Patient Focused Decision Support
October 8, 2015
9:30am – 10am
Jonathan Teich, MD, PhD
Chief Medical Informatics Officer, Elsevier
Dept. of Emergency Med., Brigham & Women's Hospital
Conflict of Interest Disclosure

Jonathan Teich, MD, PhD

• Salary: Elsevier
The Ideal Patient CDS?
RESEARCH

Undetermined impact of patient decision support interventions on healthcare costs and savings: systematic review

OPEN ACCESS

Thorn Walsh postdoctoral fellow, Paul James Barr postdoctoral fellow, Rachel Thompson postdoctoral fellow, Elissa Ozanne associate professor, Ciaran O’Neill professor, Glyn Elwyn professor

1Dartmouth Center for Health Care Delivery Science, Dartmouth College, 37 Dewey Field Road, Hanover, NH 03755, USA; 2Dartmouth Institute for Health Policy and Clinical Practice, Dartmouth College, 35 Centerra Parkway, Lebanon, NH 03756, USA; 3School of Business and Economics, National University of Ireland, Galway, Ireland
CDS for Patients

• Essential in concept
• It has been hard to show value and stickiness
• Some value from new technologies
• Great promise from ACO / Pop health / longitudinal care movement

• What are the most valuable forms?
• How much can we extrapolate from provider CDS?
The Range of Patient Info Needs

• Understand my condition
• Risk/benefit visualizations
• Understand needed self / clinical steps
• Make a plan that includes clinical best practice, my preferences, my makeup (PSFDH)
• Execute and stay on the plan
• Know how to handle events (fever, pain...)
• Rules / basic medical flows and algorithms
• Work alone and with my provider
Workflows

A: Pre-encounter
   - Pre-visit questionnaires; facesheets

B: RN & MD
   - History/Assess.

C: Formulate plan of care
   - Knowledge delivery/Interactive ref
   - Structured document'n

D: Documentation
   - Order sets; error checking
   - Error checking; alternatives

E: Orders/Rx
   - Order handling & Med Dispense

F: Order
   - Alerts, monitors

G: Therapies/Procedures
   - Pt educ guides; Follow-up care prompts
   - Time-based monitors; pt reminders

H: Results and new events

I: Consult requests

J: Discharge & Referrals

K: Post-Visit/Home Care

Understand  Plan  React  Communicate
10 Types of CDS Interventions

1. Immediate Alerts: warnings and critiques
2. Event-driven alerts and reminders
3. Order Sets, Care Plans and Protocols
4. Parameter Guidance
5. Smart Documentation Forms
6. Relevant Data Summaries (Single-patient)
7. Multi-patient Monitors and Dashboards
8. Predictive and Retrospective Analytics
9. Filtered Reference Information and Knowledge Resources
10. Expert Workup Advisors

## 10 Types of CDS Interventions

1. **Event-driven alerts and reminders**
2. **Order Sets, Care Plans and Protocols**
3. **Parameter Guidance**
4. **Smart Documentation Forms**

6. **Relevant Data Summaries** (single patient)
7. 
8. 
9. **Filtered Reference Information and Knowledge Resources**
10. 

Understand - Visualizations

What's Next?

1. **Your Chest Pain Diagnosis**
   - Your initial test results are **NEGATIVE** for a heart attack. This includes:
     - **Blood tests** to look for an enzyme called troponin (T) that is released when the heart muscle is damaged. Additional troponin tests may be done to monitor you for heart attack during your emergency visit.
     - **An electrocardiogram** to check whether your heart is getting enough oxygen and blood.
   - However, the chest pain you are experiencing today may be a warning sign for a future heart attack.

2. **What You Can Do**
   - A **STRESS TEST**, which views blood flow to your heart at rest and under stress, may be needed. Examining your risk will help you and your clinician decide together whether or not you should have additional heart testing.

