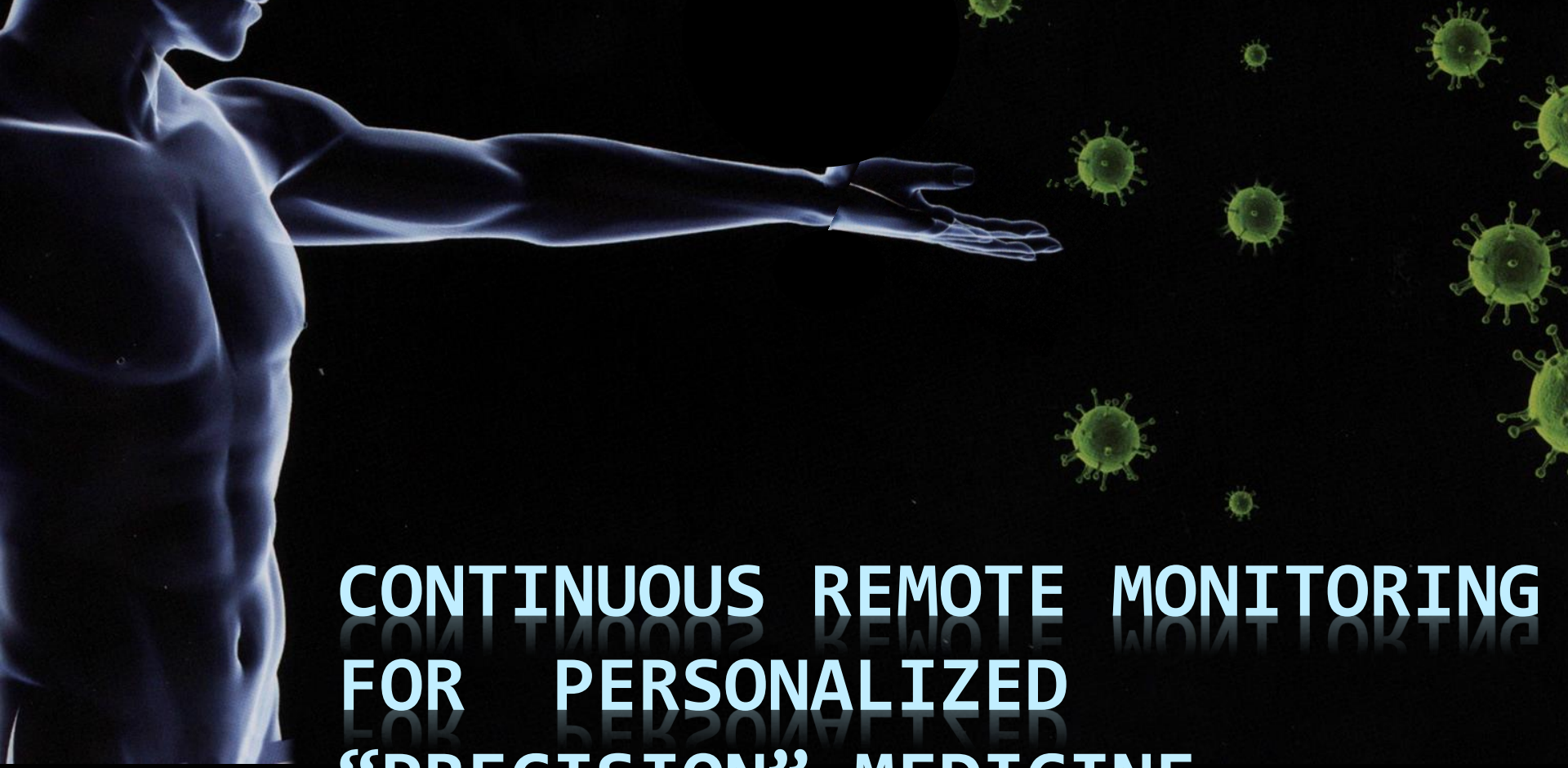
MATRC17

TRACK D: INNOVATIONS IN TELEHEALTH TECHNOLOGY AND DATA ANALYTICS

Moderator: *Robin A. Felder, PhD*

Panelists: *Majd Alwan, PhD*
Tom Edmondson, MD, CMD, AGSF, FACP
Najib Ben Brahim, PhD

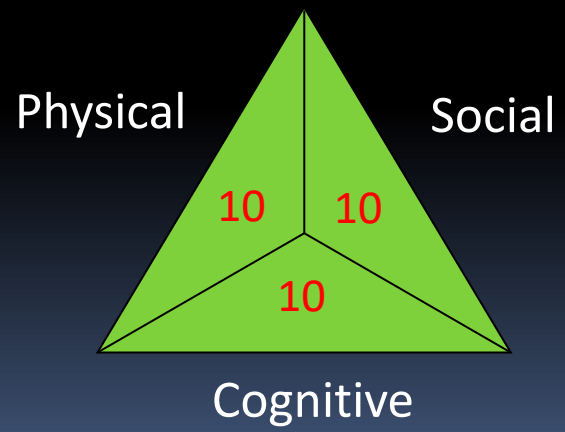


CONTINUOUS REMOTE MONITORING FOR PERSONALIZED "PRECISION" MEDICINE

Robin A. Felder, PhD
Chair, Medical Automation http://medicalautomation.org
Professor of Pathology, The University of Virginia

Pursuit of Wellness

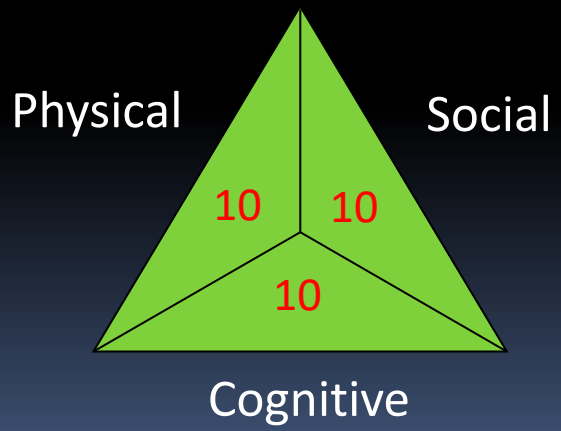
- Achieving physical, mental and social well-being from
  - Positive perspectives and life choices
  - Continuous remote diagnostics can provide real time coaching that facilitates positive choices



Wellness Balance

Pursuit of Wellness

- Achieving physical, mental and social well-being from
  - Positive perspectives and life choices
  - Continuous remote diagnostics can provide information that facilitates positive choices
  - Continuous real time health status



Wellness Balance

THE BUILDING BLOCKS OF REMOTE PRECISION MEDICINE

- INFORMATICS
- WIRELESS COMMUNICATION
- BIOSENSORS
  - IMPLANTABLE
  - INSERTABLE
  - WEARABLE
  - NON-CONTACT

Home Health IT

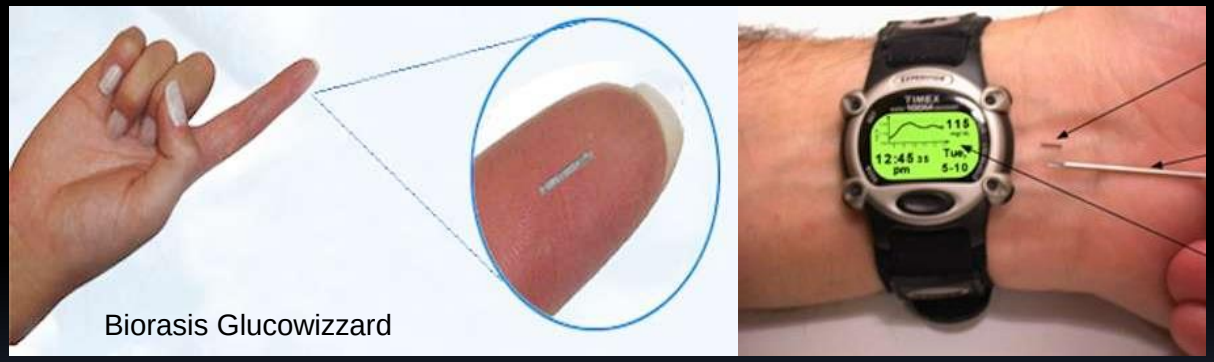
- Medical Cloud interpretations and coaching

