



Case Study: UPMC Digital Healthcare Innovation

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Chief Information Officer and Vice President

UPMC International

UPMC Hillman Cancer Center

15th National Health Summit - Dublin, Ireland - February 7th, 2019



UPMC Introduction:
Health System Overview



Technology Innovation:
How UPMC Does It



Innovation Acceleration:
A Private Hospital As An Innovation Hub

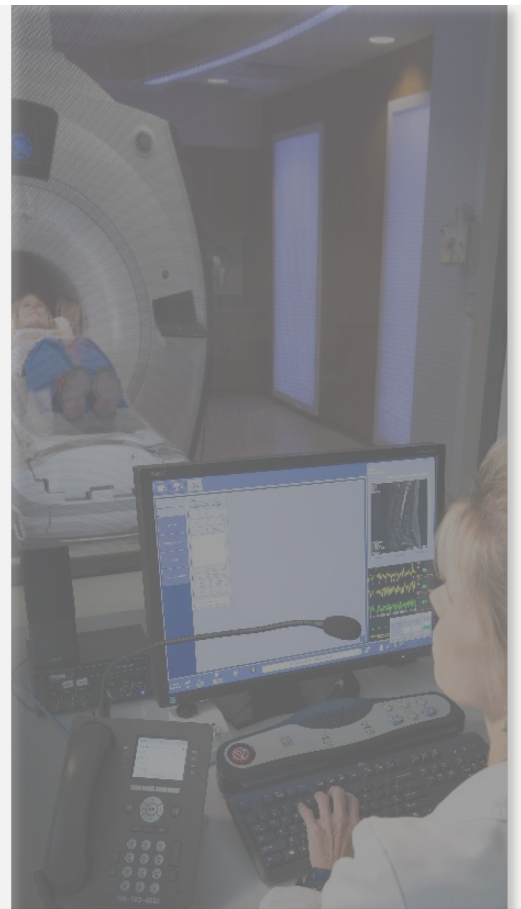


UPMC

Introduction:

Health System Overview





UPMC IS A **GLOBALY RECOGNIZED** NON-PROFIT
ACADEMIC MEDICAL CENTER

Research & Innovation

UPMC and The University of Pittsburgh are committed to fostering the next generation of global health leaders and scholars.

- 500m in National Institutes of Health funding for medical research
- One of the largest programs in US with 1,900+ residents and fellows
- Strong global alumni base



*Joint Board
Appointments*



By the Numbers

\$19b Revenue

85k Employees

4,6k+ Physicians Employed by UPMC

40+ Community & Specialty Hospitals

600+ Physician & OP Locations

8,5k Licensed Beds

200+ Innovation Experts at UPMC Enterprises

20+ Years of UPMC International Ops Experience

3,4m+ UPMC Health Plan members

Our Mission

To serve our communities by
**providing outstanding
patient care**
and to **shape tomorrow's
health system**
through clinical
and technological innovation,
research, and education

UPMC

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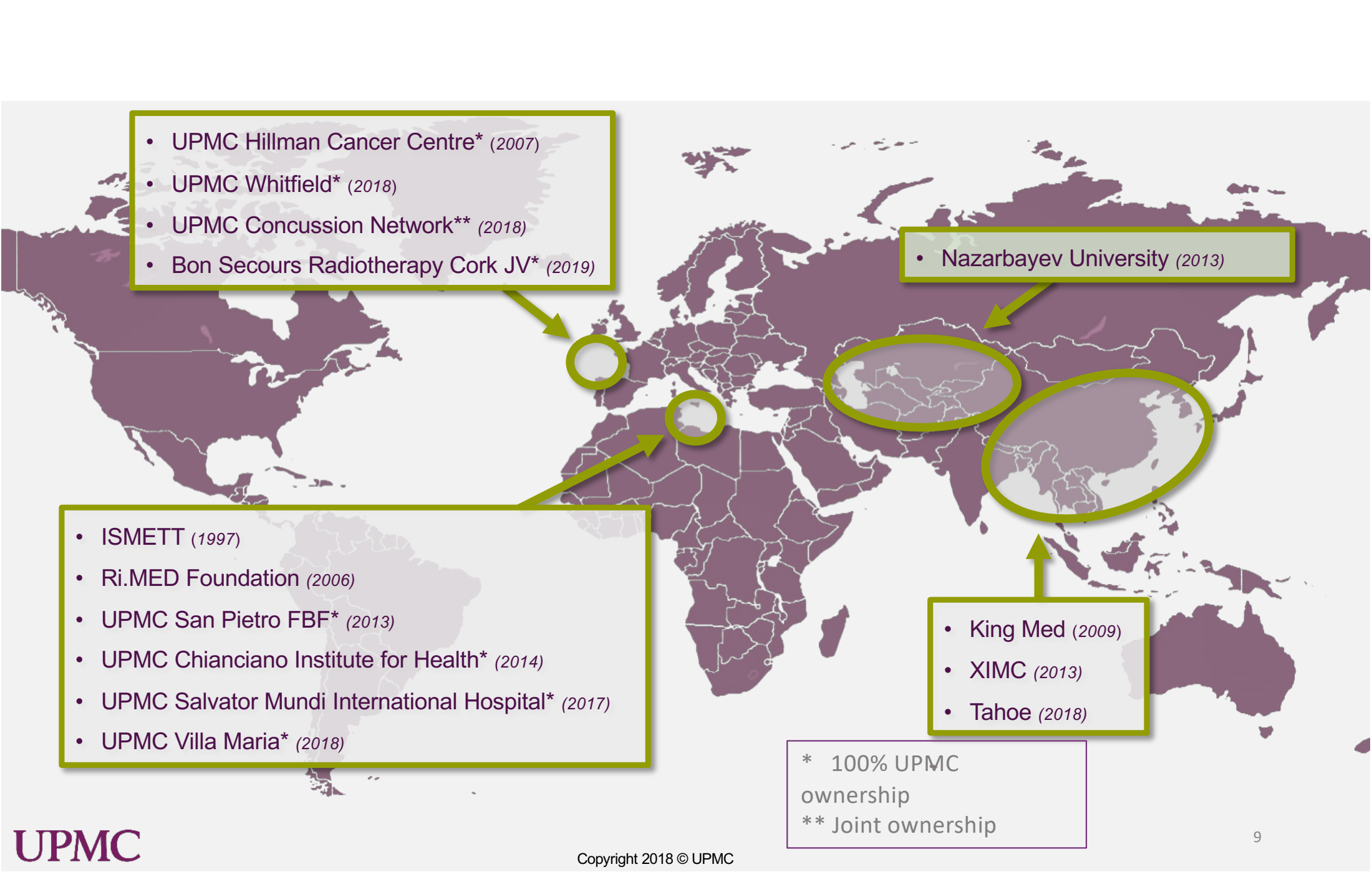


