Integration of EMR/PHR and Patient Portal with Decision Support

Charles B. Eaton M.D., M.S.
Center for Primary Care and Prevention
Memorial Hospital of Rhode Island

David K. Ahern, Ph.D.
Health e-Technologies Initiative
Brigham and Women’s Hospital/
The Abacus Group
Overview

• Healthcare Delivery Challenges

• Critical EHR, EMR and PHR Functions

• Importance of Interoperability

• Patient-Provider Integration with Decision Support
Vision

‘Medical Home’ utilizing an integrated EMR/PHR with decision support will transform the healthcare system by improving patient-provider communication, quality, efficiency and reduced costs.
Paper-Based Records

- Prone to error
- Lots of information but no data (electronic)
- Limited decision support
- Does not integrate with eHealthcare
Healthcare Delivery Challenges

Medical error, patient safety, quality and cost issues

- 1 in 4 prescriptions taken by a patient are not known to the treating physician
- 1 in 5 lab and x-ray tests ordered because originals cannot be found
- 40% of outpatient prescriptions unnecessary
Healthcare Delivery Challenges

Medical error, patient safety, quality and cost issues

- Patient data unavailable in 81% of cases in one clinic, with an average of 4 missing items per case
- 18% of medical errors are estimated to be due to inadequate availability of patient information
- Patients receive only 54.9% of recommended care
Healthcare Delivery Challenges

A fractured and ‘unwired’ healthcare system

- Medicare beneficiaries see 1.3 – 13.8 unique providers annually; on average, 6.4 different providers/yr

- 90% of the >30B healthcare transactions in the US every year are conducted via mail, fax, or phone
IOM Recommended 21st Century Health Care System

- Safe - Avoids errors
- Effective - Evidence-based
- Patient-centered
- Timely - Reduces waits and harmful delays
- Efficient - Avoids waste
- Equitable - Provides quality of care unrelated to age, race, gender, geographic location, or socio-economic status
EMR Linkage to PHR: a Critical Solution

- IOM highlighted improved information systems as a means for achieving quality

- “Effective methods of communication, both among caregivers and between caregivers and patients, are critical to providing high-quality care”
Critical EHR Functions

Core Functionalities for an Electronic Health Record (EHR) System

- Results Management
- Health Information and Data
- Order Entry/Management
- Decision Support
- Electronic Communication and Conductivity
- Patient Support
- Administrative Processes
- Reporting & Population Health Management

Project HealthDesign:
Rethinking the Power and Potential of Personal Health Records

Project HealthDesign supports technology pioneers to design the next generation of personal health record systems in ways that empower patients to better manage their health and health care.

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Newsroom

Expert Teams to Design New Solutions for Personal Health Records to Help Consumers Manage Their Health
Thursday, December 7th, 2006
Project HealthDesign Selects Nine Teams to Design and Test Innovative, Consumer-Centered PHR Applications
Read More >>

Rethinking Potential of Personal Health Records is Goal of New RWJF Program
Monday, July 17th, 2006
Project HealthDesign accepting proposals through September 19, 2006
Read More >>
LifeSensor® website www.us.lifesensor.com

Secure login to LifeSensor Personal Health Record
LifeSensor® user “Katharina Ruhland” homepage

WELCOME, KATHARINA RUHLAND

MY LATEST ENTRIES
Here you can find the latest entries and alerts from your care providers and additions to your file.

Diabetes and fitness
Dr. Henke, GP | 13.07.2006 Suggestions how to plan your work-outs with regard to diabetes.
Submitted by Dr. Henke | 13.07.2006

Ambulatory Encounter
Dr. Henke, GP | 13.07.2006 On patient's request | Emergency | Linked information available.
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Laboratory findings
Dr. Henke, GP | 11.07.2006 HDL and LDL at upper limit of normal range, Triglycerides slightly.
Submitted by Katharina | 11.07.2006

NEWS
Seasonal Specials
FSME vaccination protects!
Protect yourself from an FSME infection after a tick bite by FSME vaccination.

Topic of the month
Losing weight...
You want to lose weight but do not know which would be the right way for you? We will inform you about various approaches...

