mHealth and 2nd Generation Telemedicine: Making the Medical Home Mobile to Provide Care for the World’s Population

William C. Thornbury, Jr., M.D., R.Ph., FAAFP
Conflict of Interest Disclosure
William C. Thornbury, M.D.

Disclose ownership of Jobathco, Entp., Inc. which accounts for expenditures within medical technology.
Learning Objectives

- Recognize cultural pressures driving E-technology in healthcare
- Review 2-year study on mobile e-Visit technology
- Summarize the global benefits of mobile E-visit technology
- Analyze the implications of making the Medical Home virtual
Goals

1. Demonstrate Mobile e-Visits are possible, safe, effective—and, patients love them.

2. Enhance the Triple Aim: Improved patient experience, lower cost of care, and advance the population health.

3. Show opportunity for positive disruption in health delivery.

4. Prove that distance does not diminish care.
Are the Benefits of Telehealth a Myth?
The culture that shops online, banks online, purchases books, movies and music online---will conduct healthcare online. The question is, “With whom will they conduct it?”
“I’m very sorry, but we cannot see you today.”
“I’m very sorry, but we cannot see you today.”

- Rural Multi-Specialty Clinic: Full
“I’m very sorry, but we cannot see you today.”

- Rural Multi-Specialty Clinic: Full
- U.S. residents are retiring at 10,000/day
- 96,000 physician shortfall in U.S. by 2020
- 47,000 MD-equivalent work force cutback/4-yr
“U.S. Health System (Organization & Delivery) is Unsustainable”
(2005, IOM/NAE Joint Statement)
“U.S. Health System (Organization & Delivery) is Unsustainable”
(2005, IOM/NAE Joint Statement)

“U.S. Health System Too Complex & Costly to Continue”
(2012, IOM Consensus Statement)
Standard of Medical Care

- Healthcare struggles to advance.
- Stifled by process, not science.
- Systemic Indictment: We simply cannot get the benefit of our knowledge to those in need of care in an efficient and effective manner.
“You never change things by fighting the existing reality. To change something, build a new model that makes the existing model obsolete.”

-Buckminster Fuller
Who is this?
• **25%** Symptom-checker as much as going to MD

• **27%** Instead of going to MD

• **10%** Web-based info/Tx saved their life

United States

- **25%** Symptom-checker as much as going to MD
- **27%** Instead of going to MD
- **10%** Web-based info/Tx saved their life
  
- **70 million** already have online access to their MD
  
  (www.census.gov/prod/2005pubs/p23-208.pdf)
Worldwide

- 6 Billion Cell phones in use
- 1 Billion Smartphones (2X by 2015)
- ½ Billion will have Med Apps by 2015

(Research2Guidance 2010—http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm263340.htm)
The Next Market Solution?
Control: Who really makes the decisions influencing outcome?
87% would love the convenience -- and the savings -- of using online technology to consult with their doctors.

ORIGINAL ARTICLE

Safety of Prescribing PDE-5 Inhibitors via e-Medicine vs Traditional Medicine

MARK A. MUNGER, PHARM.D; GREGORY J. STODDARD, MS; ALLEN R. WENNER, MD; JOHN W. BACHMAN, MD;
JOHN H. JURIGE, MD; LAURA POE, RN; AND DIANA L. BAKER, RN

OBJECTIVE: To determine the safety of a US-based, state-regulated Internet system vs a multispecialty primary care system for prescribing phosphodiesterase type 5 (PDE-5) inhibitors for erectile dysfunction.

PATIENTS AND METHODS: From January 1, 2001, through December 31, 2005, 500 e-medicine clients (mean ± SD age, 47±11 years; hypertension, 60%; type 2 diabetes mellitus, 2%; mean ± SD number of medications, 0.4±0.8) vs 500 traditional medicine patients (mean ± SD age, 57±12 years; hypertension, 50%; type 2 diabetes mellitus, 23%; mean ± SD number of medications, 5.1±3.1) with erectile dysfunction symptoms were assessed. Noninferiority safety was assessed in this retrospective, cross-sectional study with stratified random sampling by identification number and zip code. Results: The e-medicine and traditional medicine groups were well matched for baseline diabetes, hypertension, and age. The overall incidence of adverse events was 7.4% in both groups, with 6.7% in the e-medicine group and 8.3% in the traditional medicine group. Patient satisfaction was assessed with a 100-point Likert scale with higher scores indicating better satisfaction. The mean score for the e-medicine group was 82.4, and for the traditional medicine group was 81.3. No significant differences were found between the two groups. Conclusion: The e-medicine system provides a safe and effective alternative to traditional medicine for prescribing PDE-5 inhibitors.

