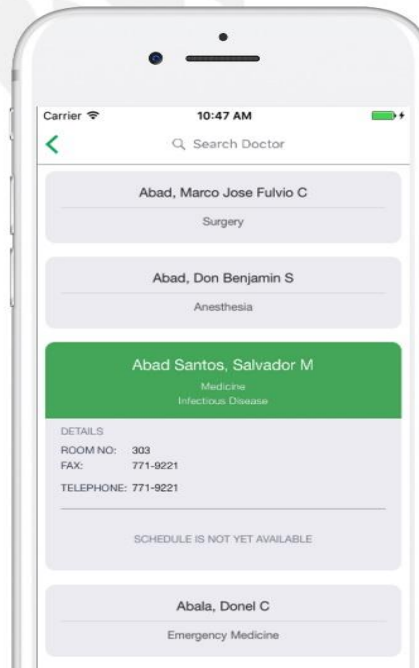


Application Development Projects – AHMC IOS Application

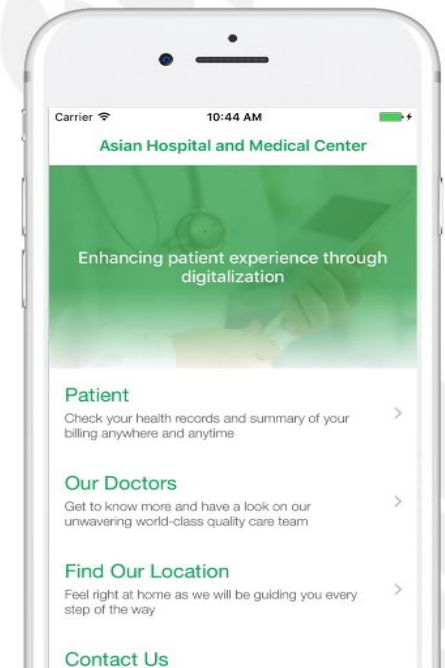
Reach out to us anytime
and we'll cordially address
your concerns



List and information of doctors
available to help you



"Tatak Asian" care.
In your pocket

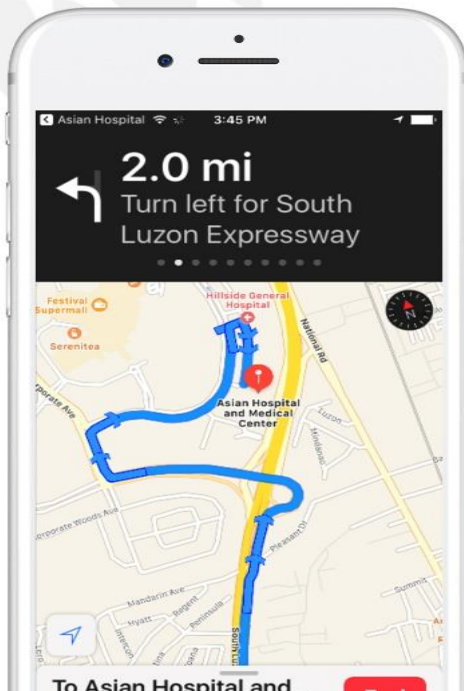


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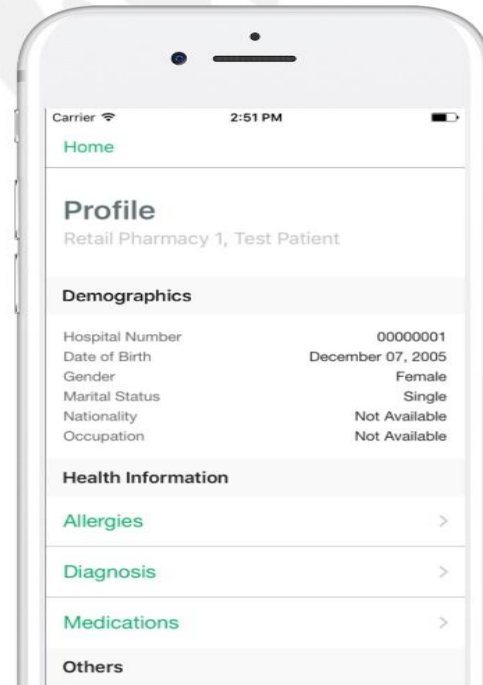