UPMC 's international operations
complement the core mission.

We customize solutions so that patients and regions thrive and, ultimately, drive economic and reputational benefit back to UPMC and the communities we serve.

UPMC

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- UPMC Hillman Cancer Centre* (2007)
- UPMC Whitfield* (2018)
- UPMC Concussion Network** (2018)
- Bon Secours Radiotherapy Cork JV* (2019)

- Nazarbayev University (2013)

- ISMETT (1997)
- Ri.MED Foundation (2006)
- UPMC San Pietro FBF* (2013)
- UPMC Chianciano Institute for Health* (2014)
- UPMC Salvator Mundi International Hospital* (2017)
- UPMC Villa Maria* (2018)

- King Med (2009)
- XIMC (2013)
- Tahoe (2018)

* 100% UPMC ownership
** Joint ownership

Core Emphasis on Quality Patient Care

UPMC is a pioneer in developing and adopting technology to improve quality, safety, and efficiency

- Significant investment to support clinical excellence and create new care models
- Numerous accreditations, including **Joint Commission**, **Joint Commission International**, and **Magnet Recognition**



UPMC IS
CONSISTENTLY
RECOGNIZED AS A
“Most WIRED”
HEALTH SYSTEM



Technology Innovation: *How UPMC Does It*



An aerial photograph of Pittsburgh, Pennsylvania, showing the city skyline, the Allegheny River, and several yellow arch bridges. In the foreground, a red trolley is visible on a track, partially obscured by a purple text box. The sky is clear and blue, and the city is densely packed with buildings.

Pittsburgh

- 2 million + people in the metropolitan area
- Second largest city in Pennsylvania
- 68 colleges and universities – Pitt, CMU
- 1880s world epicenter of the steel industry

A photograph of the Pittsburgh skyline at dusk. The sky is a mix of purple and pink. Several skyscrapers are visible, including the UPMC building on the left with its name illuminated, and the PPG Place building in the center with its distinctive four towers. Other buildings are lit up with interior lights, and some smoke is rising from the tops of some structures. The foreground shows some lower-level buildings and streetlights.

Pittsburgh

- Tech, robotics, biomed, healthcare
- More than 1,600 technology companies
- Google, Apple, Intel, Uber, Facebook
- Technology generates over \$20B in annual Pittsburgh payrolls

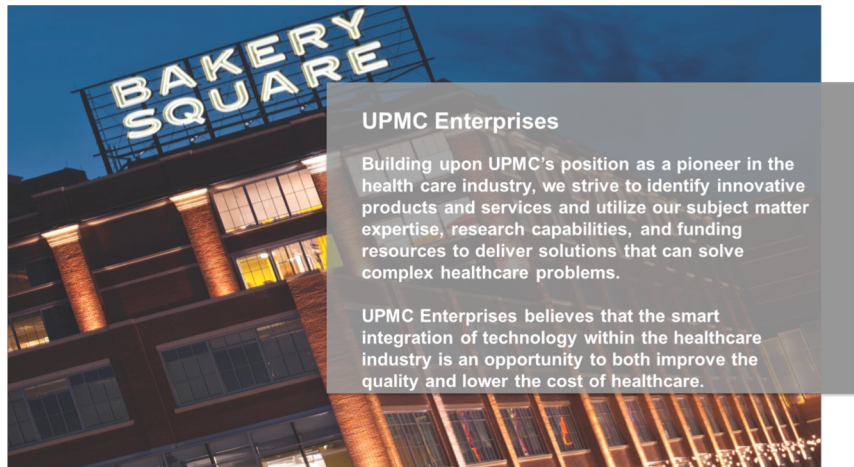
Shaping the Future of Healthcare Through Innovation Partnerships

UPMC Enterprises

DEVELOPING
SOLUTIONS
WITH LEADING
INDUSTRY
PARTNERS



UPMC's Technology Innovation Hub



... Generates Dozens of New Technologies and Investments



Pitt Alumni Event

The Innovation Equation

A collaboration between UPMC and the University of Pittsburgh



The Innovation Equation provides insights and ideas about how best to work across a range of intellectual platforms, communication mediums and physical borders to transform medicine.