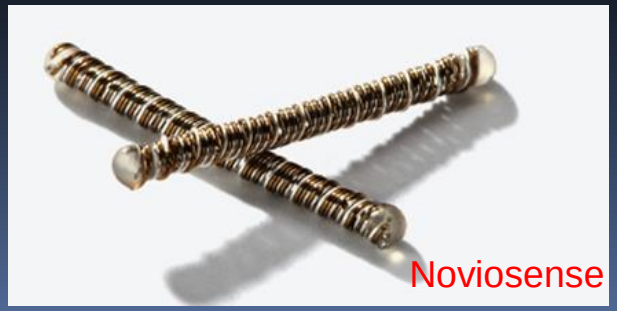
Cloud Interpretations

Technologies measure the spectrum of health

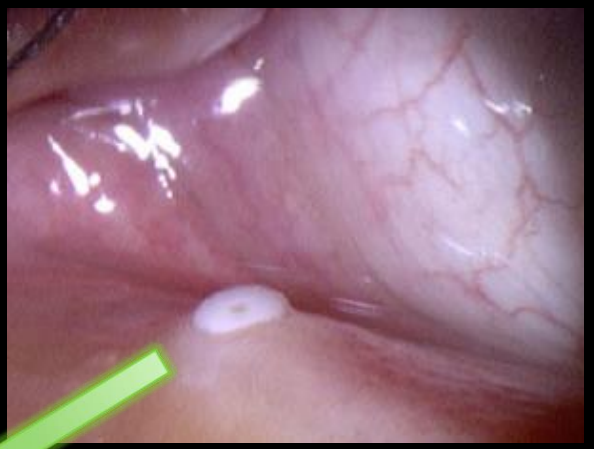
Wellness → Ill Health

Implantable/Insertable Continuous Glucose Monitoring





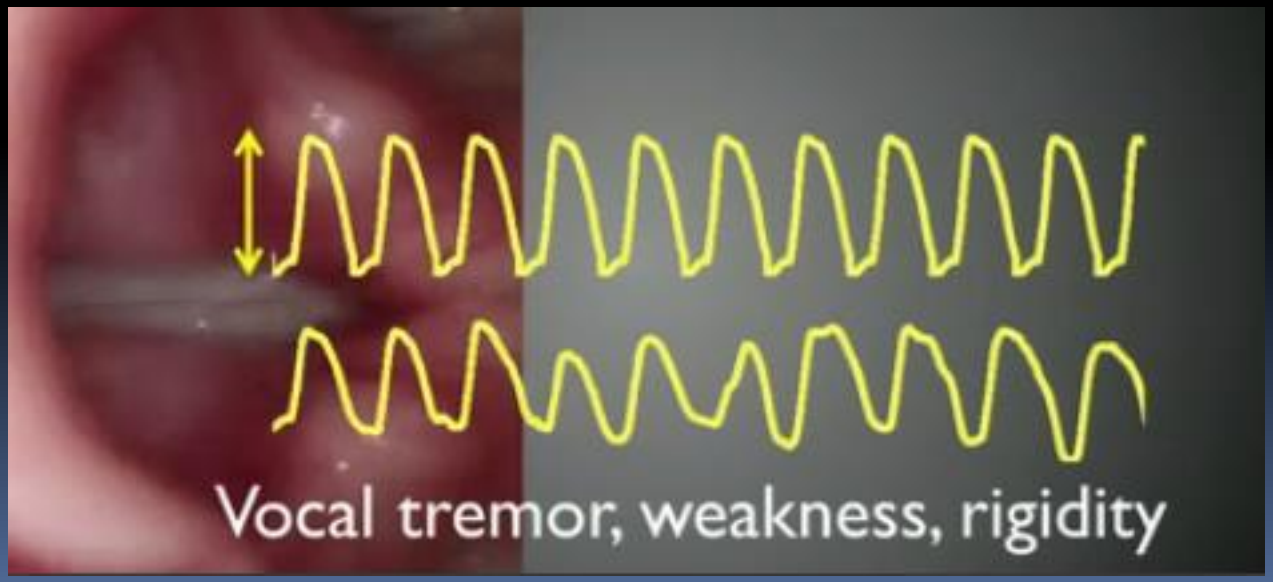
BlinkBit Lachrylmal Canaliculus Tear Based Chemistry Lab and Biosensing



- Measures tear chemistry continuously
- Reports values to cell phone

Cloud Based Diagnosis of Parkinsons

- Non-invasive phone based
- Accurate (98%)
- Remote, non-expert
- Low Cost
- Rapid diagnosis
- Scalable to large populations

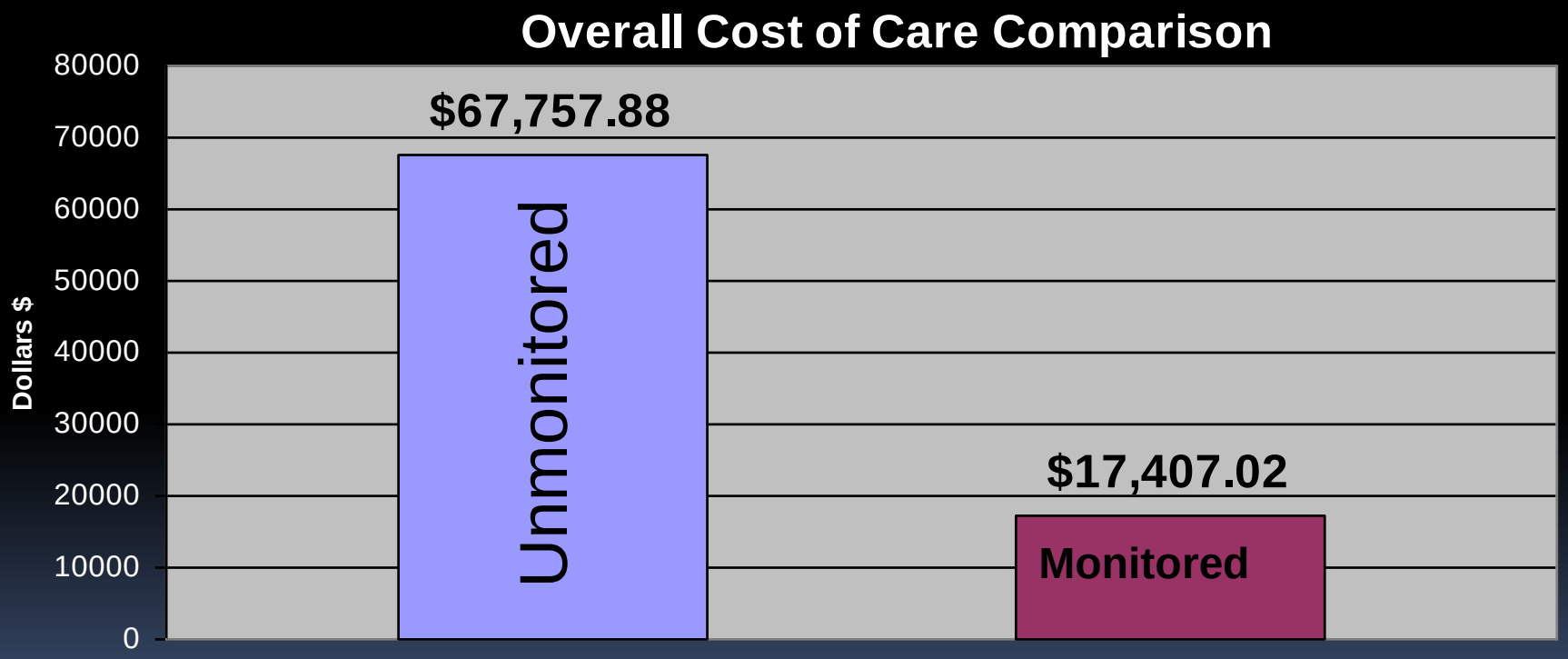


Max Little - Parkinson's Voice Initiative
TED Conference 2012

Passive Remote Monitoring

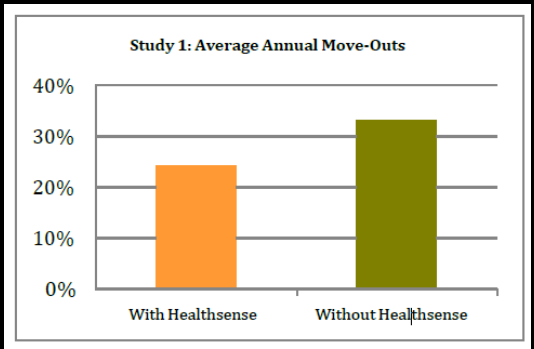
Health Sense solution

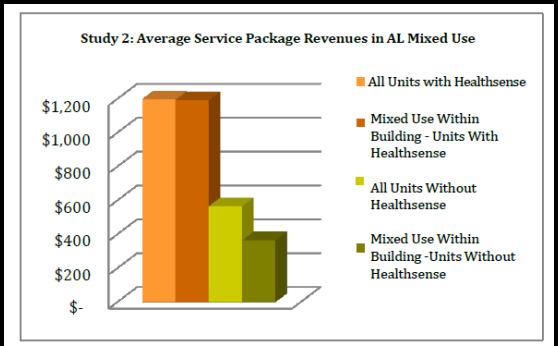
Telehome Monitoring Decreases Costs by 74%