Application Development Projects – AHMC IOS Application

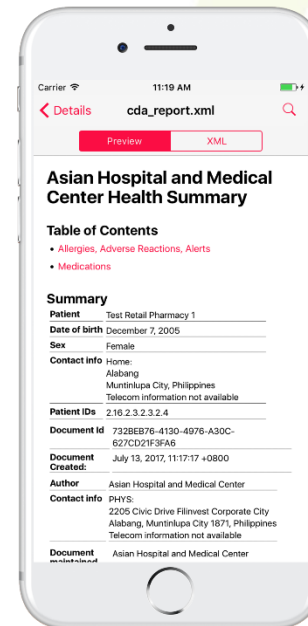
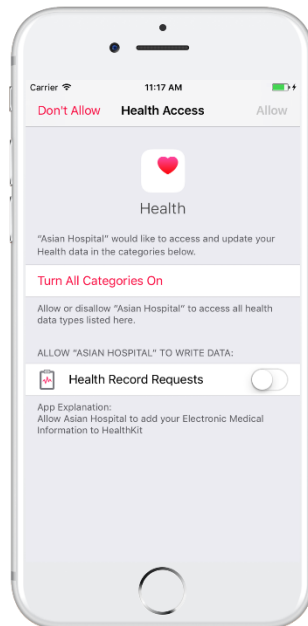
Feel right at home as we will be guiding you every step of the way



It's never been easier to keep up with your personal records



Apple Healthkit

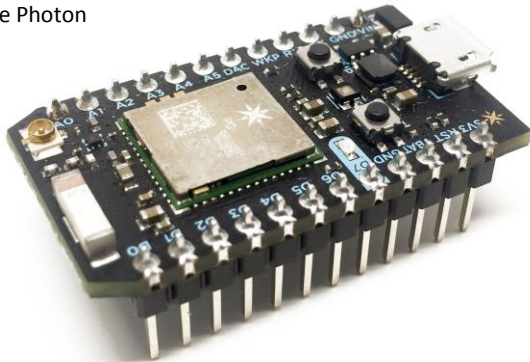


IoT Projects

- Joint Commission Requirements to monitor Temperature and Humidity everywhere
- Data Center Overheated

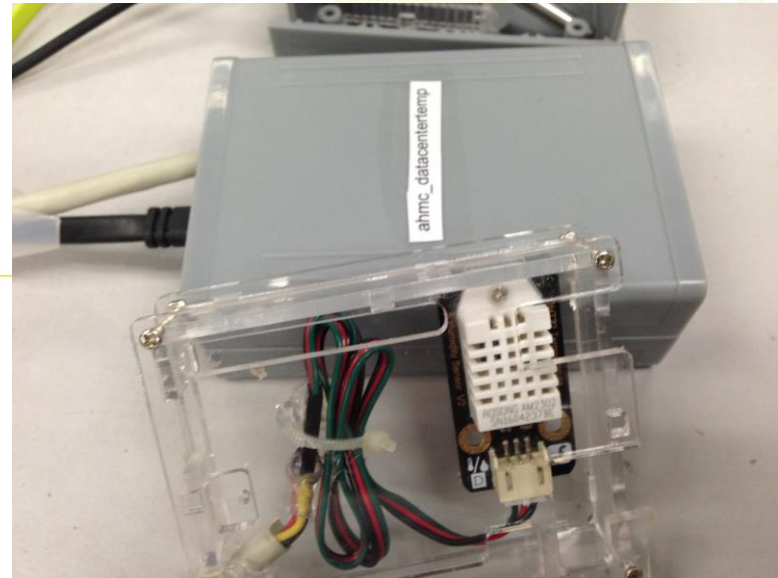
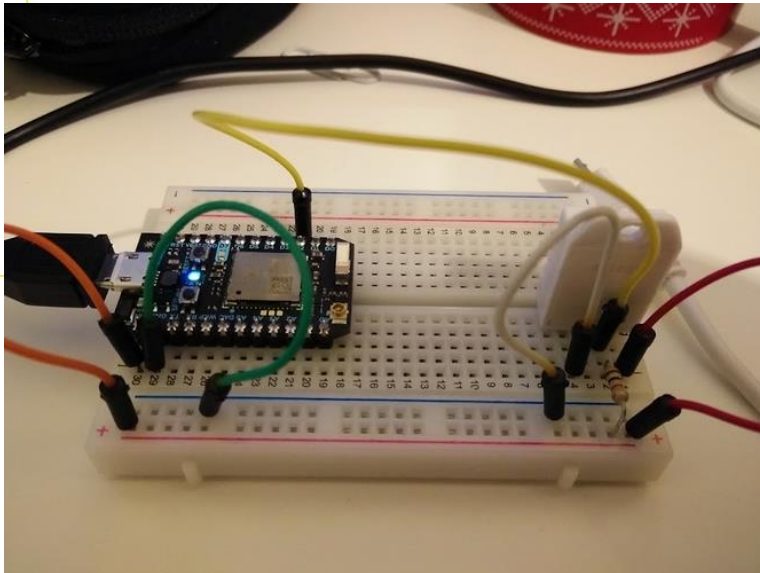


Particle Photon



ABOUT THIS PROJECT

Data communications between Particle Photon, Celsius Scale Thermometer and Percentage Scale Humidity Meter that results to the real-time monitoring of temperature and humidity over the internet using Ubidots IoT Platform.