The study of e-medicine prescribing has appropriately raised serious concerns about the safety of prescribing over the Internet. Non-inferiority was confirmed in this study. The e-medicine system has the potential to improve access to medication for patients with erectile dysfunction.
Analysis of Safety Endpoints

Safety Outcome
- Asked time of sexual dysfunction
- Asked confidence in erection
- Asked erection acceptable for penetration
- Asked maintain erection to complete intercourse
- No contraindicated prescriptions
- PDF-5 inhibitor medication instructions provided
ORIGINAL ARTICLE

Pilot Study of Providing Online Care in a Primary Care Setting

STEVEN C. ADAMSON, MD, AND JOHN W. BACHMAN, MD

OBJECTIVE: To study the use of e-visits in a primary care setting.

PATIENTS AND METHODS: A pilot study of using the Internet for online care ("e-visits") was conducted in the Department of Family Medicine at Mayo Clinic in Rochester, MN. Patients in the department preregistered for the service, and then were able to use the online portal for consultations with their primary care physician. Use of the online portal was monitored and data were collected from November 1, 2007, through October 31, 2009.

RESULTS: During the 2-year period, 4282 patients were registered for the service. Patients made 2531 online visits, and billings were made for 1189 patients. E-visits were submitted primarily by women during working hours and involved 294 different conditions. Of the 2531 e-visits, 62 (2%) included uploaded photographs, and 411 (16%) replaced nonbillable telephone protocols with billable encounters. The e-visits made office visits unnecessary in 1012 cases (40%); in 324 cases (13%), the patient was asked to schedule an appointment for a face-to-face encounter.

CONCLUSION: Although limited in scope, to our knowledge this is regulatory issues, and concerns over security, privacy, and confidentiality.2,2 Also, electronic consultations to date have generally used online forms or secure e-mail. The information in these formats is unstructured and often lacks sufficient information, prompting the clinician to respond to the patient to request further information, which results in delays.2 Furthermore, the lack of organization in an e-mail makes it difficult to code complexity; consequently, the same fee is often charged for all online consultations, regardless of complexity.2,2

Isolated reports of the use of online consultations have been disappointing. For example, despite indications that electronic communication could decrease health care costs2 and provide reimbursement from patients,2,2

For editorial comment, see page 701
The Kentucky Doctor
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• Online
The Kentucky Doctor

- Online >>>>> Mobile
The Kentucky Doctor

• Online >>>>> Mobile >>>>> Safe
The Kentucky Doctor

- Online >>>> Mobile >>>> Safe >>>> Efficient
The Kentucky Doctor

• Online >>>> Mobile >>>> Safe >>>> Efficient

• House Call by Smartphone
The Kentucky Doctor

- Online >>>> Mobile >>>> Safe >>>> Efficient
- House Call by Smartphone
- Mobile + Smartphone = Next-Gen Telemedicine
The Kentucky Doctor

- Online >>>> Mobile >>>> Safe >>>> Efficient
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85% U.S. pop mobile phones
(2013 Pew Internet/PewReserchCenter)

81% Adults use internet
(2010 Pew Internet & American Life Project--http://pewinternet.org/Commentary/2012/February/Pew-Internet-Mobile.aspx)
EVIDENCE OF COST SAVINGS & QUALITY IMPROVEMENT in the MEDICAL HOME

Barbara Starfield of Johns Hopkins University
- Within the U.S., adults with a primary care physician (rather than a specialist) had 33 percent lower costs of care and were 19 percent less likely to die.
- In both England and the United States, each additional primary care physician per 10,000 persons is associated with a decrease in mortality rate of 3 to 10 percent.
- In the U.S., an increase of a single primary care physician decreases the death rate 1.44/10,000 persons.

