Home Patient Monitoring Program
Clinical and Outcomes Evidence and Future Prospects

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Nonin Medical

- Leading provider of physiological sensor
- Leading provider of Pulse Oximetry to Home monitoring, mHealth
- Advancing the science of:
  - sensor technology and uses
  - tissue (regional) oximetry
  - Added parameter measurement

- Founding Member of Continua
- First Continua certified products
- Microsoft Healthvault and Siemens Assignio Certified
Summary

- Status of the Patient Monitoring
- Chronic Disease and Care Management programs in the US, UK, Canada
- Performance to outcomes measurements.
- Classes of technology solutions being used
- Incentives and barriers to broad scale deployment and how these are being addressed.
Economic Drivers are Known

- Rising Cost of Healthcare is Unsustainable
- Largest and fastest growing portion of government budgets
  - Approaching 20% of GDP in US
  - Approaching 15% in rest of developed world
- “Baby Boom” population bubble
- Living Longer = Chronic disease = Higher cost
- Aging population and decreased birth rates creating population imbalance between contributors and consumers of healthcare
Costs & Drivers are going the Wrong Direction


Healthcare Spending as % GDP

Note: For countries not reporting 2005 data, data from previous years is substituted.

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Market Drivers

- Baby boomers and following generations have higher expectations
  - More familiar with technology and its benefits
  - Demand more efficiency and transparency from healthcare
  - Demand technology, demand services for a subject that controls life, death and quality

- Patients will demand a higher level of care
- Carers will demand more support.
Home Patient Monitoring is not “New”

- Hundreds of programs in over a dozen countries
- Over 180,000 systems installed in the US
- Hundreds of papers and reports written
- With a few exceptions … Results are overwhelmingly positive and consistent

- The question is no longer: Will it work?
- The question is: How do we make it happen?
This is Not New

- Related science in the international council on medical & care compunetics - Database

- A systematic review of telemonitoring for the management of heart failure
  Louis AA et al, European Journal of Heart Failure, 5(5), 2003-10

- A pilot study of nurse-led, home-based telecardiology for patients with chronic heart failure
  Scalvini S et al, J Telemed Telecare, 10(2), 2004

- The effects of telephone consultation and triage on healthcare use and patient satisfaction: a systematic review

- The SUMMA Project: A Feasibility Study on Telemedicine in Selected Italian Areas

- Predicting need for intervention in individuals with congestive heart failure using a home-based telecare system
  Biddiss, Elaine et al, J Telemed Telecare, 15(5), 2009-07

- Home telemonitoring for congestive heart failure: a systematic review and meta-analysis
  Polisena J et al, J Telemed Telecare, 16(2), 2009-12-11

- Telemedical Support in Patients with Chronic Heart Failure: Experience from Different Projects in Germany

- Home telemonitoring in patients with chronic heart failure: a chance to improve patient care?
  Schmidt S et al, Deutsches Ärzteblatt International, 107(6), 2010-02-26

- Use of Remote Monitoring to Improve Outcomes in Patients with Heart Failure: A Pilot Trial

- Impact of blood pressure telemonitoring on hypertension outcomes: a literature review
  AbuDagga A et al, Telemedicine and e-Health, 16(7), 2010-09-03

- Is teleassistance for respiratory care valuable? Considering the case for a 'virtual hospital'
  Vitacca M et al, Expert Review of Respiratory Medicine, 4(6), 2010-12

- A new multidisciplinary home care telemedicine system to monitor stable chronic human immunodeficiency virus-infected patients: a randomized study
  León A. et al, PloS One, 6(1), 2011-01-21

- Noninvasive Remote Telemonitoring for Ambulatory Patients With Heart Failure: Effect on Number of Hospitalizations.
  Domingo M et al, Revista Espanola
Program Results - US

- **US VA – Care Coordination Program**
  - Over 37,000 patients under home monitoring
  - 25% reduction in the average number of days hospitalized
  - 19% percent reduction in hospitalizations
  - 70% + reduction in referral to nursing home
  - Cost of Telehealth services averaged $1,600yr vs.
    - $13,121 for home-based primary care services
    - $77,745 for nursing home
  - Permits VA to give the right care in the right place at the right time
  - Not about a specific technology
    - Using over 5 different technology providers – similar result from each of them
Program Results - US

- Massachusetts General Brigham and Women's Hospital
  - Heart failure patients receiving care are automatically enrolled in a remote monitoring program.
  - Patients transmit their weight, heart rate, pulse and blood pressure to their provider.
  - Program promotes
    - greater patient engagement,
    - just-in-time education,
    - nursing interventions to improve care
- Reduce hospital readmissions by 48%.
Program Results - US