Temperature Sensor Inside
Data Center




Temperature Sensor Inside UPS Room




Application Development Projects – IoT Project



SIGN IN

 username

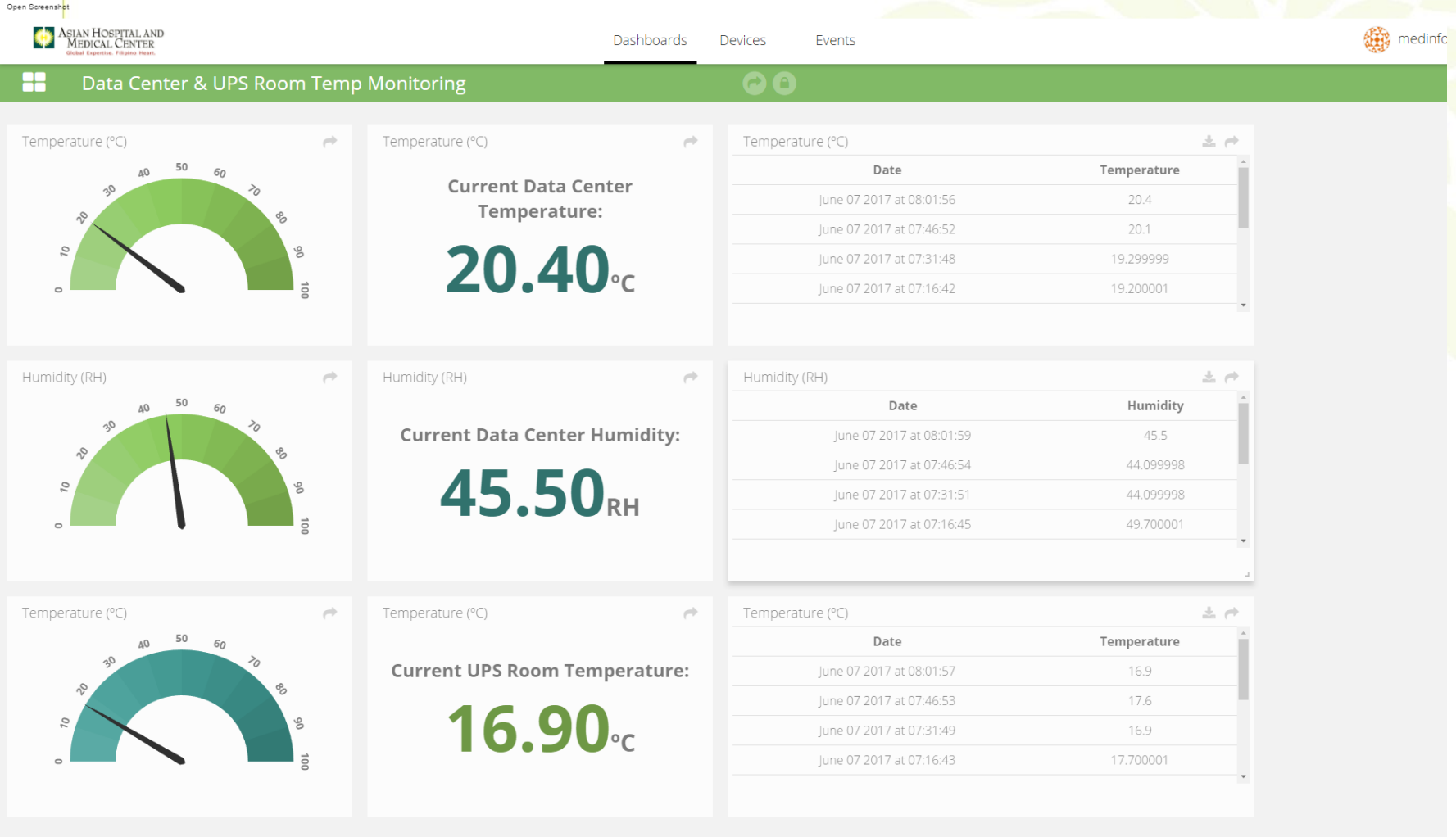
 password

Forgot password?