Transforming Medicine

From Concept to Market

Saturday, October 20, 2018

10:15 a.m. - 3 p.m.

[The Westbury Hotel](#), Dublin

Healthcare Innovation Through Collaboration
University of Pittsburgh and UPMC Co-hosted
Leadership for both organizations presented

Attendance:

- Pitt alumni in Ireland (80+)
- Thought leaders from hospitals, medical companies, VCs, and government agencies

Themes:

- New technologies fall short if they don't complement care teams and patients
- Successful projects need to be driven by clinical and operational stakeholders
- Collaboration and good process over \$\$



Healthcare Digital Transformation

The healthcare industry has been transitioning to computerized systems for decades now. New innovations are showing promise that technology can have a profound impact on how we deliver and consume healthcare...

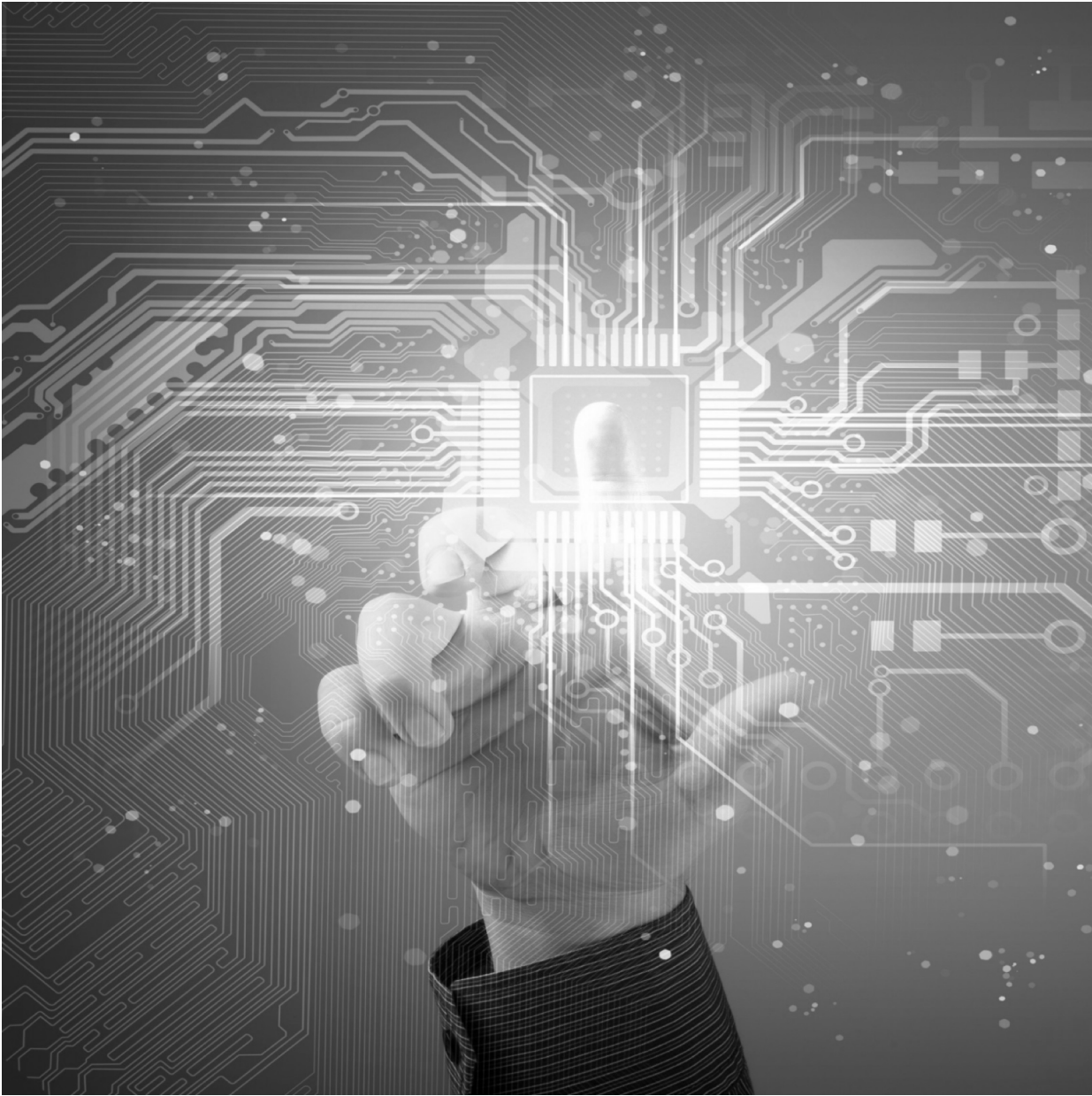


Key Drivers:

- Lowering cost
- Increased prevalence of chronic diseases/aging population
- Shortage of key providers
- Increasing consumer (patient) expectations (choice/delays)
- The need to manage and analyze large and disparate data sets
- Significant increase in cybercrime

