



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.

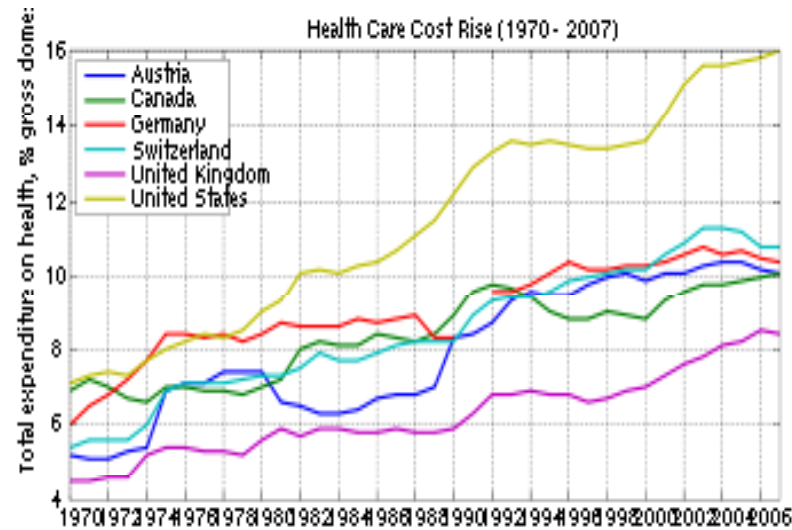


Economic Drivers are Known

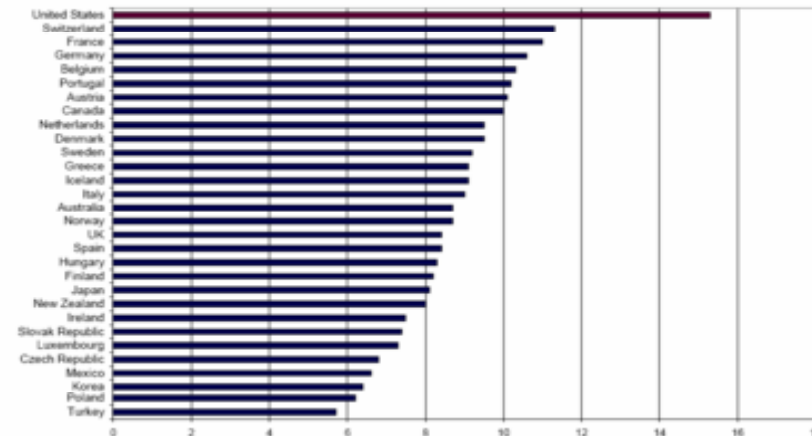
- ❖ Rising Cost of Healthcare is Unsustainable
- ❖ Largest and fastest growing portion of government budgets
 - Approaching 20% of GDP in US
 - Approaching 15% in rest of developed world
- ❖ “Baby Boom” population bubble
- ❖ Living Longer = Chronic disease = Higher cost
- ❖ Aging population and decreased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



Costs & Drivers are going the Wrong Direction



Healthcare Spending as % GDP



Source: Organization for Economic Cooperation and Development, OECD Health Data, 2008 (Paris: OECD, 2008).
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.

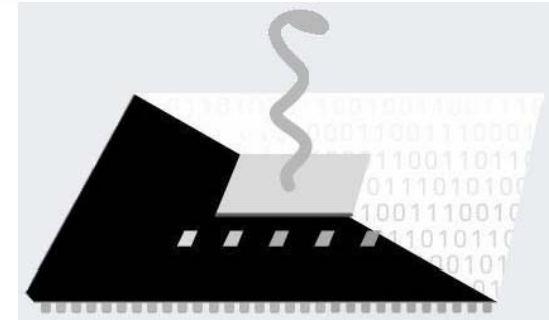


Home Patient Monitoring is not “New”

- ❖ 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](#)
Bunn F et al, The British Journal of General Practice, 55(521), 2005-12
- ❖ [The SUMMA Project: A Feasibility Study on Telemedicine in Selected Italian Areas](#)
Scalvini S et al. Telemedicine and e-Health. 15(3), 2009-04-21
- ❖ [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](#)
Müller A et al, International Journal of Telemedicine and Applications, 2010, 2010
- ❖ [Home telemonitoring in patients with chronic heart failure: a chance to improve patient care?](#)
Schmidt S et al, Deutsches Ärzteblatt International, 107(8), 2010-02-26
- ❖ [Use of Remote Monitoring to Improve Outcomes in Patients with Heart Failure: A Pilot Trial](#)
Kulshreshtha A et al, International Journal of Telemedicine and Applications, 2010, 2010-05-19
- ❖ [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



BRIGHAM AND
WOMEN'S HOSPITAL
A Teaching Affiliate of Harvard Medical School

- 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 world wide
- Implementing home monitoring to improve services and profits

❖ VNA of Western New York



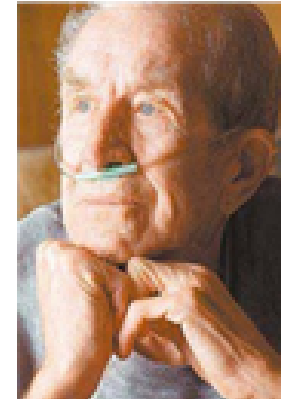
- Largest US Visiting Nurse Association
- Part of standard care process
- • Improved quality of life scores
- • Reduction in hospital readmissions
- • Reduction in unneeded ER visits
- • High patient acceptance levels
- • High nurse acceptance levels
- • Improved data gathering and accuracy

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

The logo for the British Medical Journal (BMJ), consisting of the letters 'BMJ' in a large, blue, serif font.

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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