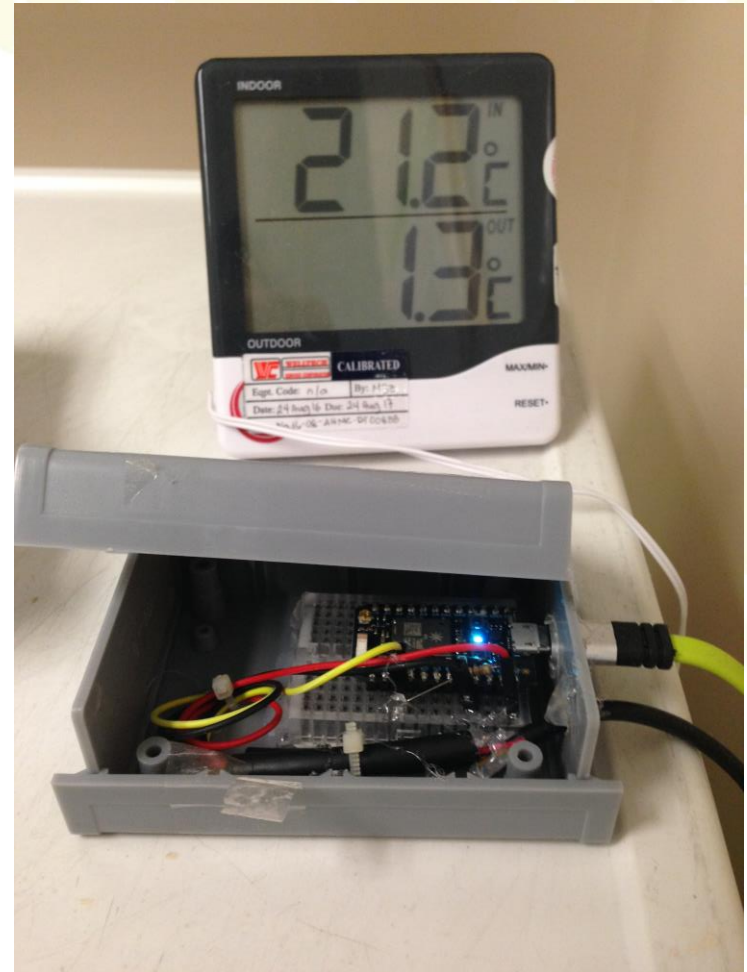
SIGN IN



Application Development Projects – IoT Project



Nurse's Station Refrigerator Monitors



Manual Temp and Humidity Monitoring

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Location: 6A

Month/Year: September 2016

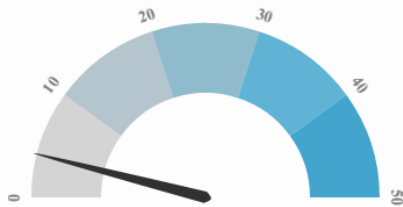
HUMIDITY, ROOM AND REFRIGERATOR MONITORING LOG

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Initials	<i>[Handwritten initials across all dates]</i>																														
ROOM TEMPERATURE																															
°C	<i>[Handwritten line graph showing room temperature fluctuations between 21°C and 24°C]</i>																														
30																															
29																															
28																															
27																															
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21																															
20																															
16° TO 20°																															
REFRIGERATOR TEMPERATURE																															
°C	<i>[Handwritten line graph showing refrigerator temperature fluctuations between 2°C and 8°C]</i>																														
9°																															
8°																															
7°																															
6°																															
5°																															
4°																															
3°																															
2°																															
1°																															
0°																															
-1° TO -5°																															
RELATIVE HUMIDITY																															
RH%	<i>[Handwritten line graph showing relative humidity fluctuations between 40% and 80%]</i>																														
VARIATION ANALYSIS AND ACTION																															
Temp out of range (Record temp. here _____)	Noted by on _____ Name : _____ ID # _____	Analysis and Action(s) Taken _____	Result (Outcome) _____																												
Temp out of range (Record temp. here _____)	Noted by on _____ Name : _____ ID # _____	Analysis and Action(s) Taken _____	Result (Outcome) _____																												
Temp out of range (Record temp. here _____)	Noted by on _____ Name : _____ ID # _____	Analysis and Action(s) Taken _____	Result (Outcome) _____																												



NS 6A Refrigerator Monitoring

NS 6A Temperature (°C)



NS 6A Temperature (°C)