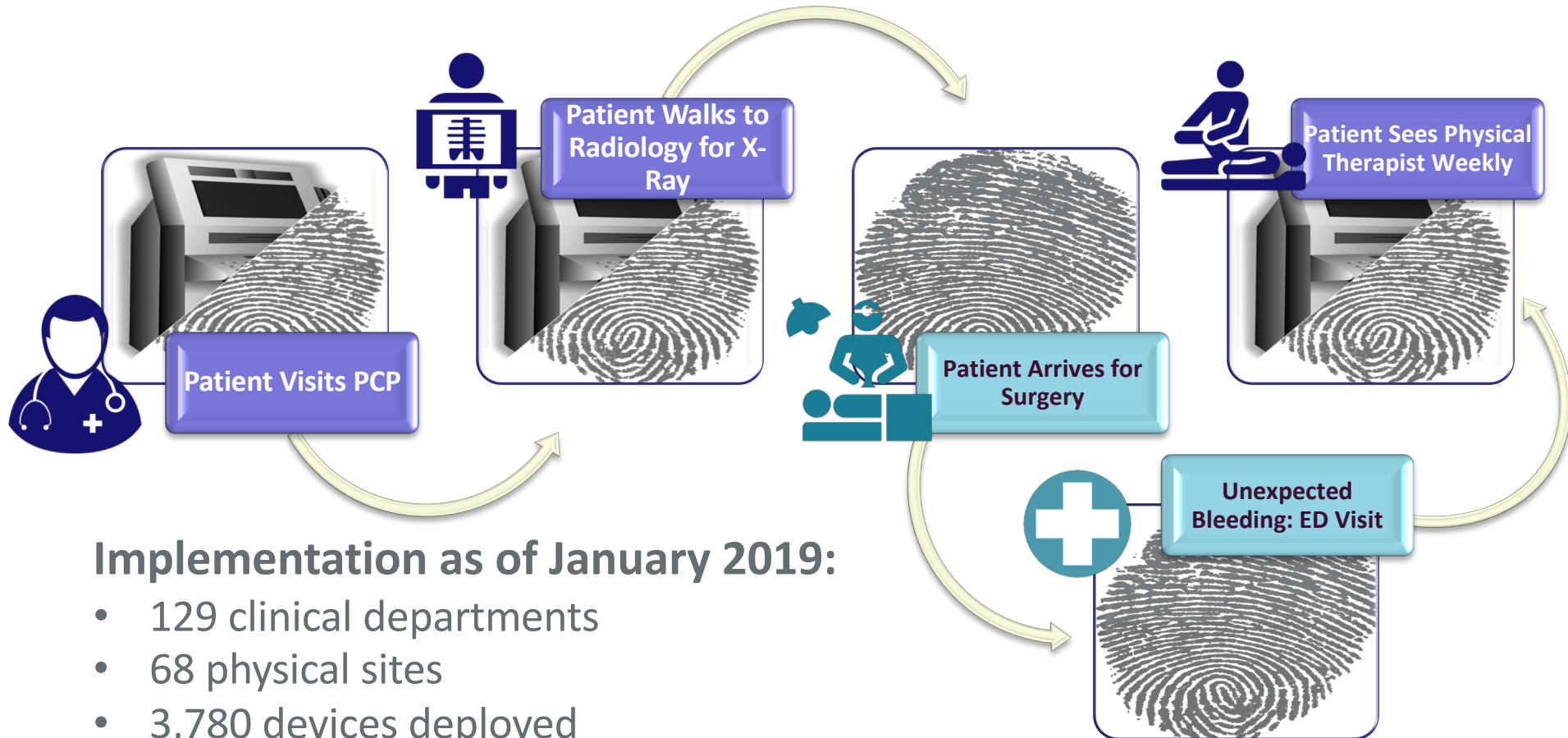
Highest Potential for Innovation:

- Cybersecurity
- Telehealth
- AI / Analytics / Precision Medicine
- Patient Engagement / Consumerism

A hand in a dark suit sleeve points towards a glowing digital interface. The interface features a central square icon with a finger, surrounded by intricate white circuit patterns and glowing particles on a dark background. The overall aesthetic is futuristic and technological.

UPMC's
Biometrics Goal:
Your Finger is the
KEY to "Unlock"
your Consumer
Experience at
UPMC

Self Arrival Consumer Experience



Implementation as of January 2019:

- 129 clinical departments
- 68 physical sites
- 3,780 devices deployed
- 500,000 fingerprints captured

Biometrics – Bridging Security and Consumerism

Positive Patient Identification:

- Reduced patient duplicates
- Reduced insurance fraud
- Reduced costs in correcting errors
- Increased patient safety & quality
- Increased physician/patient satisfaction



Telehealth

- Video consults, apps, remote monitoring, wearables, SMS, chatbots
- Program goals and patient preference drive solutions
- Customize for each program's KPIs
- Achievable outcomes
 - Patient satisfaction
 - PROs
 - Compliance
 - Medication adherence
 - Readmissions



Remote Monitoring Use Case

Postpartum Hypertension

- Program launched February 1, 2018
- 359 patients, 93% opt-in rate, 94% patient satisfaction
- Identify all at-risk hypertension / preeclamptic patients
- Collecting blood pressures, adjusting medication, reducing readmissions
- Ensuring patients have long-term awareness and education related to hypertension
- Increased scheduled follow up appointments by 40%
- Eliminated 57% of unnecessary 1-week post-discharge appointments with monitoring (<https://goo.gl/jqayA6>)
- BYOD mobile-based model



Healthcare IT News

Remote patient monitoring via smartphone cuts one-week post-partum visits by 57%

This case study shows how UPMC Magee-Womens Hospital accomplished that reduction by sending new mothers home with a free blood pressure cuff and access to a remote monitoring portal.

