Future Directions in Symptom-Driven Consumer Applications

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What are “Symptom-Driven Mobile Apps?”

- Mobile applications where navigation is controlled by user-entered medical symptoms. The symptoms plus other data are used to provide the user with one or more of the following outputs:
  - Recorded symptoms over time
  - Trend graphs
  - Recommend treatments and diagnostic tests
  - Recommended providers or facilities
  - Connections with services
  - First aid instructions
  - Insurance information and estimated cost
  - Quality information
  - Referral and consultation opportunities

These applications are being used by consumers every day to help them make critical healthcare decisions!
Today’s Presentation

- Example applications
- Future developments
- Barriers to progress
- Why we should move forward
- Discussion
Haiti Earthquake Victim Uses iPhone to Survive

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The Cult of iPhone News and Satire

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Haiti Earthquake Victim Uses iPhone to Survive

When American film producer Dan Woolley, found himself buried alive under the rubble of the Hotel Montana, after the massive 7.0 earthquake that hit Haiti last week, he used his iPhone to serve as a lifesaver during his 65 hour ordeal.

Woolley, from Colorado Springs, first used the light from his iPhone to identify injuries to his leg. He then accessed a medical first-aid app to correctly diagnose his broken foot and get instructions from the app to treat excessive bleeding from cuts on his leg and also on the back of his head. Yep, there’s an app for that.

"I had my iPhone with me and I had a medical app on there," Woolley told NBC 6 Miami. "So I was able to look up treatment of excessive bleeding and compound fracture."

Thanks to http://www.iphone­savior.com/
Pocket First Aid & CPR

Doug Kent
Jive Media

Developed App

Teamed with
American Health Association

Documented use in toughest possible situation
iPhone Apps

- WebMD Mobile (Free)
- iTriageHealth (Free)
- Pocket First Aid & CPR ($3.99)
- Medscape Mobile (Free)
- Diagnosaurus DDx ($0.99)
- Swine Flu Scanner (Free or $0.99)
- Symptoms TakTools ($1.99)
- iHeadache (Free or $4.99)
- SignsSx Handbook of Signs and Symptoms ($46.99)
- Symptom Mate (Free)
- Differential Diagnosis i-pocket ($9.99)
- STATworkUP ($24.99)
- eRoentgen Radiology DX ($29.99)
- Symptom Minder (Free)

Symptom-Driven Apps from Apple Apps Store

Image from: http://www.mactropolis.com/images/blog/iphone-doctor.jpg
WebMD CEO Wayne Gattinella on Q3 2009 earnings call:

“We’re also investing in new markets for the future as we see the market going more mobile and more global. Our WebMD mobile health applications for consumers launched on the iPhone less than a year ago and they’ve already generated over 1 million downloads consistently ranking at the top of the App Store for health applications.”
WebMD Mobile

WebMD Symptom Checker

“The WebMD Symptom Checker helps people pinpoint potential conditions associated with their physical symptoms. WebMD developed a tool that combines graphics with a series of prompts that allows users to select a variety of symptoms and delivers back possible conditions or ailments based on the symptoms. The information can also be used to better inform the doctor visit. WebMD’s Symptom Checker was created by an experienced group of WebMD physicians, using the latest standards of evidence-based medicine, and an easy to use, patent pending interface making entering symptoms a snap.”

Courtesy Kate Hahn, WebMD PR
Healthagen

Founded by ER physicians who saw many inappropriate patients in their Emergency Departments

Partners with TelaDoc, Coalition America and HealthGrades

Disclosure: I have provided advisory services to Healthagen
iTriageHealth

User follows symptoms to “Possible Cause” then selects description, tests, symptoms, treatment, search web or find a provider

Available on other mobile platforms and the desktop

www.itriagehealth.com

Notes

Geolocation used to promote participating:
- Hospitals
- Physicians
- Urgent Care
- Centers
- Retail Clinics

Helps health plans control costs
Home Care Advice for Mild Chest Pain

1. **Fleeting Chest Pain**: Fleeting chest pains that last only a few seconds and then go away are generally not serious. They may be from pinched muscles or nerves in your chest wall.

2. **Chest Pain Only When Coughing**: Chest pains that occur with coughing generally come from the chest wall and from irritation of the airways. They are usually not serious.

3. **Cough Suppression Medications**: The most common cough suppressant in over-the-counter cough medications is dextromethorphan. An example is Robitussin DM. You should not try to suppress coughs that produce mucus and phlegm. Dextromethorphan is best used in the late stages of a respiratory infection when the cough is dry and hacking.

4. **Expected Course**: These mild chest pains usually disappear within 3 days.