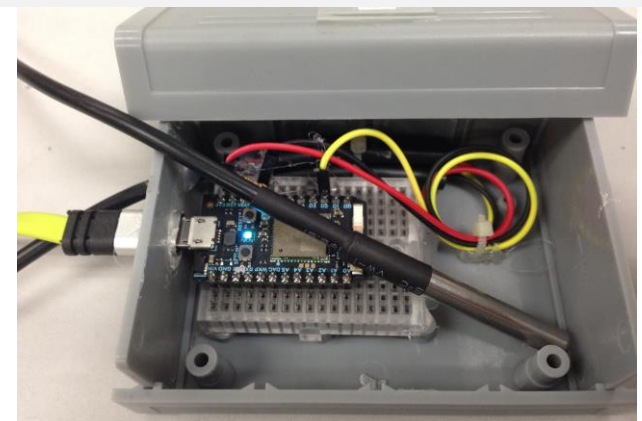
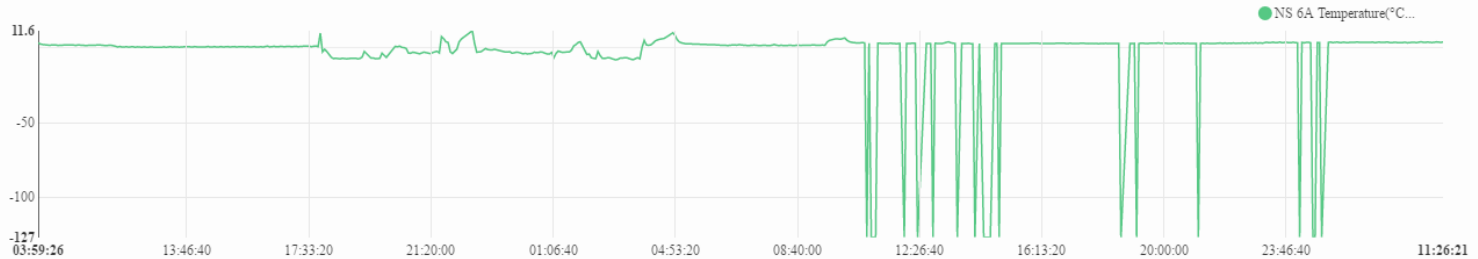
Last value NS 6A Temperature:

4.00°C

NS 6A Temperature (°C)

Date	Last value
September 21 2016 at 11:26:21	4
September 21 2016 at 10:56:08	3.8125
September 21 2016 at 09:55:57	4.125
September 21 2016 at 09:25:49	3.8125
September 21 2016 at 08:55:44	3.6875

NS 6A Temperature (°C)



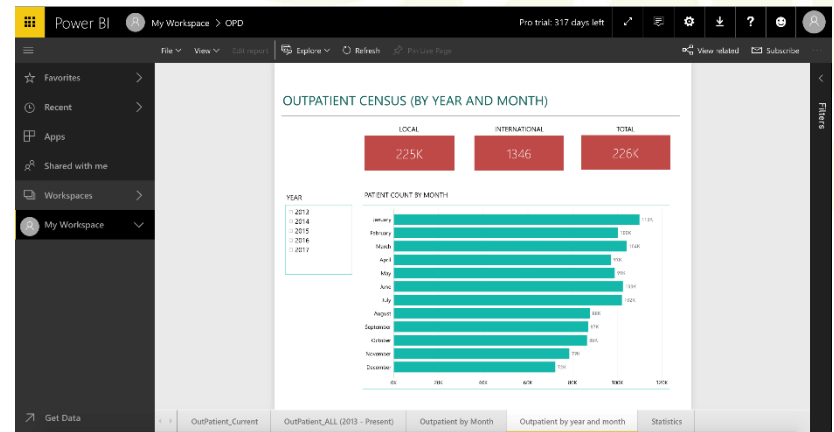
Business Analytics

Business analytic is the practice of iterative, methodical exploration of an organization's data, with an emphasis on statistical analysis. Business analytics is used by companies committed to data-driven decision-making.



Microsoft Power BI

- Comes with O365
- Pro is free till May 2018

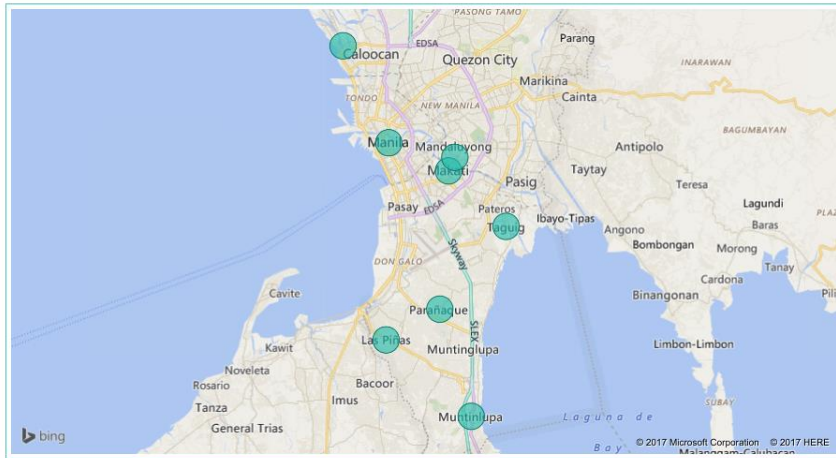


Business intelligence (BI) is an umbrella term that includes the applications, infrastructure and tools, and best practices that enable access to and analysis of information to improve and optimize decisions and performance