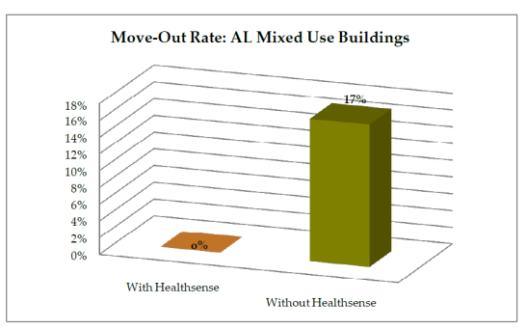


N=21 in each group, P<0.05;
Telemed J E Health, 2007 13(3):279-85

White Paper: Economic Analysis

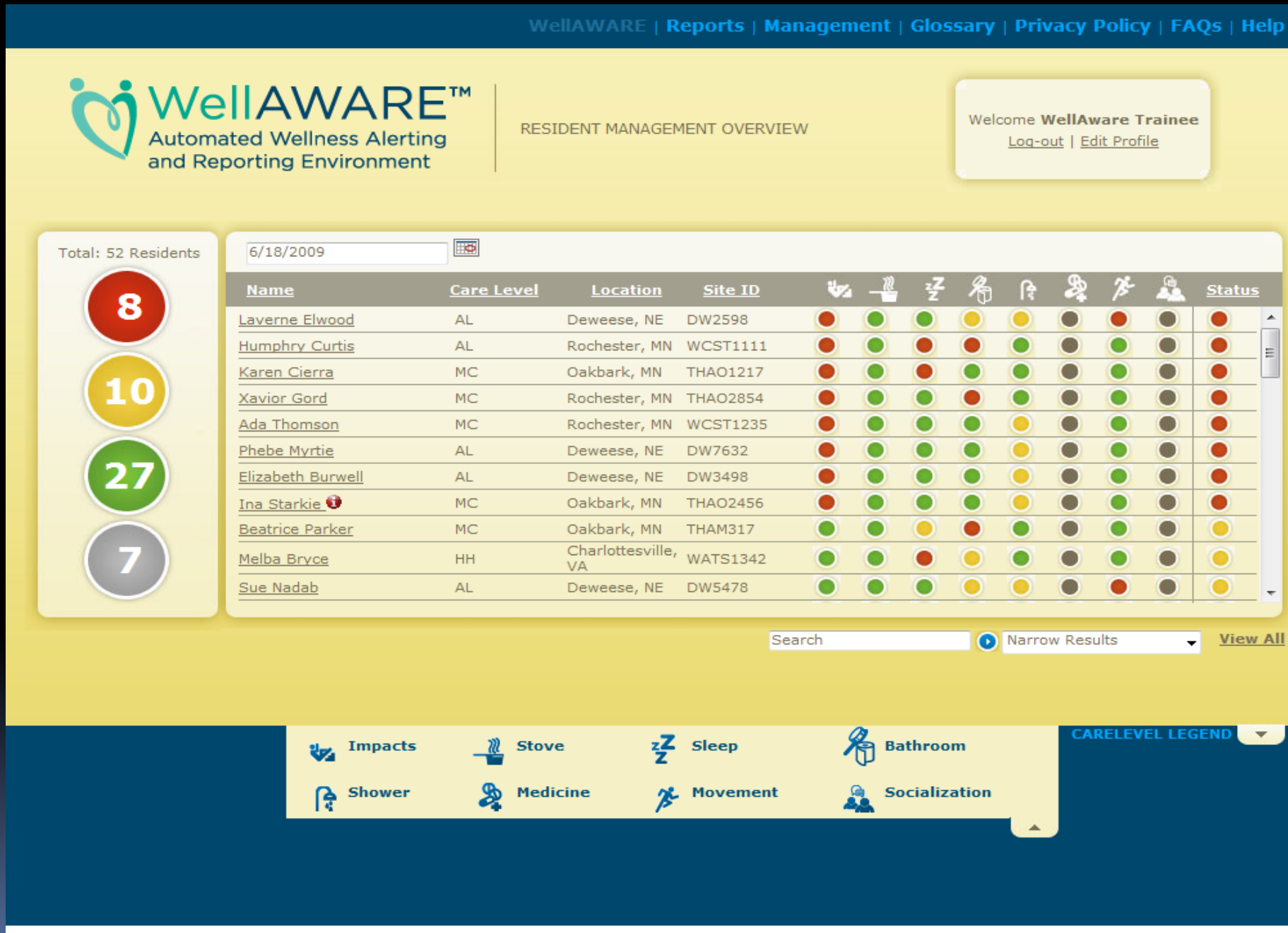






- Study 1: A statistically significant decrease in the discharge rate for facilities with Healthsense vs. facilities without Healthsense.
- Study 2: A threefold increase in the service package price for AL facilities with Healthsense vs. facilities without Healthsense.
- Study 3: An estimated savings of 1 FTE per day for a facility with 42 residents when Healthsense was used in their units.

Source: Dave Knutson, Senior Advisor for Halleland Habicht Consulting

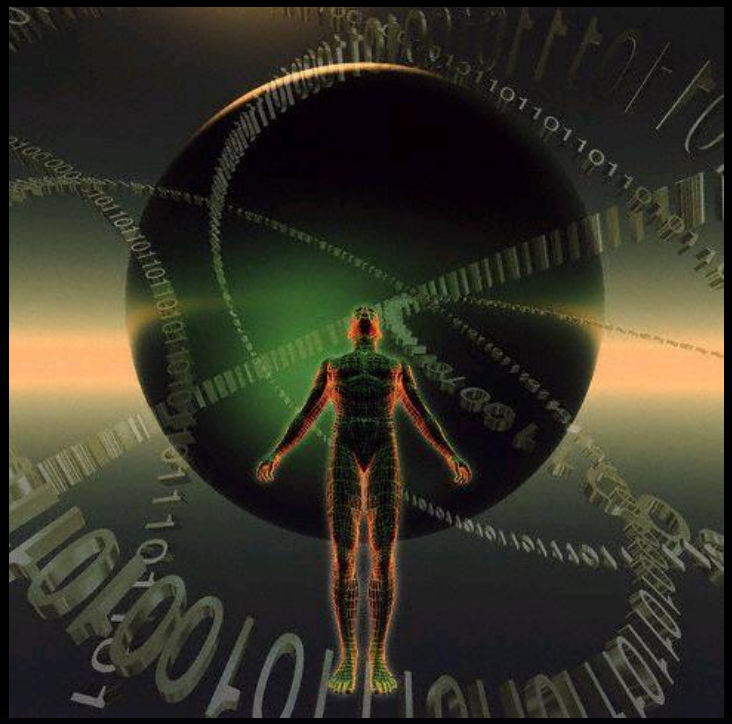

WellAWARE | Reports | Management | Glossary | Privacy Policy | FAQs | Help
WellAWARE™
Automated Wellness Alerting and Reporting Environment
RESIDENT MANAGEMENT OVERVIEW
Welcome WellAware Trainee
Log-out | Edit Profile
Total: 52 Residents
8
10
27
7
6/18/2009
Name
Care Level
Location
Site ID
Status
Laverne Elwood AL Deweese, NE DW2598
Humphry Curtis AL Rochester, MN WCST1111
Karen Cierra MC Oakbark, MN THAO1217
Xavior Gord MC Rochester, MN THAO2854
Ada Thomson MC Rochester, MN WCST1235
Phebe Myrtie AL Deweese, NE DW7632
Elizabeth Burwell AL Deweese, NE DW3498
Ina Starkie MC Oakbark, MN THAO2456
Beatrice Parker MC Oakbark, MN THAM317
Melba Bryce HH Charlottesville, VA WATS1342
Sue Nadab AL Deweese, NE DW5478
Search
Narrow Results
View All
Impacts
Stove
Sleep
Bathroom
Shower
Medicine
Movement
Socialization
CARELEVEL LEGEND

Summary

- Ubiquitous computing will enable portable health
- Sensors will be inserted, implanted, worn, and passive
- Interpretation will be automated
- Motivation for wellness will be self directed or coached by a wide variety of providers

Medical Automation.org

A non-profit educational organization improving healthcare quality and efficiency through teaching automation principles and their application in health systems



http://medicalautomation.org

TagLine - BioMedical reality

http://medicalautomation.org

Telehealth & Related Technology Planning and Selection Tools

with MAJD ALWAN, PH.D.

LeadingAge™ CAST
center for aging services technologies

Models & Enabling Technologies

Integrated/ Coordinated Health Care	Community-Based Support Services	Real Estate Based
+ Interoperable EHRs & HIE + Remote Monitoring/ Telehealth + Care coordination tools	+ Interoperable EHRs & HIE + Remote Monitoring/ Telehealth + Care coordination tools	+ Interoperable EHRs & HIE + Remote Monitoring/ Telehealth + Care coordination tools
	+ Remote monitoring and assistive devices + Wellness & quality of life	+ Remote monitoring and assistive devices + Wellness & quality of life + Facility management

http://www.leadingage.org/sites/default/files/CAST_Scenario_Planning.pdf

TECHNOLOGIES FOR
TELEHEALTH

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TECHNOLOGIES FOR
MEDICATION ADHERENCE

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TECHNOLOGIES FOR

SHARED CARE PLANNING AND COORDINATION TOOLS

- Person-Centered Shared Care Planning:
  - Goals and Preferences
  - Clinical Needs
  - Social Support
  - Family Caregiver
- Care/ Case Management
- Communication Portals and Health Information Exchange (HIE).