Commonwealth Fund has reported:
A medical home can reduce or eliminate racial and ethnic disparities in access and quality for insured persons. The U.S. health care system could reduce health care expenditures by more than $2 trillion and save U.S. households $537 billion during the next 10 years by adopting a series of policies that include greater use of primary care and the patient-centered medical home.

Denmark has organized its entire health care system around patient-centered medical homes, achieving the highest patient satisfaction ratings in the world. Denmark has among the lowest per capita health expenditures and highest primary care rankings.

Investing in Primary Care Patient Centered Medical Homes:
- Improved quality of care,
- Higher patient satisfaction,
- Savings in Hospital and Emergency room utilization.

Source: PCPCC (www.pcpcc.net)
Enter the Reason for Your Visit

Please select the reason for your visit from the list below.

OR enter the reason for your visit.

Poison Ivy
(e.g., cough, headache, chest pain, depression)  Help

Next
Patient

Enter the Reason for Your Visit

Please select the reason for your visit from the list below.

- [ ]

OR enter the reason for your visit.

- Poison Ivy
- (e.g., cough, headache, chest pain, depression) [Help]

Next

Play audio

Continue
Provider

Chief Complaint
Jill Atkins is a 42 year old female. Her reason for visit is "poison ivy".

History of Present Illness
#1. "poison ivy"
Location
She reported: Skin rash located on the right arm. Rash confined to one region of body. Itching only in one place.
She denied: Itching over many parts of body.
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**Contact Info**
jill@myemail.com
Cell: (123)-456-7890

**Pharmacy**
Pharmacy Rx (111)-123-4567

**Allergies**
PCN

**Add'l Info**
I do not tolerate pills well. Prefer capsules.

**Meds**
- MVI 1 QD
- Nuva Ring 1 Monthly
- Requip 0.5 mg Nightly
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Allergies
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Add'l Info
I do not tolerate pills well. Prefer capsules.

Meds
MVI 1 QD
Nuva Ring 1 Monthly
Requip 0.5 mg Nightly
Primary Care Pilot: Yr 1

188 E-VISITS

78%

22%

9 COUNTIES SERVED

MEAN AGE: 42.5 YEARS
Primary Care Pilot: Yr 1

- 5% Opt-Out by MD
- 26% Repeat-Usage/6 mos
- 90% Occurred before 9:00pm
- 97% Global Patient Satisfaction
- <3 minutes Turnaround
Primary Care Pilot: Yr 2

283 E-Visits

83%

17%

10 Counties Served
Primary Care Pilot: Yr 2

- 80% Acute / 20% Chronic
- 2% Opt-Out by MD
- 1.7:1 Female : Male
- 40yr Avg Age
2 Year Combined

471 E-Visits

Opt-Out: 3%

Mean Age: 41 Years

14 Counties Served
14.92% Increase
Practice Capacity

14.93% Decrease
Per-Capita Costs
Primary Care After-Hours Savings

Avg after-hour visit = $205
Online care fee = $(40)
Avg savings after-hrs = $165/visit

After-hours care/yr = 190
Avg Savings/yr = $31,350
Primary Care MD = 300,000

PCP After-hours Savings = $9.4 Bil/Yr
Estimated Health System Savings

1.2Bil Pt Visits/Yr (0.4) = 480 Mil
Avg Savings $60/visit

U.S. Health System Savings/Yr = $28.8 Bil/yr
(>1% Tot HC Budget U.S.)

mHealth will save U.S. healthcare industry $305B/10yr
The Deloitte Center for Health Solutions 1/13 (Brookings Institution Study)
The Triple Aim

1. Improving patients healthcare experience
2. Reducing per-capita cost of care
3. Improving overall population health

Institute for Healthcare Improvement
Are the Benefits of Telehealth a Myth?