EVENT OUTLOOK
All records | Katharina | Achim | Michael
Katharina | Wednesday July, 12th
Eye Exam | Dr. Schneider

(top half of home page)
LifeSensor® user “Katharina Ruhland” homepage

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Latest News | 01.09.2006
Medical treatment abroad – what you should know when travelling

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Katharina | Wednesday July, 12th
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Achim | Friday July, 14th
Vaccination | Dr. Henke

Michael | Monday August, 14th
Routine Wellness Check-up | Dr. Henke

LifeSensor | FITNESS-ASSISTANT
Health goal oriented training with performance and target control.
Try it now… for a month free membership

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(bottom half of home page)
LifeSensor Diabetes

Goal Progress
- Medicine
- Diet
- Activity
- Testing

Positive Health Trends
- Blood Glucose
- Weight
- HbA1c
- Mood

Quick Log Today's Stats
- BG Results
- Diet
- Activity
- Mood

March 16, 2007
Today's Goals
- Eat under 200 fewer calories per meal
- Walk 30 minutes
- Test 3 times today
- Take medication

Reminders
- HbA1c Test
- Cholesterol Test
- Refill

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LifeSensor Diabetes

Blood Glucose

Activity

'M I resolve to walk 15 minutes a day on weekdays and 30 minutes a day on weekends.'

Related Graphs
- weight
- hba1c
- medication
- testing
- diet
- resolution

Related Graphs
- blood-glucose
- cholestrol
- mood
- blood-pressure

Calend
Patient-Provider Portal

Instructions to the Practice

Where should the prescription go?
- Phone or fax into Pharmacy
- Mail it to Pharmacy
- Hold it for pick-up

Select a pharmacy:
- From My Profile
- CVS Pharmacy #1866

Other Pharmacy
- Name:
- Address:
- City:
- State: MA
- Zip:
- Phone:
Importance of Interoperability

- Emerging Standards
- System Integration
- Health Information Exchange/RHIO
- Universal Health Care
How might EMR/PHR Improve Medication Utilization?

- Eliminate over-use, under-use, and misuse of medications
- Make more efficient
  - Brand to generic substitutions
  - Therapeutic substitution
  - Formulary compliance
  - Exceptions to formulary compliance in order to improve patient safety or quality of care
- Provide information to assist patients in the safe and proper use of their medications
Solutions

EMR (error reduction)

• Drug-drug interactions

• Pediatric dosing

• Renal-based dosing
Solutions

E-prescribing (pharmacy connected solutions)

• Formulary compliance

• Refill requests

• Other providers prescriptions
Solutions

PHR (patient connected solutions)

• Patient verification of
  medication/compliance

• OTC and herbal usage

• Self-management questions and
  feedback
How Might EMR Improve Lab and Radiology Utilization?

- Charge display
- Redundant test reminders
- Structured ordering with counter-detailing
- Consequent or corollary orders
- Indication-based ordering
Other EMR/PHR Process Benefits

- Reduced transcription costs
- Reduced chart pulls
- Improved clinical messaging and workflow
- Improved charge capture and accounts receivable
- Improved referral coordination
- Improved patient-provider communication and service
How Does Healthcare Information Exchange Impact the Bottom Line?

• Expected Effects

(Validation Processes Continue to Document Real Life Successes)

• Reduced healthcare information management labor costs
• Reduced duplicative tests and procedures
• Reduced fraud and abuse
• Improved service delivery efficiency
• Improved patient convenience
• Reduced medical error
Memorial Hospital of RI (MHRI)

- Center for Primary Care and Prevention:
- 2 million dollars in NIH research support yearly
- Best Practice Technology Test Center
- 60+ users of GE Centricity - v5.6, moving to v6.0
- 12,000 patients in system
MHRI EMR System - Current

- Scheduling, internal messaging, medication lists, problem lists, flow sheets
- Progress notes, lab and transcription transfer, referrals, chart reminders
- Patient self-management tools, chronic disease registries, decision support tools, disease management reporting
- Ongoing quality improvement team and patient satisfaction reporting, patient and family advisory team
EMR and PHR Integration Plan