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CAST Technology Selection Tools

EHR

Telehealth/RPM

Medication Management

Functional Assessment

Shared Care Planning & Coordination

http://www.leadingage.org/Technology_Selection_Tools.aspx

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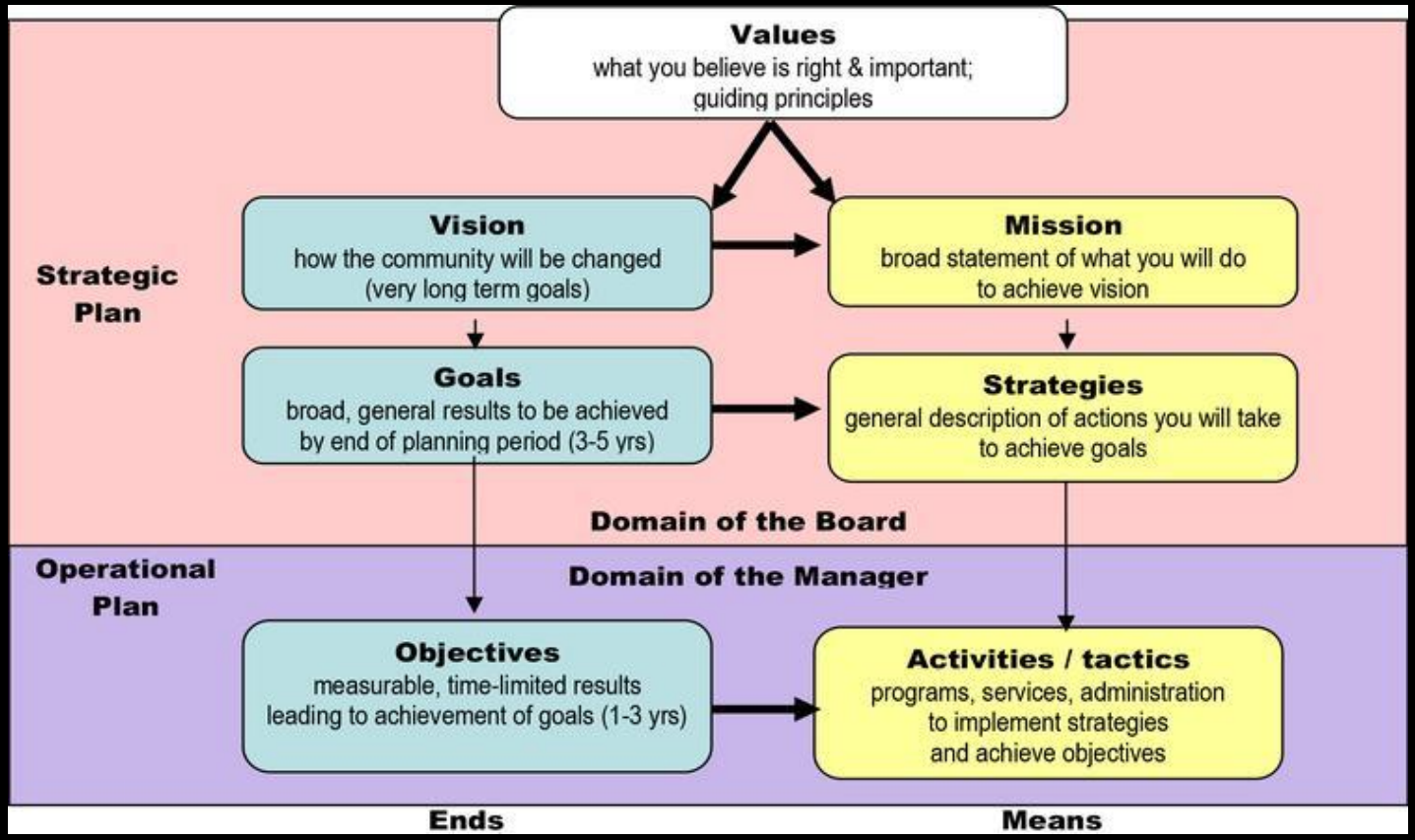
CAST Strategic Planning & Strategic IT Planning Workbook



http://www.leadingage.org/strategic-it-planning-tools

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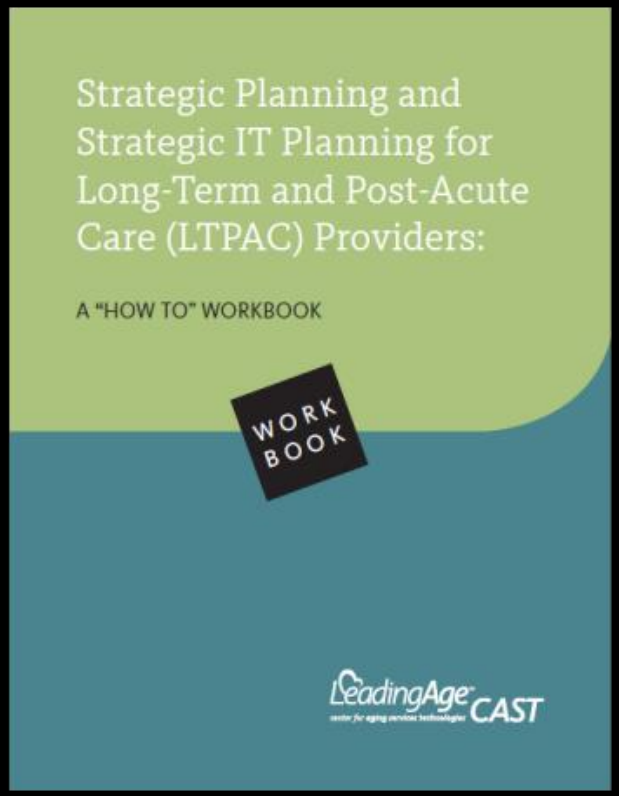
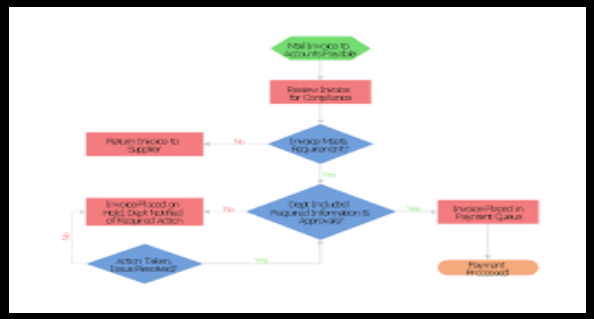
Strategic IT Planning Tools





Interactive Online Tool

http://www.leadingage.org/StrategicITPlanning.aspx

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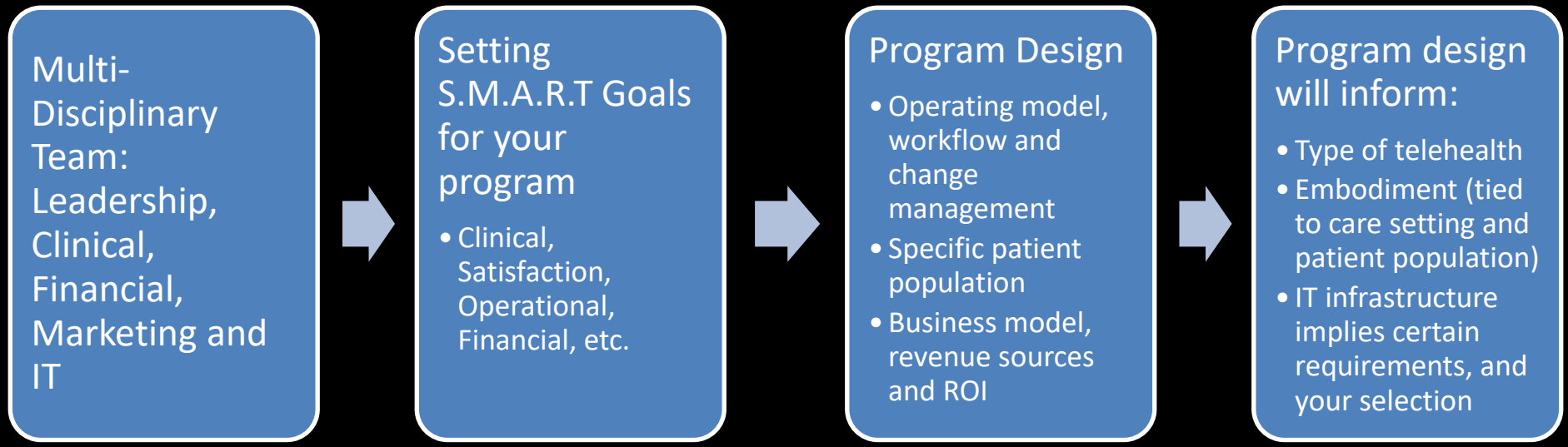
Telehealth Operational Planning