3. **Your Personal Risk Evaluation**
   - Your risk of having a heart or pre-heart attack within the next 45 days can be determined by comparing you to people with similar factors who also came to the Emergency Department with chest pain.
   - Of every 100 people like you who came to the Emergency Department with chest pain, 99 did not have a heart or pre-heart attack within 45 days of their Emergency Department visit.

4. **Would you prefer to have a stress test during this emergency visit or decide later during an outpatient appointment?**
   - Would you like to have a stress test during my emergency visit? I realize that this may increase the cost of my care and/or lengthen my stay.
   - Would you like to be seen by a heart doctor within 24-72 hours and would like assistance in scheduling this appointment?
   - Would you like to schedule an appointment on my own to consult with my primary care physician?
   - Would you like my Emergency Department doctor to make this decision for me?

*Stress test options include nuclear stress testing, adenosine stress testing, or exercise EKG (electrocardiogram) stress testing. Further stress testing involves exposure to radiation which has been shown to be linked to increased cancer risk over a lifetime. Your doctor can help you explore which option may be best for you.
"How do I treat a pulmonary embolism"

OK, here you go:

<table>
<thead>
<tr>
<th>Input interpretation</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>pulmonary embolism and infarction</td>
<td></td>
</tr>
<tr>
<td>drugs prescribed at visit</td>
<td></td>
</tr>
<tr>
<td>coumarins and indandionanes</td>
<td>male 34%</td>
</tr>
<tr>
<td></td>
<td>female 40%</td>
</tr>
<tr>
<td></td>
<td>all 38%</td>
</tr>
<tr>
<td>phenindionanes</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>22%</td>
</tr>
</tbody>
</table>
Support Sites — How? Which?

Living With Diabetes

This is Grace (right in photo). She was diagnosed with diabetes on April 22, 2008 at 9 months of age. I knew that morning when she woke up something wasn’t right; she was so thirsty and wet her diapers through and through all morning. She was so lethargic, I took her to her doctors that morning and she saw a nurse who simply said she has the flu. Go home and keep an eye on her when she starts vomiting give her pedialyte.

Later that afternoon she was worse and I kept calling the doctors office to speak with the nurse. I finally said enough and took her to the E.R. THANK GOD I did. I had told the triage nurse what her symptoms were and right away she wanted to test her blood sugar. The meter just said High. After hours and hours in the E.R. her blood results came back that her BG was 1107! She had DKA and almost in a coma.

Because I have type 1 diabetes, my daughter is at risk. That’s why I had her screened through TrialNet.
Support Sites - Mediated?

Home Remedies for Burns
A list of home remedies for the topic Burns.

This remedy was passed on by my great great great grandparents. They lived in the jungles of Peru and as you would imagine don't have medicine, but they have their home remedies passes on from their ancestor. The remedy is to put some oil (any type) and sprinkle some salt on it. We have been using this for years. We don't know the science behind it but it works, and it avoids the burn to blister.

This might seem a bit weird, but when you get a burn, pour melted candle wax over the area and let it sit for about 3-5 minutes and the oils in the wax will relieve the burned area.

Several times a day cut a fresh slice of potato and rub it on the affected area or at least squeeze the juice on it if possibly. It helps with the sting and cuts healing time in half.

自然HONEY is the best remedy for burns,

TOOTHPASTE & EGG WHITES
THE MIRACLE CURE FOR BURNS.
ESPECIALLY ON FINGERS OR HANDS/FEET.
Plan - Execute

Your Daily Summary

1569 CALORIES REMAINING

<table>
<thead>
<tr>
<th>Goal</th>
<th>Food</th>
<th>Exercise</th>
<th>Net</th>
</tr>
</thead>
<tbody>
<tr>
<td>2100</td>
<td>+1010</td>
<td>-479</td>
<td>531</td>
</tr>
</tbody>
</table>