By [Bill Swicki](#) | October 12, 2018 | 02:19 PM

Patient Engagement Use Case

Obstetrics – challenged to provide consistent education

- Leveraged UPMCe investment - Xhealth
- Digital delivery of educational content
- Providers order content directly from EMR
- Patients can receive in portal, app, or email (used for initial pilot)

- 9,871 pregnancies
- 92% prescribed at least 1 bundle
- 53% opened email
- 75% (3,459) accessed content

- Future: additional methods
 - SMS, App, etc.

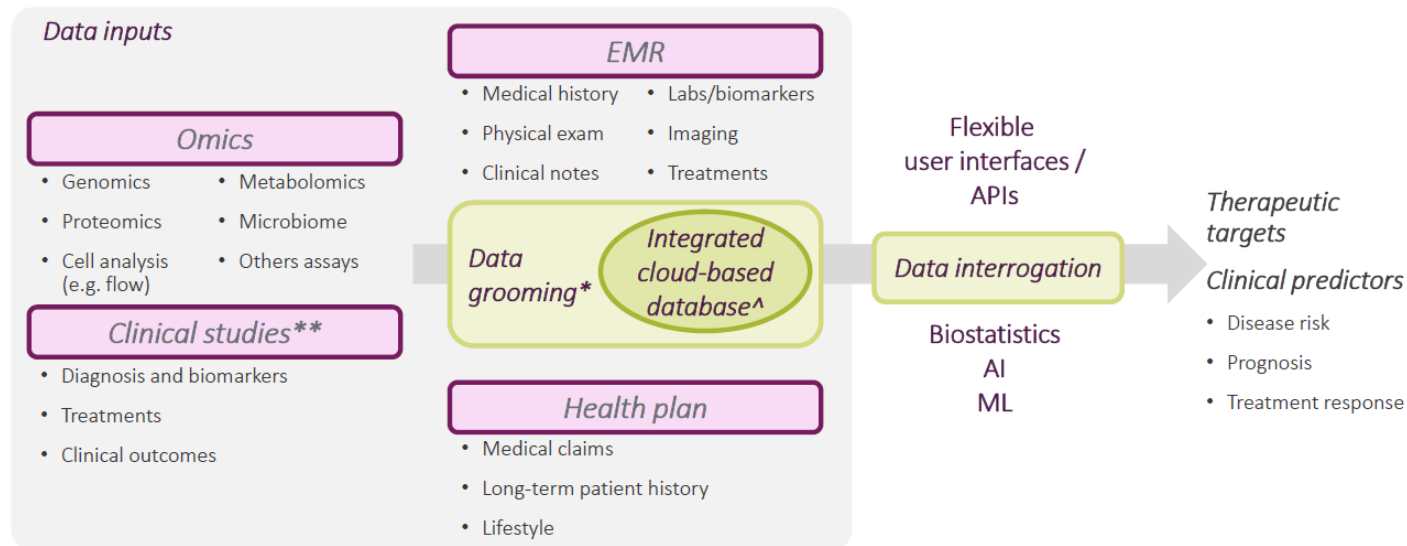


“Big Data” / Analytics

Healthcare systems capture a tremendous amount of data. And it’s growing exponentially!

- Medications, problems, treatment history, notes, orders, claims, billing
- Patient-reported outcomes, wearables, remote monitoring devices
- Genomics, population health data, outcomes

Requires a robust data strategy and clear value proposition...



Identifying Opportunities from Analyses of Real World Data

Hospital Bedded Patients

01/01/2015 to 09/05/2018

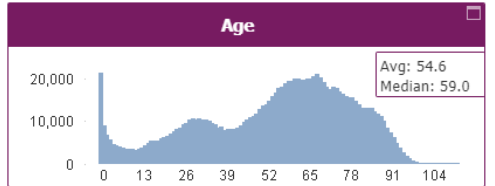
Visits: 1,085,744 Unique Pts: 544,679

Financial Grouping

LOS

Avg: 4.1
Med: 2.5

Healthplan Members	% Surgery	% IP	% OBS
34.2%	27.3%	66.2%	33.8%
% Female	% Arrived through ED	% ICU	% Deliveries
55.2%	61.0%	13.0% Avg LOS: 4.3 Med LOS: 2.0	4.8%

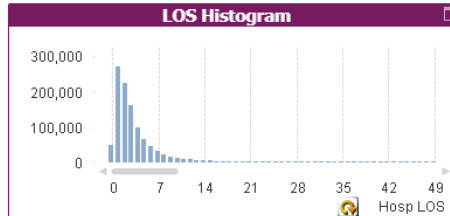
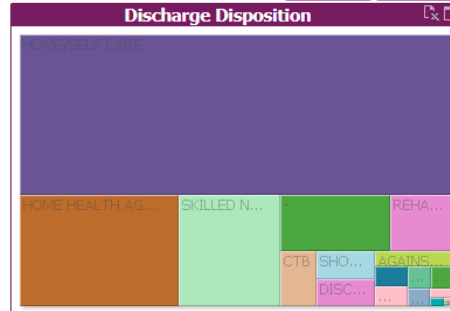