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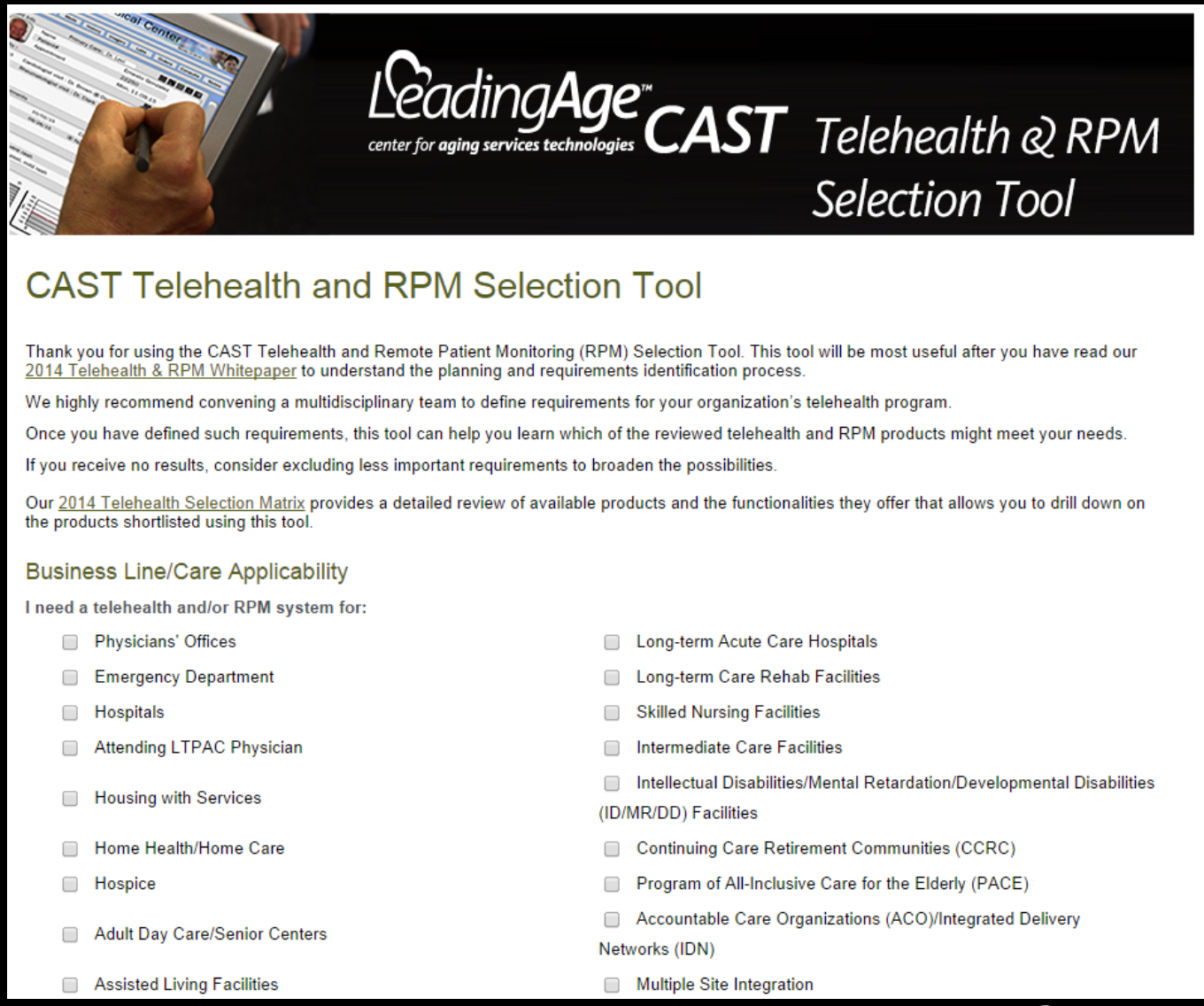
Online Telehealth Selection Tool



http://www.leadingage.org/cast-telehealth-and-rpm-selection-tool

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Readmits ↓ from 16% to 5%

for congestive heart failure

http://www.leadingage.org/sites/default/files/Jewish_Home_Lifecare_Case_Study.pdf

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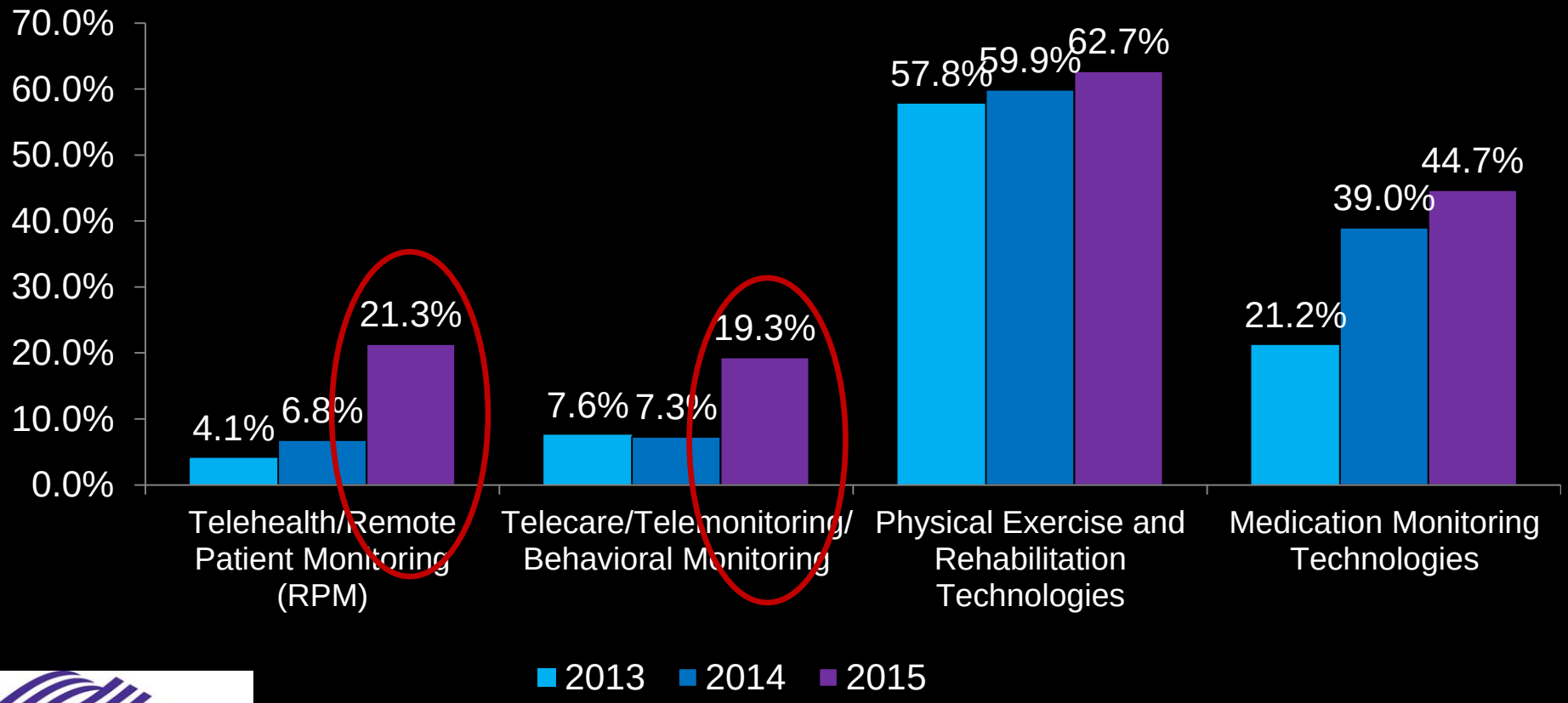
LZ-150 Technology Adoption

PERCENTAGE OF LZ 150 COMMUNITIES/OPERATIONS USING HEALTH & WELLNESS MONITORING TECHNOLOGIES



Ziegler
CAPITAL :: INVESTMENTS :: ADVICE

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Thank You...

MAlwan@LeadingAge.org

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Unlocking The Secrets of Telehealth: Case Studies in Clinical Transformation

Tom Edmondson, MD, CMD, AGSF, FACP
Physician Director
Hospital to Home

April 3, 2017

PHILIPS

Session Objectives

- Typical chronic disease management in the U.S.
- Physician's perspective
- Patient perspective
- Telehealth technology versus technology-enabled clinical transformation
- Achieving the Quadruple Aim with the aid of telehealth technologies

Case Study

Ms. TE is a 73 year old woman

- Separated from her 2nd husband of 40 years
- Lives alone in an apartment
- 4 children, 6 grandchildren, 10 great grandchildren and 3 great-great grandchildren
  - Estranged from several
- Served in the military
- Transportation: Drives but her husband has the car
- Advanced care planning: not complete
- Medical history:
  - CAD, TIA, COPD/Asthma, HTN, T2DM, hyperlipidemia, headaches, pancreatits x 1
  - s/p right below-the-knee amputation; does not use her prosthetic leg but crutches instead
- Fall risk: high
- Admits to stress, anxiety, and depression

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Case Study

- Utilization:
  - PCP
  - Sub-specialists 10
  - ER visits
    - 2014: 18
  - Acute Hospital Admissions
    - 2014: 10

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Physician's Perspective: Quadruple Aim

- For every hour spent with patients, physicians spend 2 hours on EHRs and desk work.
- 49% of physicians' office hours spent on EHR and desk work while 27% spent directly with patients.
- When meeting with patients, physicians spent 37% of their time on EHRs and desk work.
- After office hours, physicians worked a mean of 1.5 hours per day, with most of that time dedicated to EHR tasks.