Application Development Projects – Business Intelligence (Patient Census Dashboard)

OUTPATIENT COUNT PER CITY



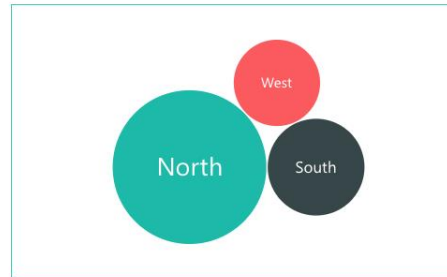
LOCAL



INTERNATIONAL



LOCATION



VISIT TYPE

- ☐ Ancillary Services
- ☐ Breast Center
- ☐ Chrys Specialty Pharmacy
- ☐ Conquer C
- ☐ Day Surgery
- ☐ Emergency Room
- ☐ Employee Health Clinic
- ☐ Endoscopy
- ☐ ER Triage
- ☐ Genesis

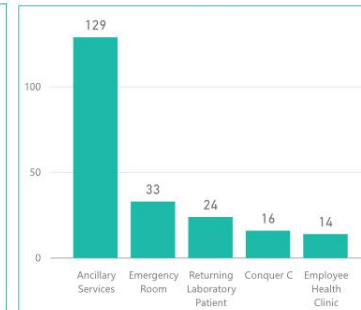
OPD COUNT BY VISIT REASON

Visit Reason	Primary Service	Count of HN
Ancillary Services	Laboratory	61
Consultation	Emergency Servic...	34
Unknown	Laboratory	25
Ancillary Services	Physical Therapy	20
Ancillary Services	OB-Gyne	17
Ancillary Services	Radiology	16
For Hemodialysis	Hemodialysis	13
For Treatment	Asian Cancer Insti...	12
Total		262

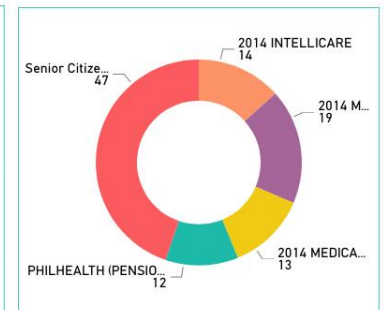
INTERNATIONAL PATIENTS

Country	Count of HN

TOP 5 VISIT TYPE PER OPD COUNT



TOP 5 POLICIES PER OPD COUNT



OutPatient_Current

OutPatient_ALL (2013 - Present)

Outpatient by Month

Outpatient by year and month

Statistics



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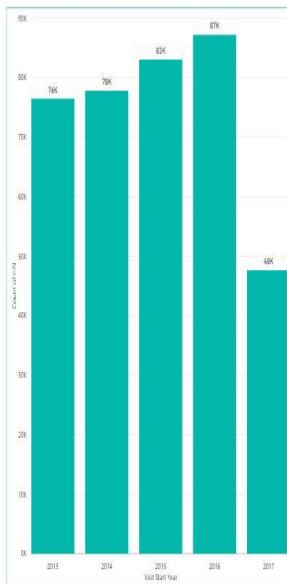
Application Development Projects – Business Intelligence (OPD)

OUTPATIENT STATISTICS

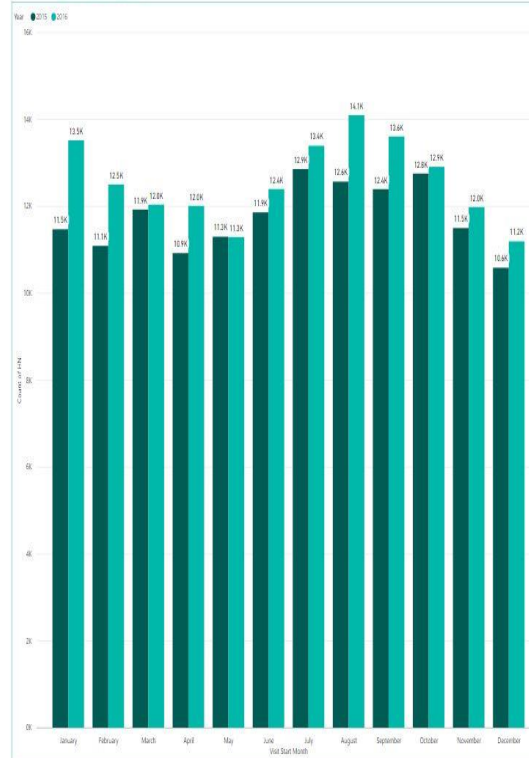
CURRENT OUTPATIENT COUNT
(as of Today)