Add to Diary

Nutrient Summary

<table>
<thead>
<tr>
<th>Total</th>
<th>Goal</th>
<th>Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Fat (g)</td>
<td>20</td>
<td>104</td>
</tr>
<tr>
<td>Saturated (g)</td>
<td>1</td>
<td>34</td>
</tr>
</tbody>
</table>
Consumer Health Apps for Apple's iPhone - MobiHealthNews.com

- PHR 0.71%
- Medication Adherence 1.36%
- Smoking Cessation 2.23%
- Emergency 2.73%
- Sleep 4.13%
- Chronic Conditions 5.45%
- Mental Health 5.80%
- Calculator 6.03%
- Strength Training 6.97%
- Women's Health 7.27%
- Stress & Relaxation 11.44%
- Diet 14.15%
- Cardio 16.36%
- Other 15.36%
This Week in JAMA...

Original Investigation

Effect of Lifestyle-Focused Text Messaging on Risk Factor Modification in Patients With Coronary Heart Disease: A Randomized Clinical Trial

Clara K. Chow, MBBS, PhD; Julie Redfern, PhD; Graham S. Hills, MBChB, PhD; Jay Thakkur, MBBS; Karla Santo, MBBS; Maree L. Hackett, PhD; Stephen Ion, PhD; Nicholas Green, PhD; Laura de Koper, RGN (Nurse); Tony Purru, RGN; Severine Brammont, RGN (Staff); Sarafina Staines, MLington

EDITORIAL

Can Mobile Health Applications Facilitate Meaningful Behavior Change? Time for Answers

Zubin J. Eapen, MD, MHS; Eric D. Peterson, MD, MPH
FIND OUT YOUR WELLNESS NUMBER

Coming soon! June 23 - July 5

Health Risk Assessment [HRA]

During the open enrollment period, register for your personal Health and Benefit Manager. It’s free, completely confidential, and provides the tools and support you need to address and track your wellness progress.

Register to find out your wellness number.
React

How do you feel today?

Great  OK  Poor
Medication Review

Please select the side effects that best approximates yours. Multiple selections are possible.

- Headache
- Cough
- Fatigue
- Rash
- Dizziness
- Nausea
- Swelling of ankles
- Shortness of breath
- Other

I Have Made My Selections
Communicate

- Patient/Family Goals and Preferences
- Clinical Evidence and Expertise
- Biological, Sociological, & Psychological Context

EBDM

SDM
Source: U. Mich. Comprehensive Cancer Center
Pre-visit Info

• Feed into provider CDS
• Branch to detailed patient CDS
• Home use
PHR – EHR Comm. (or OpenNotes)
Different Groups to Address!

<table>
<thead>
<tr>
<th>Group</th>
<th>Duration</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy / mild acute</td>
<td>170 M</td>
<td>Maint reminders</td>
</tr>
<tr>
<td>Prenatal / postnatal / fertility</td>
<td>12 M</td>
<td>Home monitor</td>
</tr>
<tr>
<td>Acute trauma / illness</td>
<td>60 M</td>
<td>Plan/execute CDS</td>
</tr>
<tr>
<td>Chronic conditions - stable</td>
<td>50 M</td>
<td>Care plan, monitor</td>
</tr>
<tr>
<td>Significant disability</td>
<td>7 M</td>
<td>Event handling</td>
</tr>
<tr>
<td>Organ failure</td>
<td>1 M</td>
<td>Care plan, monitor</td>
</tr>
<tr>
<td>Frail elderly</td>
<td>1 M</td>
<td>Support</td>
</tr>
<tr>
<td>Near death</td>
<td>0.5 M</td>
<td>Preferences</td>
</tr>
</tbody>
</table>
Concluding Thoughts

• Patient forms of CDS correspond roughly to forms of provider CDS
  – Can leverage that for effective design
• Greater focus on understanding, visualization, communication
• Need to factor in PSFDH and patient stage
• Yes, we’ll need to test these more formally
Questions?

Jonathan Teich - j.teich@elsevier.com