Ann Intern Med. 2016;165:753-760. doi:10.7326/M16-0961

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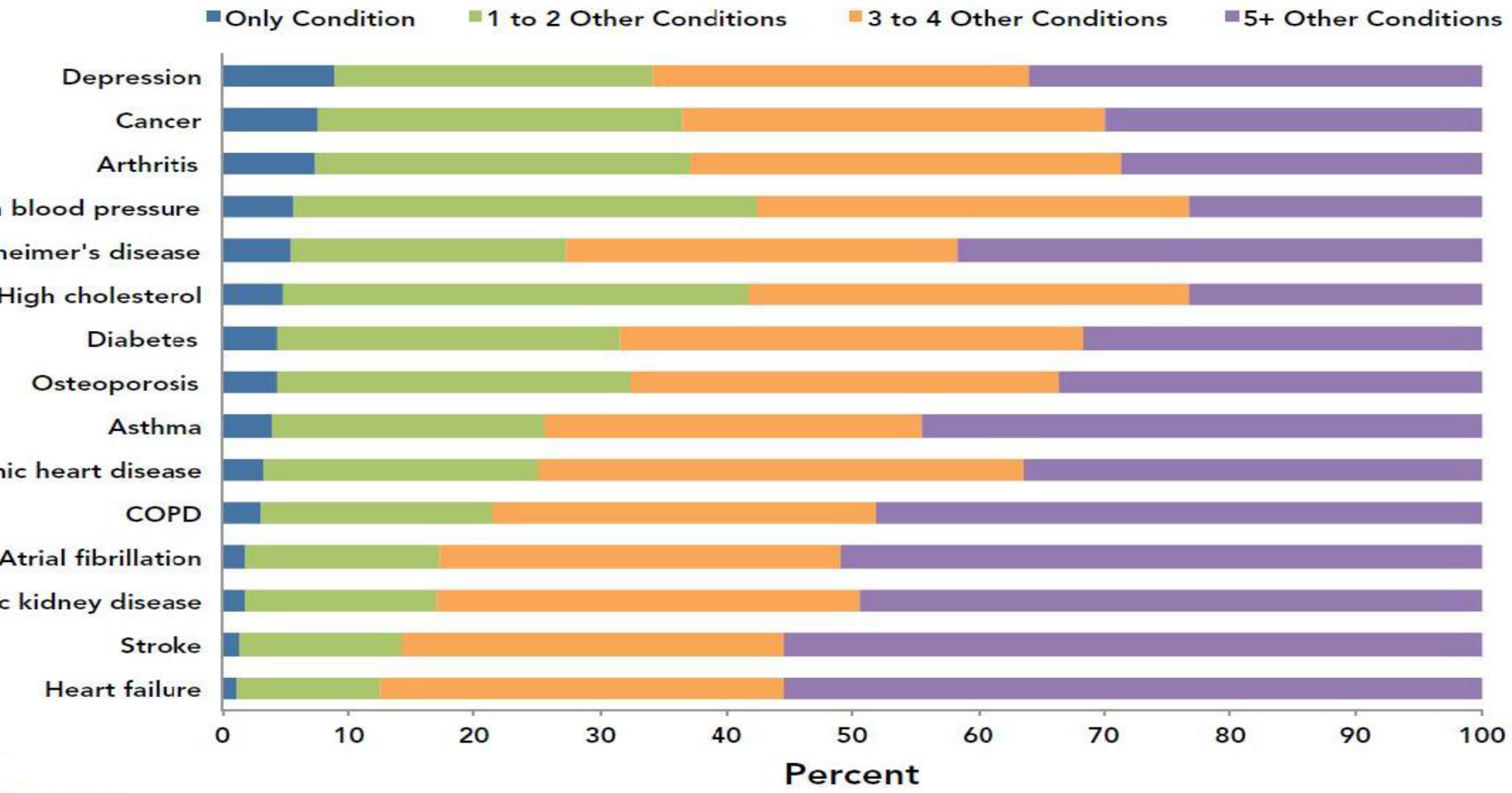
Figure 4.1 *Co-morbidity among Chronic Conditions for Medicare FFS Beneficiaries: 2010*



VU Langone
MEDICAL CENTER

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State of the Art care?

Delivery of chronic care: Fragmented care

- See an average of 7 clinicians each year (Pham AIM, 2009)
- Everyone focuses on different disease outcomes
- Lack of coordination of care: Unclear roles and accountability among clinicians, patients, and caregivers

How do older adults manage their health?

National Health and Aging Trend Survey

- Self Manage: 69.4%
- Co-Manage: 19.6%
- Delegate: 11%

Wolff JL and Boyd CM JGIM 2015. DOI: 10.1007/s11606-015-3359-6

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Living with Multiple Medical Conditions

Time	Medications	Non-pharmacologic Therapy	All Day	Periodic
7 AM	Ipratropium MDI Alendronate 70mg weekly	Check feet Sit upright 30 min. Check blood sugar	Joint protection Energy conservation Exercise (non-weight bearing if severe foot disease, weight bearing for osteoporosis) Muscle strengthening exercises, Aerobic Exercise ROM exercises Avoid environmental exposures that might exacerbate COPD Wear appropriate footwear Albuterol MDI prn Limit Alcohol Maintain normal body weight	Pneumonia vaccine, Yearly influenza vaccine All provider visits:Evaluate Self-monitoring blood glucose, foot exam and BP Quarterly HbA1c, biannual LFTs Yearly creatinine, electrolytes, microalbuminuria, cholesterol Referrals: Pulmonary rehabilitation Physical Therapy DEXA scan every 2 years Yearly eye exam Medical nutrition therapy Patient Education: High-risk foot conditions, foot care, foot wear Osteoarthritis COPD medication and delivery system training Diabetes Mellitus
8 AM	Eat Breakfast HCTZ 12.5 mg Lisinopril 40mg Glyburide 10 mg ECASA 81 mg Metformin 850mg Naproxen 250mg Omeprazole 20mg Calcium + Vit D 500mg	2.4gm Na, 90mm K, Adequate Mg, ↓ cholesterol & saturated fat, medical nutrition therapy for diabetes, DASH		
12 PM	Eat Lunch Ipratropium MDI Calcium+ Vit D 500 mg	Diet as above		
5 PM	Eat Dinner	Diet as above		
7 PM	Ipratropium MDI Metformin 850mg Naproxen 250mg Calcium 500mg Lovastatin 40mg			
11 PM	Ipratropium MDI			

Boyd et al. JAMA 2005;294:716-724

If we are to achieve results never before accomplished, we must employ methods never before attempted.

Francis Bacon

Slide courtesy of Banner iCare

Case Study: Time for a dose of magic

Hospital leadership enrolled Ms. TE in the hospital's new telehealth program

Case Study: Ms. TE

- Utilization:
  - ER visits
    - 2014 18
    - 2015 26
  - Acute Hospital Admissions
    - 2014 10
    - 2015 13


Do not throw in the towel;
use it for wiping the sweat off
your face.
PictureQuotes.org

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Case Study: Clinical Transformation In Remote Patient Monitoring Technology

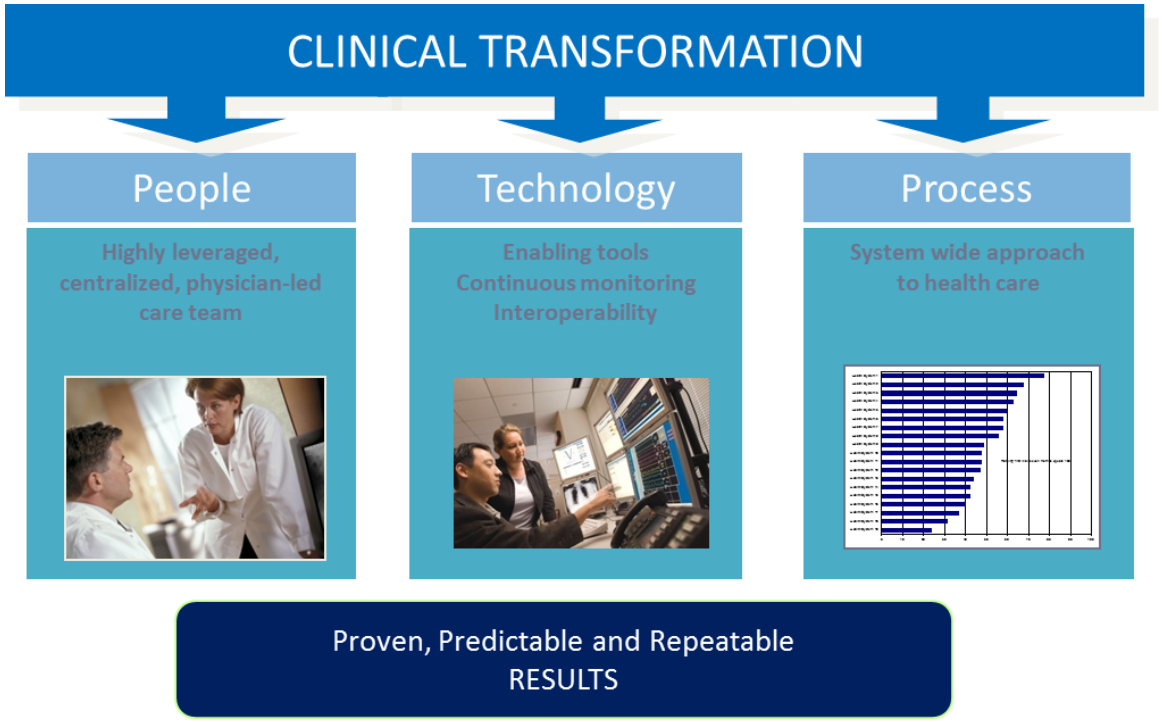
Telehealth technology

versus

Technology-enabled clinical transformation

PHILIPS

Technology Enabled Care Model



Case Study: Ms. TE

Clinical Transformation in Remote Patient Monitoring

- Goals & Objectives
  - –**S**pecific, **M**easurable, **A**ttainable, **R**ealistic, **T**ime-bound
- Major focus on Quality Improvement
- Telehealth team
  - ✓Proactive population health management
    - ✓Use technology to drive coordination of care and allocation of resources per patient
  - ✓Includes PCP, specialists, and sub-specialists
  - ✓Critical workflow:
    - ❖How the PCP and specialists leverage the telehealth team's work