OUTPATIENT COUNT PER YEAR

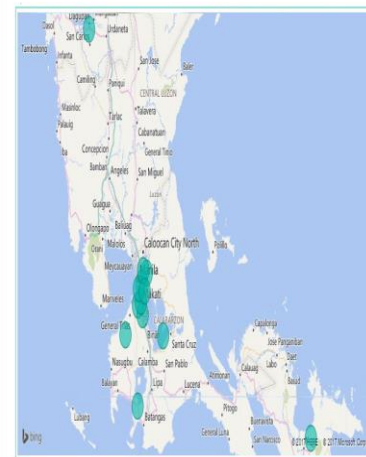


OUTPATIENT COUNT PER MONTH
(for 2015 and 2016)



OUTPATIENT CENSUS (as of Today)

OUTPATIENT COUNT PER CITY



LOCAL

217

INTERNATIONAL

1

LOCATION



VISIT TYPE

- ☐ Ancillary Services
- ☐ Day Surgery
- ☐ Emergency Room
- ☐ Endoscopy
- ☐ ER Triage
- ☐ Genesis
- ☐ Returning Laboratory Patient

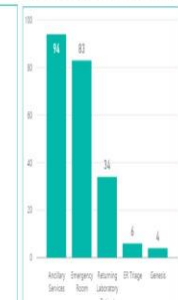
OPD COUNT BY VISIT REASON

Visit Reason	Primary Service	Count of HN
Consultation	Emergency Services	80
Ancillary Services	Laboratory	45
Unknown	Laboratory	34
Ancillary Services	Physical Therapy	33
Ancillary Services	Radiology	13
Medical Check-Up	Emergency Services	9
Consultation	OB-Gyne	4
Ancillary Services	Heart Station	3
Total		218

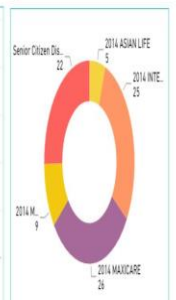
INTERNATIONAL PATIENTS

Country	Count of HN
Northern Mariana Islands	1
Total	1

TOP 5 VISIT TYPE PER OPD COUNT



TOP 5 POLICIES PER OPD COUNT

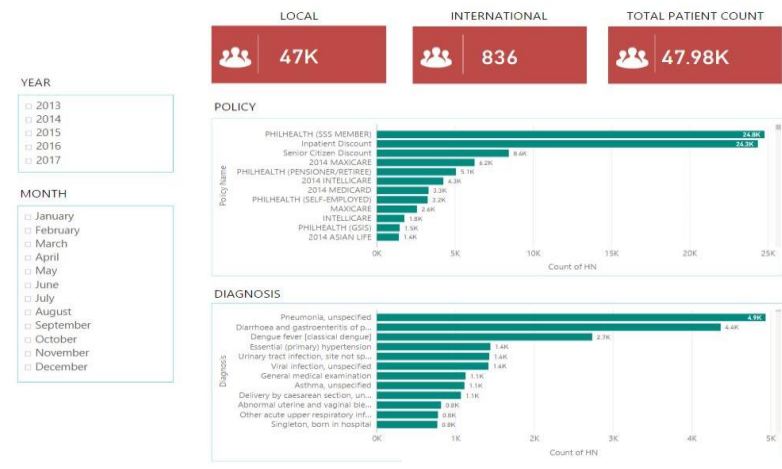


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Application Development Projects – Business Intelligence (IPD)

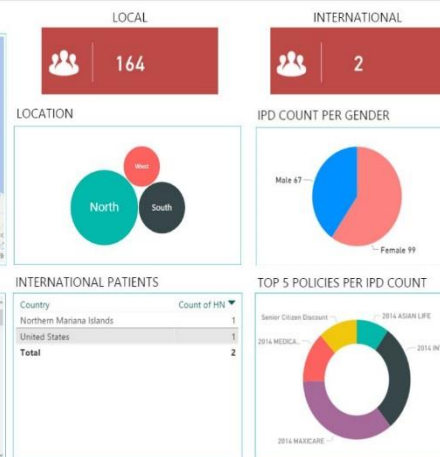
INPATIENT CENSUS (BY MONTH)



INPATIENT CENSUS (as of Today)



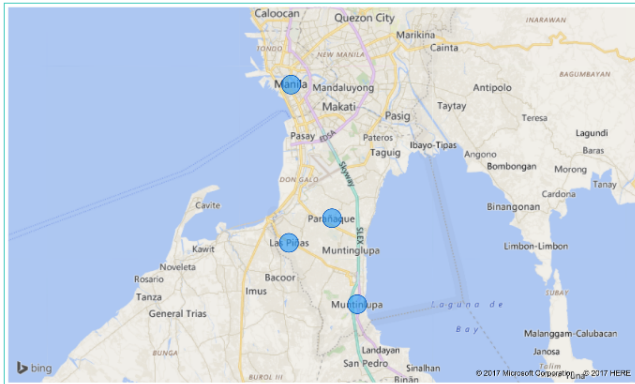
INPATIENT STATISTICS



Application Development Projects – Business Intelligence (IPD)