- Personal Health Record (LifeSensor®) interoperable with electronic medical record (GE Centricity) at MHRI (3 providers; 1,000 patients for pilot)
- Secure patient portal having evidence-based and patient-centric self management tools (HeartAge, LifeSensor Diabetes)
- Secure emailing between patient and provider
- Adjudicated medication list using e-prescribing
MHRI

• HeartAge system - Patient self-management support website; Go-to-Goal: PDA and web-based Decision Support tool regarding CHD risk factor reduction and patient-centered communication tool

• In progress - seamless integration/interoperability of DSS with electronic health record
User-Centered Design

Patients' Perceptions of Cholesterol, Cardiovascular Disease Risk, and Risk Communication Strategies

Robert E. Goldman, PhD
Donna R. Parker, ScD
Charles B. Eaton, MD
Jeffrey M. Borkan, MD, PhD
Robert Gramling, MD
Rebecca T. Cover, BA
David K. Abern, PhD

ABSTRACT

PURPOSE Despite some recent improvement in knowledge about cholesterol in the United States, patient adherence to cholesterol treatment recommendations remains suboptimal. We undertook a qualitative study that explored patients' perceptions of cholesterol and cardiovascular disease (CVD) risk and their reactions to 3 strategies for communicating CVD risk.

METHODS We conducted 7 focus groups in New England using open-ended questions and visual risk communication prompts. The multidisciplinary study team performed qualitative content analysis through immersion/crystallization.
Cholesterol Education and Research Trial Hypothesis

Informed, activated patient
(Computer in Doctor’s waiting room)

Improved Cholesterol Management

Prepared, proactive practice team aided by information technology (PDA)
Patient Activation Software
Program in Doctor’s Waiting Room
on Computerized Kiosk

Spend a few minutes to see if you can gain a few years...

HeartAge™

Click Here to Enter

THIS PROGRAM IS FREE & CONFIDENTIAL
Patient Enters Data

HeartAge™ Follow 4 Easy Steps

♥ Step 1  Please enter your age in the box. Then, enter your gender by clicking on the button.

Age: 64  Gender:  Male  Female

♥ Step 2  Select "Yes" or "No" to the following five questions.

Have you smoked any cigarettes in the past 30 days?  Yes  No
Are you currently taking any medication for high blood pressure?  Yes  No
Do you have Diabetes?  Yes  No
Have you ever had a heart attack or heart surgery?  Yes  No  Don't Know
Do you have a family history of heart disease?  Yes  No  Don't Know

EXIT  NEXT
Patient Enters Lipid Values
(or Enters Estimates)

If you know your numbers, use the keyboard to enter them into the boxes. If you do not know your numbers, take a guess or click here for an example.

<table>
<thead>
<tr>
<th>Total Cholesterol</th>
<th>238</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (130 or lower)</td>
<td></td>
</tr>
<tr>
<td>Average (200)</td>
<td></td>
</tr>
<tr>
<td>High (240)</td>
<td></td>
</tr>
<tr>
<td>Very High (320 or higher)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>&quot;Bad&quot; Cholesterol (LDL)</th>
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</thead>
<tbody>
<tr>
<td>Low (60 or lower)</td>
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<tr>
<td>Average (100)</td>
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<tr>
<td>High (150)</td>
<td></td>
</tr>
<tr>
<td>Very High (210 or higher)</td>
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</tbody>
</table>

<table>
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<tr>
<th>&quot;Good&quot; Cholesterol (HDL)</th>
<th>38</th>
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</thead>
<tbody>
<tr>
<td>Very High Risk (30 or lower)</td>
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</tr>
<tr>
<td>High (40)</td>
<td></td>
</tr>
<tr>
<td>Average (50)</td>
<td></td>
</tr>
<tr>
<td>Low Risk (60 or higher)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Systolic Blood Pressure (top number)</th>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (100 or lower)</td>
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</tr>
<tr>
<td>Average (130)</td>
<td></td>
</tr>
<tr>
<td>High (140)</td>
<td></td>
</tr>
<tr>
<td>Very High (180 or higher)</td>
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</table>
Software Uses Framingham Risk Equation and Determines 10-yr Risk of CHD, Converts This Risk into Equivalent Risk Adjusted Age

Based upon the factors entered, you have the same chance of having a heart attack, or dying of heart disease, as a typical 80 year old male. This number is an estimate and may not reflect your true HeartAge.