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NEVER
THROW IN THE TOWEL
USE IT TO WIPE THE
SWEAT OFF, THEN
KEEP GOING!
© MuscleThreadz.com

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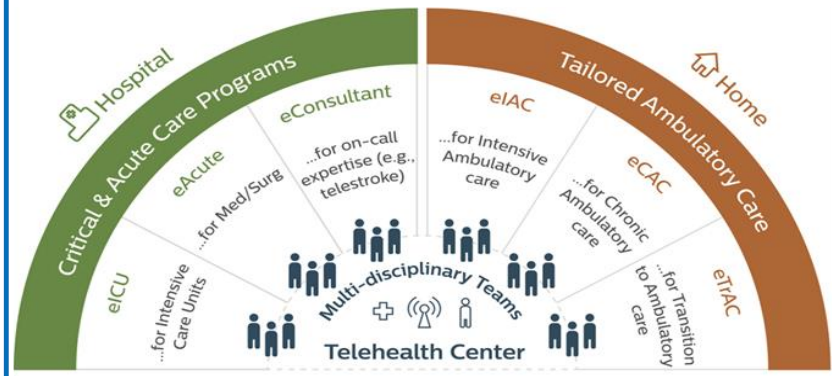
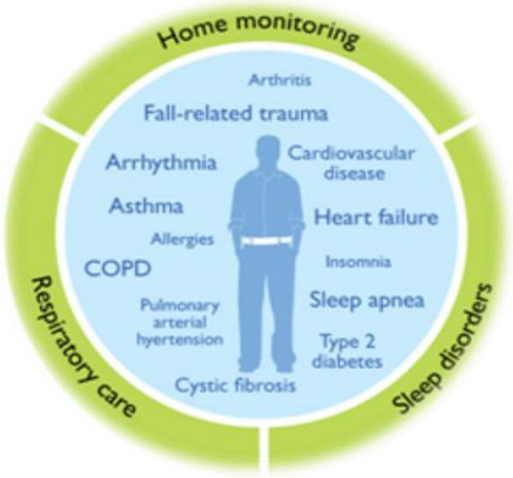
Case Study: Ms. TE

- Utilization:
  - ER visits
    - –2014 18
    - –2015 26
    - –2016 10
  - Acute Hospital Admissions
    - –2014 10
    - –2015 13
    - –2016 6

A solutions business spanning the patient continuum…



Disease-state monitoring for readmission management



Dedicated telehealth business focused on chronic disease management

"Hospital To Home"

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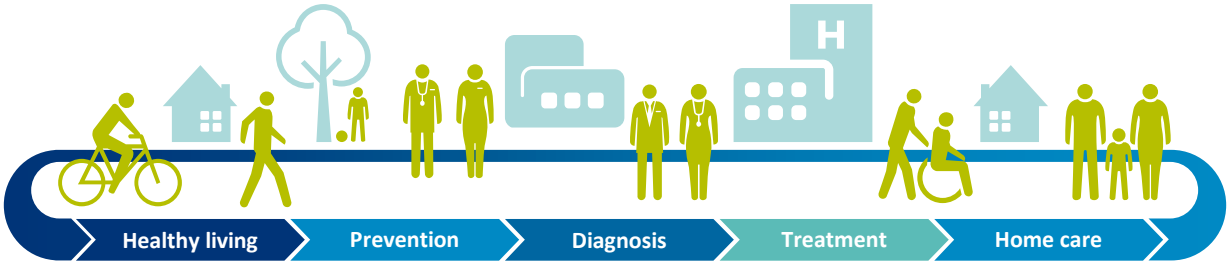
Continuous health is our unique population health management approach



Working across the full spectrum of where, when and how health happens

Across settings	Continuous care as patients transition from **one context to another**
Across people	Continuity across the **care team, populations, and conditions**
Across data	Continuous and holistic analysis of **all types of data**
Across time	Continuous, proactive engagement throughout a **person's lifetime**

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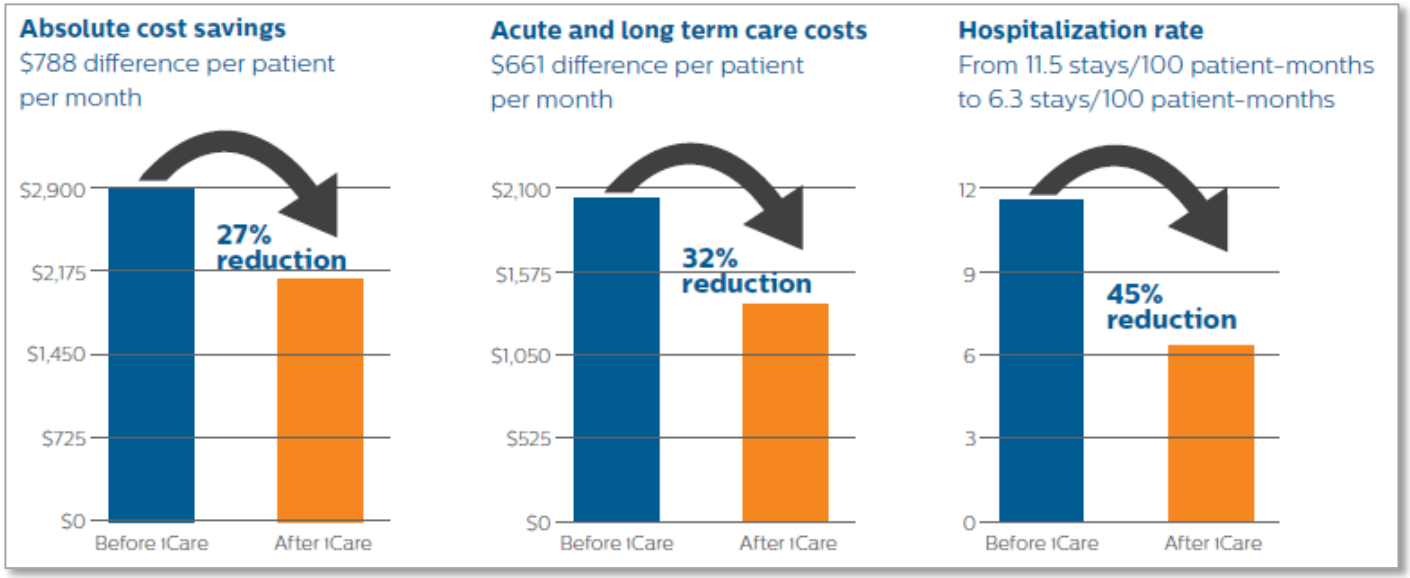
Philips Intensive Ambulatory Care (eIAC) telehealth program

Banner Health in Arizona

1 yr pre- vs. 6 months eIAC



Banner Health®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SWEAT OFF, THEN
KEEP GOING!
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Case Study: Clinical Transformation In Remote Patient Monitoring Technology

Philips Intensive Ambulatory Care (eIAC) telehealth program, *Banner Health in Arizona*
1 yr pre- vs. 12 months eIAC

Total Cost	Hospitalization Rate	Avg. # Days in Hospital	30 day Readmission Rate
$2,709 vs. $1,755	10.9 vs. 5.5 # hosp/100 pts/month	60 vs. 30 avg # days in hospital/100 pts/month	20% vs. 5%
34.5 % reduction	49.5% reduction	50% reduction	75% reduction
P<0.001	P<0.001	P<0.001	P<0.004