DAILY ADMISSION (as of Today)

ADMITTED PATIENT PER CITY



ADMITTED PATIENT PER DIAGNOSIS

Diagnosis	Count of HN
Acute bronchitis, unspecified	1
Hyperglycaemia, unspecified	1
Hypo-osmolality and hyponatraemia	1
Pulmonary embolism	1
Urinary calculus, unspecified	1
Urinary tract infection, site not specified	1
Total	6

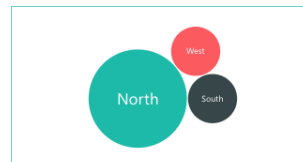
LOCAL



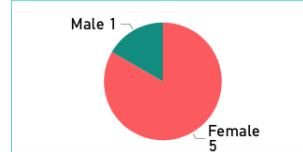
INTERNATIONAL



CARDINAL DIRECTION



ADMITTED PATIENT PER GENDER



DISCHARGE DETAILS (as of Today)

PATIENT DISCHARGE



Discharge Reason

☐ With approval

Discharge Outcome

☐ Improved

DISCHARGE DETAILS

HN	Patient Name	Visit Type	Visit Start	Discharge Date Time
66612222	C	Inpatient Visit	7/18/2017 2:45:34 AM	7/19/2017 9:17:49 AM
	C	Inpatient Visit	7/11/2017 4:08:53 AM	7/19/2017 9:02:03 AM
	L	Inpatient Visit	7/16/2017 4:32:34 PM	7/19/2017 8:54:27 AM
	J	Inpatient Visit	7/17/2017 4:17:29 AM	7/19/2017 9:52:53 AM
	L	Inpatient Visit	7/17/2017 12:17:20 AM	7/19/2017 9:58:17 AM
	F	Inpatient Visit	7/13/2017 12:38:56 AM	7/19/2017 9:47:37 AM
	F	Inpatient Visit	7/16/2017 5:20:31 AM	7/19/2017 9:58:34 AM
	A	Inpatient Visit	7/16/2017 8:05:03 PM	7/19/2017 9:15:48 AM
	L	Inpatient Visit	7/17/2017 2:08:35 PM	7/19/2017 7:28:09 AM

InPatient_Current

InPatient_ALL(2013 - Present)

Inpatient by Month

Inpatient by year and month

Admission and Discharge Details

Statistics

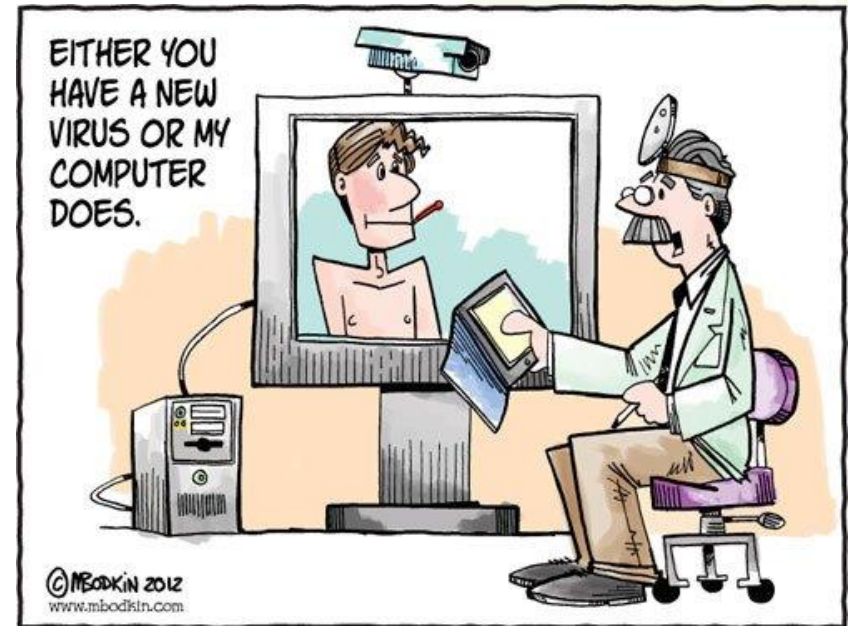


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What's Next

- Data Warehouse for Value Healthcare
- Machine Learning
- Artificial Intelligence



Summary

- We are still playing catch up
- Focus on a few things, refocus often
- Not everything will work as planned
- Garbage in, garbage out
- You are not alone
- There is no perfect system





Thank you



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