- Leading Disease Management Company
  - Private Company – Progressive
  - Disease Management worldwide
  - Implementing home monitoring to improve services and profits

- VNA of Western New York
  - Largest US Visiting Nurse Association
  - Part of standard care process
  - Improved quality of life scores
  - Reduction in hospital readmissions
  - Reduction in unneeded ER visits
  - High patient acceptance levels
  - High nurse acceptance levels
  - Improved data gathering and accuracy
Program Results - Canada

OTN Telehomecare Study Outcomes

Self-reported data from 818 enrolled patients with CHF and COPD

- 64 – 66% decrease in hospital admissions
- 72 – 74% reduction in emergency department visits
- 16 – 33% decrease in number of primary care physician visits
- 95 – 97% reduction in walk-in clinic visits
- Patient satisfaction exceeds 98%
- Hospital cost avoidance of more than $5 for every $1 invested
Program Results - Canada

- **Heart Failure:**
  - Reduced rates of re-hospitalisations, ED visits and bed days of care
  - Meta-analysis (4 studies, 463 patients): **22% reduction in patients re-hospitalised**
  - Meta-analysis (6 studies, 645 patients): **35% reduction in risk of death**
  - **Comparable or better QoL**, adherence to treatment, compliance and patient satisfaction

- **COPD:**
  - Reduced rates of re-hospitalisations and ED visits
  - Meta-analysis (3 studies): **31% reduction in rate of hospitalisation**
  - **Comparable or better health-related QoL**

- **Diabetes:**
  - **Better glycaemic control**. Meta-analysis (12 studies, 2,595 patients): **weighted mean difference 0.21**
  - Reduced rehospitalisation and bed days of care
  - **Comparable or better QoL** and patient satisfaction

Canadian systematic review of the Telehealth evidence for HF, COPD and Diabetes (2008)
Program Results - UK

- **Whole System Demonstrator UK**
  Claims “Largest randomize trial”
  Reports to date have been positive
  Concern, Was it designed to succeed?

See: Supporting COPD Patients with Telehealth: Angela Single
Program Results - General

- 14 randomized controlled trials (4264 patients)
  - 4 tele-monitoring
  - 9 phone support
- Monitoring
  - Reduced hospital admissions for CHF by 21%
  - Reduce all cause mortality by 20%
- Of the 6 trials evaluating quality of life
  - 3 reported significant benefits with remote monitoring,
- Of the four studies examining healthcare costs with structured telephone support
  - 3 reported reduced cost

Telemonitoring or structured telephone support programmes for patients with chronic heart failure: systematic review and meta-analysis, (British Medical Journal 2007)
Program Results - General

- Medications Reminder Study - 135,000 individuals with one or more of four chronic conditions, CHF, hypertension, diabetes and dyslipidemia.

  …“substantial medical savings, … reductions in hospitalization and emergency department use.

- Benefit-cost ratios range from:
  - 2:1 for adults under age sixty-five with dyslipidemia to more than
  - 13:1 for older patients with hypertension

Health Affairs January 2011
Classes of Technology Being Used

- **Home Monitors**
  - Purpose build for aging patients in the home
  - Tunstall, Viterion (Bayer), Bosch, Honeywell, Philips

- **Standard Platforms**
  - Interface to off-the-shelf devices – (Pads and PCs)
  - Healthanywhere, others

- **mHealth**
  - Mobile Applications for Smart phones and pads
    - *About 5000 phone Apps available today*
Conclusions

- Reduce focus on “Pilots” and “Study”
  - We are wasting valuable time and money
- The question is no longer: Does it work?
  - The effectiveness is proven
  - Cost savings and quality of life improvement are compelling
- The question now is: How do we achieve large scale implementation?
  - Focus on patients that are impacted the most
  - Integration into care flow and information is key
  - The tools are already there.
  - Incentives are needed

See: Need for Integrated Care: Solutions That Transform Care Delivery in the Community - Jelle van der Weijde
What Next?

- **Policy Change**
  - Pay for performance not for procedure
  - Bundled services

- **Delivery process change**
  - Coordinated care – Accountable Care Organizations, Primary Care Centered, Citizen Centered Care

- **Incentives and Penalties**
  - Direct reimbursement?
  - Non-Payment for re-hospitalizations within 30 days
  - Reduced payments to hospitals with high re-hospitalization rates
Thank You

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