PHILIPS

Tom Edmondson, MD, CMD, AGSF, FACP

Physician Director, Ambulatory Solutions

tom.edmondson@philips.com

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TELEHEALTH management

AN ENTERPRISE RESOURCE PLANNING APPROACH TO MANAGING TELEHEALTH

Najib Ben Brahim, PhD

Founder and CEO, Telehealth Management

HISTORY

TELEHEALTH management

SYMPTOMS

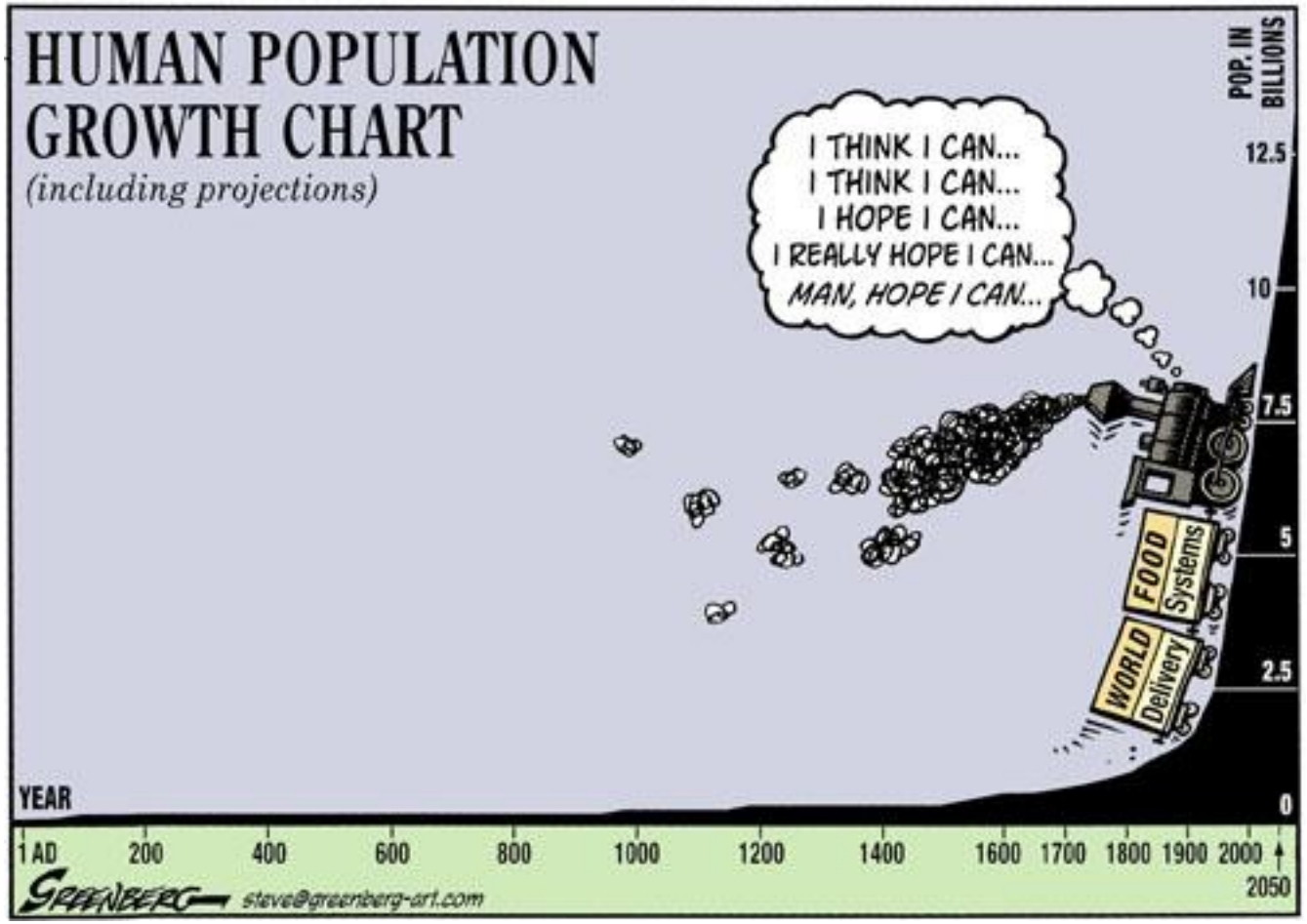
1. You Have Lots of Different Software for Different Processes

2. You Don't Have Easy Access to Information About Your Business

3. Accounting Takes Longer and Is More Difficult

TELEHEALTH management

TELEHEALTH



TELEHEALTH
management

APPROACH

Clinical Dashboard

Financial Dashboard

Operational Dashboard

Contracts

Equipment Inventory

Consult Records

Charges & Payments

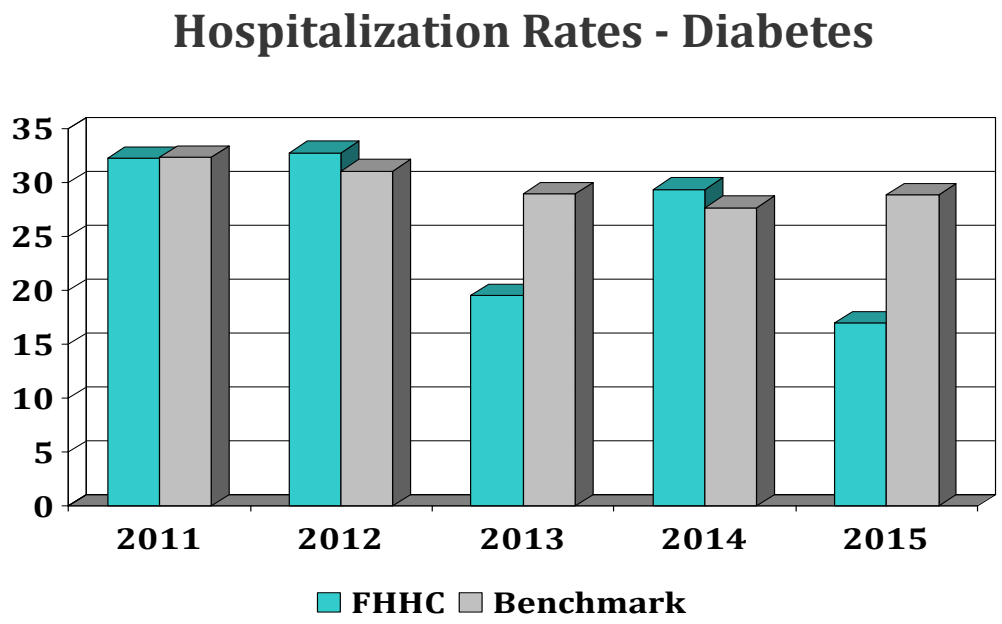
Virtual Visits Systems

Telehealth RPM Hardware

TELEHEALTH management

CASE STUDY #1 – HOME HEALTH

- Application: Chronic Disease Management
- Technology: Remote Patient Monitoring & Virtual Visits
- Site: FirstHealth of The Carolinas



TELEHEALTH management

CASE STUDY #1 – HOME HEALTH

- Application: Chronic Disease Management
- Technology: Remote Patient Monitoring & Virtual Visits
- Site: FirstHealth of The Carolinas

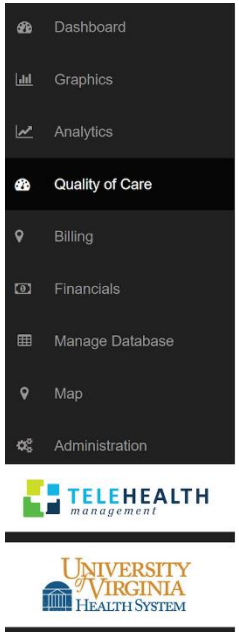
FirstHealth Complex Care Management Program in Conjunction with Health Recovery Solutions (HRS) Saves $1.9M with Reduction in Readmissions

In a study of 220 high risk heart failure, COPD, and diabetes patients, from September 2015 through May 2016, FirstHealth of The Carolinas achieved a 53% reduction in hospital readmissions with their Complex Care Management Model (CCM) and HRS's telehealth and patient engagement software, saving $1.9 million for payers.

TELEHEALTH management

CASE STUDY #2 – TELESTROKE

- Application: Telestroke
- Technology: Virtual Visits
- Site: University of Virginia



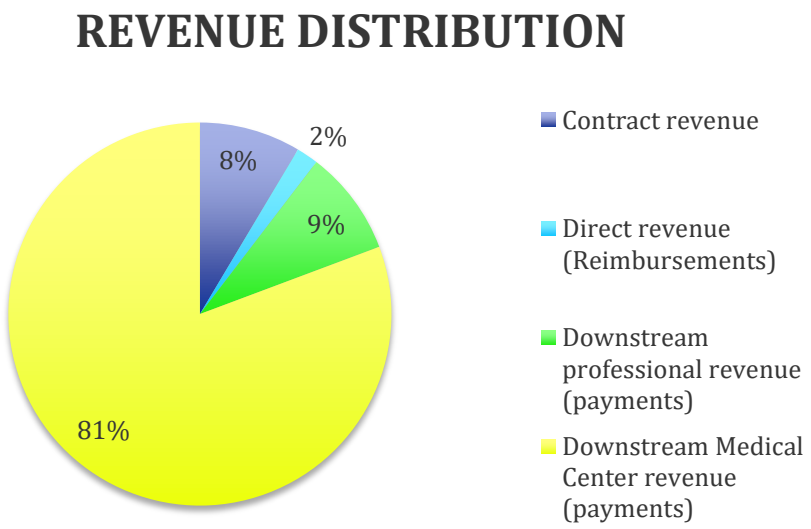
Tele Stroke Clinical Metrics

Metric Description	Value	Percentage
TPA administered	41	14.49%
Patient UVa Transfer rate	72	25.44%
Remained at local hospital	204	72.08%
Transfered to other	7	2.47%
Given TPA and transfered to UVa	25	8.83%
Given TPA and stayed at local	14	4.95%
Given TPA and transfered to other	2	0.71%
Seizure rate	15	5.3%
tPA eligibility rate	141	49.82%
Embolectomy eligibility rate	141	49.82%
Rate of calls with suspected stroke diagnosis	95	33.57%
Rate of suspected stroke diagnosis treated with TPA	41	43.16%

TELEHEALTH management

CASE STUDY #2 – TELESTROKE

- Application: Telestroke
- Technology: Virtual Visits
- Site: University of Virginia



TELEHEALTH management

WHAT NEXT?

School Based Telehealth	Direct to Consumer	Urgent Care
Pediatric Echocardiogram	Pediatric Echocardiogram	Diabetes

Physician: We Need A Bloomberg Terminal For Healthcare

Posted in Information Technology by Arundhati Parmar on September 5, 2014

As we move toward an interoperable future, analytics tools need to be developed so that providers aren't overloaded raw data, says a physician, and an expert in medical informatics and clinical research.

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THANK YOU

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TRACK D: INNOVATIONS IN TELEHEALTH TECHNOLOGY AND DATA ANALYTICS

Questions?