Your Age = 54
Your HeartAge = 80

There are many ways to reduce your chances of having a heart attack or dying from heart disease. Talk to your Health Care Provider.
Prompt to Discuss with Physician

HeatAge

Talk to your health care provider about your HeartAge!
HeartAge Patient Activation Tool

- “My HeartAge was good, I am glad I am taking Lipitor for my cholesterol.”
- “I couldn’t figure out my HeartAge because I don’t know my cholesterol values, so I asked my doctor’s medical assistant for my cholesterol numbers.”
- “It was a little scary (because my HeartAge was higher than my actual age).”
PDAs given to 32 Primary Care Providers (PCPs) representing 15 intervention practices.
PDA Decision Support Tool with Patient Education Screen

Go To Goal

- TC: 310
- HDL: 55
- TG: 150
- LDL: 225
- Gender: M, F
- Age: 50
- Systolic BP: 152
- Established CHD
- Other clinical atherosclerotic dz
- Diabetes
- Cigarette use
- HTN (or Rx for HTN)
- Fm Hx early CHD
- On Lipid Lowering Drug Therapy
- Fasting

Options Clear Assess

HeartAge = 80

10-Year Risk (per 100)

- You
- Chol
- Cig
- BP
- All

27% Risk

Back Print Options
Screening

- 85% of patients had screening profiles
- No change in screening rates with RCT

Practices that used HeartAge frequently* were more likely to have patients with lipid profile screening

| OR=2.44 | 95% CI | 1.88 to 3.16 |

*Defined as using tool 80 times per 1,000 patients per week
Management

ATP III Final Results

Time p-value < 0.0001
Group p-value = 0.0349
Group x Time interaction p-value = 0.0774
N = 4,106

CHD Equiv.  High  Moderate  Low  Total

Control

Intervention

N = 293  n=257  n=274
N = 152  n=134  n=121
N = 278  n=255  n=210
N = 377  n=454  n=453
N = 1100  n=1100  n=1058

% LDL At Goal

0  20  40  60  80  100

n=306  n=136  n=238  n=454  n=1058

55  63  68  61  51

68  68  68  64  70

75  75  74  74  70

90  90  92  92  82

72  72  77  77  76

47  48  51  60  60

61  64  64  74  64

64  64  64  64  64

63  63  63  63  63

68  68  68  68  68

75  75  75  75  75

92  92  92  92  92

77  77  77  77  77

CHD Equiv.  High  Moderate  Low  Total

管理

ATP III 最终结果

时间 p 值 < 0.0001
组 p 值 = 0.0349
组 x 时间交互作用 p 值 = 0.0774
N = 4,106

CHD 等同  高  中等  低  总

控制

干预

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n=278  n=255  n=210
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n=1100  n=1100  n=1058

% LDL 达目标

0  20  40  60  80  100

n=306  n=136  n=238  n=454  n=1058

55  63  68  61  51

68  68  68  64  70

75  75  74  74  70

90  90  92  92  82

72  72  77  77  76

47  48  51  60  60

61  64  64  74  64

64  64  64  64  64

63  63  63  63  63

68  68  68  68  68

75  75  75  75  75

92  92  92  92  92

77  77  77  77  77

CHD 等同  高  中等  低  总
**Management**

Providers that used Go To Goal frequently* were more likely to have patients at ATP III Goals

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<th>OR</th>
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<th>Goal</th>
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<tbody>
<tr>
<td>1.58</td>
<td>1.17 to 1.63</td>
<td>LDL goal</td>
</tr>
<tr>
<td>1.21</td>
<td>1.02 to 1.45</td>
<td>non-HDL goal</td>
</tr>
</tbody>
</table>

*Defined as using tool ≥3 times per week
Interoperability Model for HeartAge
Conclusions

• Integration of the EMR to an interoperable PHR/web portal to create a comprehensive virtual medical home is critical in transforming medical care to meet the IOM 21st century patient centric healthcare system.

• Patient activation and clinical decision support are essential components for transforming medical care and improving quality.

• Further research is necessary to determine extent of benefits and potential ROI for the various stakeholders: providers, patients, payors.