Effect of telehealth on quality of life and psychological outcomes over 12 months (Whole Systems Demonstrator telehealth questionnaire study): nested study of patient reported outcomes in a pragmatic, cluster randomised controlled trial

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**Abstract**

Objective: To measure the effect of telehealth on quality of life and psychological outcomes over 12 months in a pragmatic, cluster randomised controlled trial. Telehealth intervention included nurse-led telephone follow-up, in-home visits, and computerised tools for self-monitoring and teleconsultation. Cluster randomised controlled trial of 17 clusters: 8 intervention, 8 control. Follow-up at baseline, 6 months, and 12 months. Results: Telehealth significantly improved quality of life and psychological outcomes compared to controls. Conclusion: Telehealth is an effective intervention for improving quality of life and psychological outcomes in chronic conditions.

Cost effectiveness of telehealth for patients with long term conditions (Whole Systems Demonstrator telehealth questionnaire study): nested economic evaluation in a pragmatic, cluster randomised controlled trial

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**Abstract**

Objective: To measure the cost effectiveness of telehealth for patients with long term conditions over 12 months in a pragmatic, cluster randomised controlled trial. Telehealth intervention included nurse-led telephone follow-up, in-home visits, and computerised tools for self-monitoring and teleconsultation. Cluster randomised controlled trial of 17 clusters: 8 intervention, 8 control. Follow-up at baseline, 6 months, and 12 months. Results: Telehealth was cost-effective compared to controls. Conclusion: Telehealth is an effective and cost-effective intervention for improving quality of life and psychological outcomes in chronic conditions.
Implications
Patient Market Value

• Convenience: Care wherever/whenever
• Convenience: Less disruption of work/daily life
• Care from your own provider
• Easy to use
Provider Market Value

- Reimbursement for intellectual work
- Improved documentation/Lowered liability
- Continuity of care within Medical Home
- Patient Engagement
- Physician option of asynchronous or synchronous care
- Easy to use. SOAP Format/ < 3 min encounter time
Practice Market Value

- Competitive market advantage
- Resolves Provider Shortages
- e-Commerce: New revenue stream
- Increased capacity 15% +
- Lower per capita cost min 15%
- Increase quality of practice life
Hospital System Market Value

- Competitive market advantage
- Improves Hospital-Owned Practice ROI
- Reduce readmissions (25% min)
- Lower ER losses (Turn to gain)
- Communication/PR tool for the hospital
- Provides true mobility in the health system.
- Improves efficiency home health/palliative care
- **Makes Medicaid profitable**
Employer Market Value

• Lowers healthcare costs
• Less absenteeism (Acute/Chronic/Family surrogates)
• Less presenteeism (Decreased acuity/complications)
• No out-of-pocket cost for technology (Expense of 1st Gen)
• Improves morale/productivity
Insurance Carrier’s Market Value

- Lowers global acuity
- Only telehealth model within the Medical Home
- Modern approach to healthcare
Governmental Market Value

• Improves access
• Lowers cost of care
• Improves provider shortages
• Addresses disparate populations
• Addresses multi-lingual cultures
• Increases patient engagement
Disruption Sustainable?

1. Market Test: Timing - Fulfill an unmet need?

Adapted from Exploiting Chaos, J. Gutshce, Gotham Books 2009
Disruption Sustainable?

1. Market Test: Timing - Fulfill an unmet need?

2. Dynamic Test: “I’ve got to tell someone about this.”

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Disruption Sustainable?

1. Market Test: Timing - Fulfill an unmet need?
2. Dynamic Test: “I’ve got to tell someone about this.”
3. Simplicity Test: “House Call by Smartphone.”

Adapted from Exploiting Chaos, J Gutshce, Gotham Books 2009
mHealth Telemedicine
Will it work?

1. Solve a problem?
   • Addresses Access
   • Patient Inconvenience
   • Clinician Manpower

2. Does it cut costs?
   • Decreases per-capita costs
   • Decreases institutional costs
   • Decreases global system costs
Blockbuster or Netflix?
Kindle: Book Sales
Online Banking: Finance
iTunes Music: Recording Industry
Kindle: Book Sales
Online Banking: Finance
iTunes Music: Recording Industry
mHealth/e-Visits: Healthcare
Summary

1. mHealth e-Visits are possible, safe, effective---and, they are the public’s preference.

2. Mobility in the Medical Home represents a positive disruptive model of healthcare delivery.

3. True mobility can bend the cost-curve.

4. **Distance dose not diminish care.**
Mobility Will Forever Change the Delivery of Healthcare

Thank You!

Contact
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