Current Selections

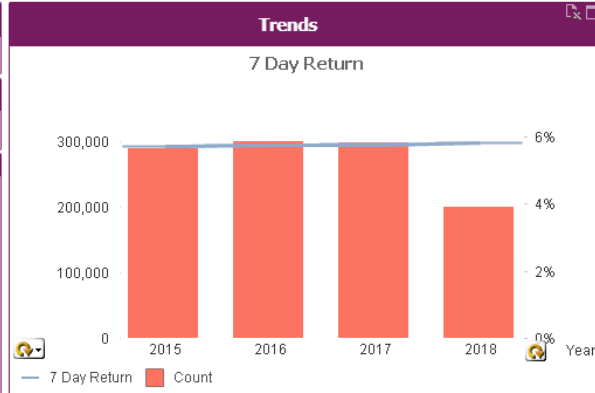
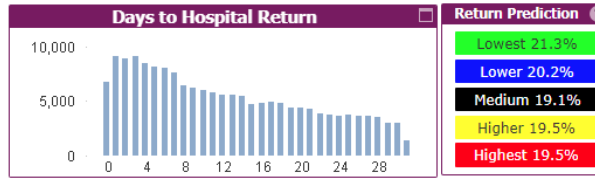
Fields: Values

Admitting Specialty	Count	Discharge Specialty	Count
HOSPITALIST	232,861	HOSPITALIST	291,285
GENERAL MEDICINE	105,019	GENERAL MEDICINE	129,657
FAMILY MEDICINE	69,273	OBSTETRICS GYNECOL...	82,608
OBSTETRICS GYNECOL...	69,265	FAMILY MEDICINE	81,023
ORTHOPAEDIC SURGERY	57,099	GENERAL SURGERY	63,695
GENERAL SURGERY	53,208	ORTHOPAEDIC SURGERY	61,217
CARDIOLOGY	42,666	CARDIOLOGY	49,828
NEUROSURGERY	31,298	PEDIATRICS	39,510
PEDIATRICS	31,150	NEUROSURGERY	39,510
PSYCHIATRY	20,144	HEMATOLOGY/ONCOLO...	33,077
HEMATOLOGY/ONCOLO...	18,605	PSYCHIATRY	19,969
SURGICAL ONCOLOGY	18,170	SURGICAL ONCOLOGY	19,232
CRITICAL CARE MEDIC...	17,648	NEUROLOGY	18,075
NEUROLOGY	17,236	UROLOGY	17,670
UROLOGY	15,653	EMERGENCY MEDICINE	15,916
PULMONARY MEDICINE	15,385	OTOLARYNGOLOGY	13,336
		VASCULAR SURGERY	12,868

Diabetes	CAD	Pneumonia	CKD/AKI	COPD
24.5%	23.6%	5.2%	17.9%	16.9%
CHF	MI	AFIB	HTN	Substance Abuse
15.5%	2.7%	14.8%	40.1%	12.0%



7 Day Hosp Return			30 Day Hosp Return		
Total	IP Only	OBS Only	Total	IP Only	OBS Only
5.8%	3.9%	1.8%	16.0%	11.3%	4.6%



Mortality

Hospital	1 Month	3 Month	6 Month	1 Year
			1.7%	

Office Visit Followup Within 30 Days*

% w/PCP Followup	Days to PCP Office	PCP Return Rate
17.9%		30 Day: 10.7% 7 Day: 1.0%
% w/ Specialty Followup	Days to Specialty Office	Specialty Return Rate
31.7%		30 Day: 9.8% 7 Day: 1.0%
% w/Any Epic Followup	Days to Any Office	Office Visit Return Rate
42.2%		30 Day: 10.4% 7 Day: 1.1%
% w/No Epic Followup		No Office Visit Return Rate
57.8%		30 Day: 20.0% 7 Day: 9.1%
% Epic Appointment Scheduled +/- 3 Days from Discharge		
40.7%		

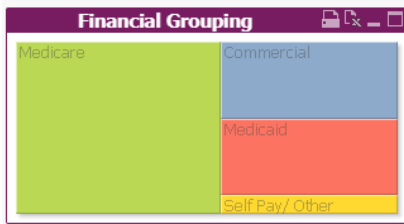
*Epic Data through: 09/10/2018

Taking Action on the Opportunities Identified

Hospital Bedded Patients

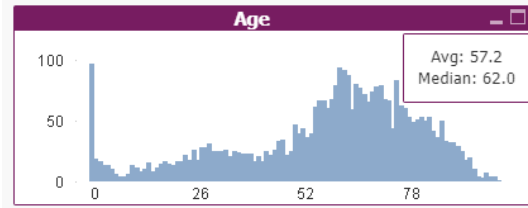
Patients: 3,522

Data Refreshed: 10/12/18 06:15



Healthplan Members	% Surgery	% IP	% OBS
36.5%	27.5%	89.2%	10.8%

% Female	% Arrived through ED	% ICU
49.5%	60.6%	23.6%



Current Selections

Search

Hospital

PUH	614
SHY	443
MER	370
ALT	288
CHP	286
HAM	285
PAS	279
SMH	191
MAG	178
EAS	164
MCK	155
NWH	111
JAM	86
HRZ	40
BED	17
HRY	13

Location

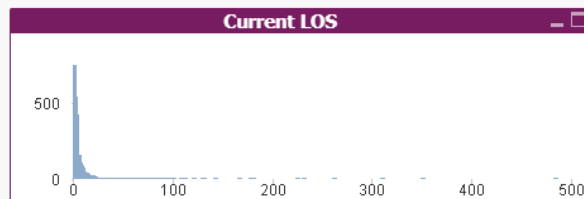
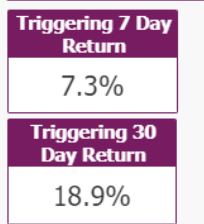
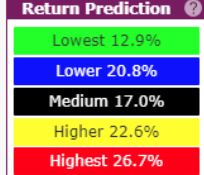
L5SO	42
L7SO	42
U10E	40
U8E	39
U12E	39
L6SO	37
U11E	34
A5A	33
I4MT	33
A5B	32
PPIC	32
A6A	31
I3MT	31
I6MT	31
KBHU	30

Admitting Specialty

HOSPITALIST	704
GENERAL MEDICINE	421
FAMILY MEDICINE	215
GENERAL SURGERY	197
ORTHOPAEDIC SURGERY	164
REHABILITATION MEDI...	141
PSYCHIATRY	129
OBSTETRICS GYNECOL...	123
CRITICAL CARE MEDI...	120
HEMATOLOGY/ONCOLO...	110
CARDIOLOGY	109
PULMONARY MEDICINE	103
NEUROSURGERY	101
PEDIATRICS	98
EMERGENCY MEDICINE	84
NEUROLOGY	64
SURGICAL ONCOLOGY	55

Current Specialty

HOSPITALIST	841
GENERAL MEDICINE	491
FAMILY MEDICINE	230
GENERAL SURGERY	191
ORTHOPAEDIC SURGERY	157
REHABILITATION MEDI...	157
PSYCHIATRY	130
OBSTETRICS GYNECOL...	129
HEMATOLOGY/ONCOLO...	116
CARDIOLOGY	112
PEDIATRICS	111
NEUROSURGERY	103
CRITICAL CARE MEDI...	91
PULMONARY MEDICINE	81
THORACIC SURGERY	65
CARDIAC SURGERY	60
SURGICAL ONCOLOGY	59

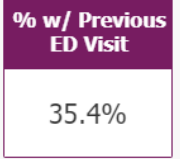
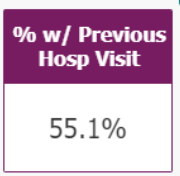
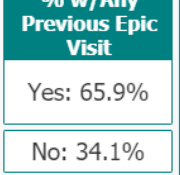
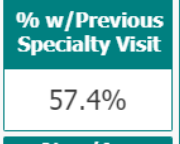
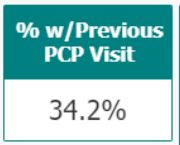


Data From Most Recent Epic Visit

Days prior to Hospital	Obese	Diab	Sinusitis	Depression
1	35.1%	25.8%	1.9%	11.7%
22				
38				
54				
70				
86				
102				
118				
134				
150				
166				
184				
200				
218				
236				
257				
280				
303				
330				
349				

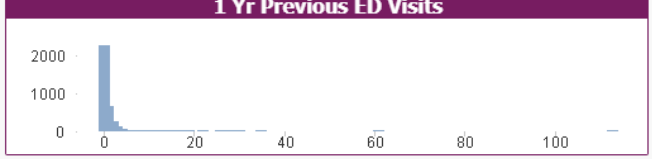
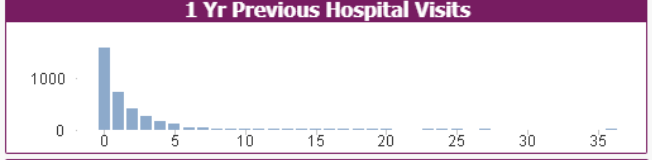
Morbid Ob...	HTN	Cancer	Asthma
9.4%	49.2%	20.2%	12.9%
CKD	CAD	GERD	AFIB
9.5%	15.9%	20.0%	14.2%
COPD	CHF	OSTEO	CCI: 2.0
14.2%	14.3%	6.3%	
Opioids	Metformin		
36.2%	13.1%		

One Year Previous Activity to Hospital Visit:



Epic Dept Name

Passavant Wound Clinic	228
Three Rivers Orthopedics - UPMC	180
UPP General Internal Medicine - Oakland	171
UPMC Cardiothoracic Transplant	139
Starzl Transplantation Institute - UPMC Transplant Services	129
Mainline Medical Altoona Office	128
Department of Orthopaedic Surgery Kaufmann Bldg.	117
CENTER FOR CARE OF INFECTIOUS DISEASES (CCID)	115
UPMC Eye Center - Oakland	108
Univ. Ear Nose & Throat Specialists - Eye and Ear Inst.	105
Neurosurgery Presby # B400	103
Vascular Surgery - Shadyside	101
Primecare Medical Associates Aspinwall	98
UPMC Hamot Foot & Ankle Center - Sterling Square Office	98
HVI Outpatient Cardiology Center at PUH	94
Franklin Community Medicine - UPMC	88
University Orthopaedics Monroeville	87
UPMC Shadyside Family Health Center	87
Division of Gyn/Oncology-Magee	86
Pulmonary Partners Passavant	85
UPMC Eye Center - Mercy	82
HOME TRANSITIONS	81
Russelton Medical Group Natrona Heights	81
McKeesport Wound Center	80
Clarion Community Medicine	79
MYCS - Outpatient Adult	79
Penn Plum Family Medicine Saltsburg	79
Mercy Wound Clinic	77
Blair Medical Associates Station Medical Center	76





Innovation Acceleration: *A Private Hospital As An Innovation Hub*



UPMC Whitfield Hospital

UPMC's platform for innovation development in Ireland

Hospital Overview

- 80 bed facility
- Elective surgeries
- Orthopedics, Ophthalmology, AMD
- Radiation and Medical Oncology, etc.

Information Technology Plan

- Fully digitalize the hospital
 - Patient ID, registration, scheduling, billing
 - Biometrics/patient check-in/authorization
 - Patient experience / access / loyalty
 - Patient engagement pre and post visit
 - Electronic medical records - Orders/results (labs, radiology, etc.)



Mobile Health / Patient Engagement



Enroll

- Admit / Discharge
- Always Connected
- Engage at Scale
- Stratify Populations
- Retain Consumers

Educate

- Discharge Self-Care
- Built-In Content
- Social Determinants
- Clinical Escalation
- Drive New Business

Self-Manage

- Automated Coaching
- Self-Awareness
- Best Practices
- Increased Engagement
- Drive Outcomes

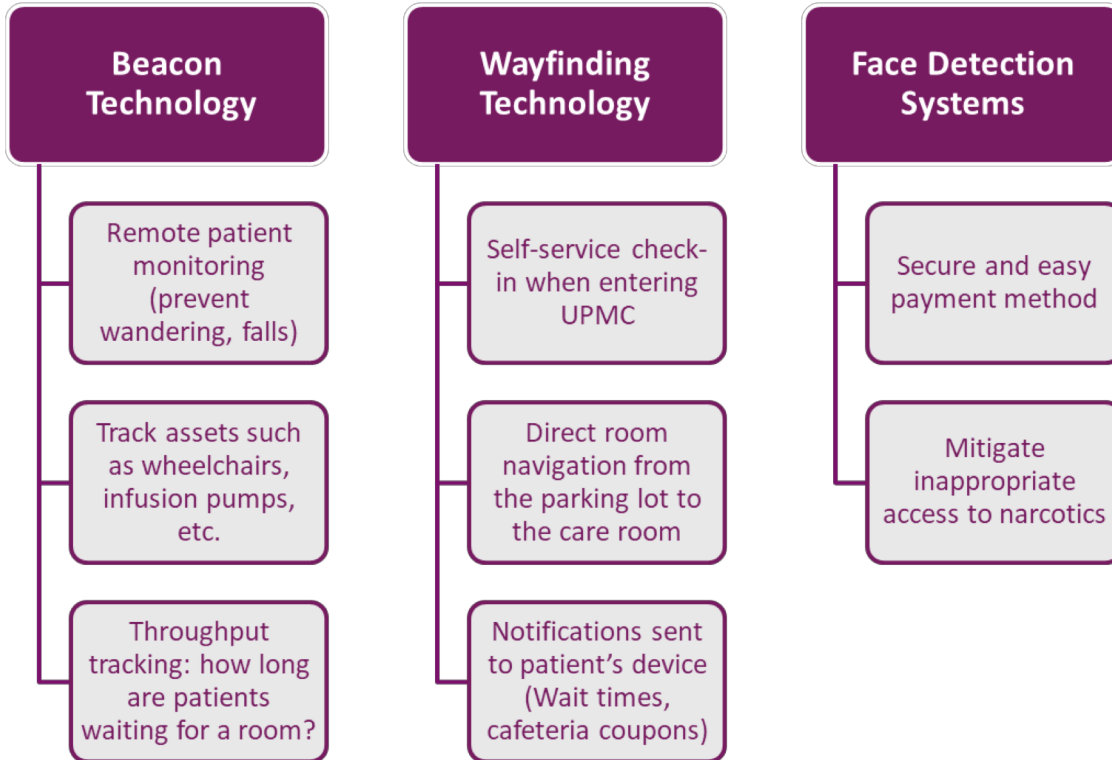
Monitor

- Remote Monitoring
- Clinically-Guided
- Biometric Integration
- Intelligent Escalation
- Drive Cost Reductions

Intervene

- Care Anywhere
- Virtual Visits
- Text Messaging
- Engage Providers

Early Stage Innovations



UPMC: The Future

- IoT technologies
 - Remote patient monitoring / wearables
 - Pain management implants
- Passive listening
 - Voice control
 - Physician liberator – no manual data entry
- Personalized medicine
 - Clinical trial matching
 - Immunotherapy / CAR-T
 - Genomics – personalized care plan
- Computers controlled by the mind
 - Brain computer interface



**IT'S WHAT YOU CAN'T SEE
THAT'S REVOLUTIONARY.**

UPMC LIFE
CHANGING
MEDICINE

More Information / Contacts

UPMC | WHITFIELD

<http://www.whitfieldclinic.ie/>

UPMC | HILLMAN
CANCER CENTRE

<http://upmcwhitfieldcancercentre.ie/>

UPMC Enterprises

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<https://connectedmed.com/blog>

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BEAT

<https://upmcnext.com>

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