5. **Call Your Doctor If**:
   - Severe chest pain
   - Constant chest pain lasting longer than 5 minutes
   - Difficulty breathing
   - Fever
   - You become worse

Additional Internet Resources

1. **Heart Attack Symptoms and Warning Signs**:
   - The American Heart Association provides helpful information about heart attack, stroke and other diseases.
   - Available online at: [http://www.americanheart.org/presenter.jhtml?identifier=4595](http://www.americanheart.org/presenter.jhtml?identifier=4595)

2. **Women and Heart Disease**:
   - [WomensHealth.Gov](http://www.womenshealth.gov) provides answers to a number for frequently asked questions.
   - Available online at: [http://www.4woman.gov/faq/heartdis.htm](http://www.4woman.gov/faq/heartdis.htm)

And remember, contact your doctor if you develop any of the "Call Your Doctor" symptoms.
iManage Migraine

Capabilities

Tracking tool (Journal)

Helps identify Migraine triggers

Presents treatment options

Helps user communicate with physician

Notes

Sponsored by Merck & Co., Inc.

Example of a Disease-specific application
Symptoms

Capabilities

Tracks symptoms for up to 4 people

Graphs data

Communication tool
- Graphic output
- CSV output

No diagnostic or clinical rules or knowledgebase

Notes

Produced by TakTools

Example of a very basic data recording and communications app
Diagnosaurus 2.0

Capabilities

“Quick reference tool for healthcare professionals”

Over 1,000 differential diagnoses for medicine and surgery

Search by organ system, symptom or disease

Notes

Developed by McGraw-Hill

For use primarily by medical professionals

Many external links
Dog Symptoms - PetMD

Capabilities

- Exclusively for Dog Health
- Recommends treatment options
- Has “finder” app to locate veterinary clinics
- Dog first aid, too!

Notes

- Could serve as prototype for human diagnostic tools without encountering the same political and regulatory obstacles.
- Not yet available for direct use by dogs.
Swine flu symptoms checker

iHealth Ventures

H1N1 flu symptom checklist

Log symptoms with notes

Email symptoms to your doctor directly from app

Support@ihealthventures.com

Notes

Another example of a disease specific application
eRoentgen

Capabilities

Specifically to help determine most appropriate radiology test

Intended to supplement other diagnostic apps

Notes

Provided by Iatros Software

Primarily for clinicians’ use.

Example of modality-specific application.
Futures

Symptom-Driven Consumer Mobile Apps
5 - 10 years out
Future Features

- Follow symptom tree to establish diagnosis
- Use input and data to establish a diagnosis with treatment options
More Future Features

- Voice/SMS/MMS
  - Complemented by shared data display
  - Connect real time with most appropriate local or distant physician or medical facility
- Connection to products and services
- Embedded PHR
- Real Time Interoperability
  - PHR, EMR and HIE
- Biosensors
  - COPD, CHF, intoxication
- Geolocation
  - Altitude sickness, infectious outbreaks, indigenous parasites, biological / chemical agent surveillance
- Accelerometer
  - Falls, Activity Levels
Rapid Evolution of Applications soon to encounter resistance

- Advances in Technology
- Consumer Health Movement
- Entrepreneurial Zeal
- Marketplace Noise
- FDA Device Approvals
- IP Constraints
- Physician Acceptance
Barriers

IP Obstacles

Patents and Copyrights
Example Patent – Interactive first aid information system

United States Patent
Sullivan, et al.

Interactive first aid information system

Abstract

In general, the invention is directed to techniques for determining appropriate first aid and applying first aid that is appropriate. A first aid system receives patient status information from an input device or a sensor, and presents first aid information as a function of the received patient status information. The first aid system may be incorporated with an external defibrillator. The first aid system may acquire patient status information through an interaction with an operator, in which the first aid system asks the operator to supply patient status information. In one embodiment of the invention, the operator may supply patient status information by touching a diagram representing at least a portion of a human body.

Inventors: Sullivan; Joseph L. (Kirkland, WA), Nova; Richard C. (Kirkland, WA), Owen; James M. (Redmond, WA)
Assignee: Medtronic Physio-Control Corp. (Redmond, WA)
Appl. No.: 10/620,742
Filed: July 16, 2003

Current U.S. Class:
Current International Class:
Field of Search:

References Cited [Referenced By]

U.S. Patent Documents

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Barriers

Regulation

FDA

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Regulated Apps?

Further advances in these symptom-driven applications take them closer and closer to FDA Regulation

“How to get FDA to clear a mobile health app” by Bradley Merrill Thompson, Partner, Epstein Becker & Green


Which applies to your mobile app?
- Software that does NOT meet the legal definition of a device and is not regulated by FDA.
- Software that does meet the legal definition of a device but is currently not actively regulated, and FDA is unlikely to require pre-market review.
- Software that does meet the definition of a device and FDA is actively regulating and would require a pre-market review.

Evaluate the risk to your investment – don’t be surprised
What makes your app or device subject to FDA regulation?

- Connection with biosensors and manipulation of biosensor data increases likelihood of FDA concerns
- Complex analysis leading to diagnosis, treatment or testing recommendations increases concerns
- Software intended to provide cure, mitigation, treatment, or prevention of disease increases concerns
- If you have any concerns at all or plans that encroach in these areas consult with an attorney experienced in working with the FDA
Barriers

Acceptance by the Medical Establishment

Fear of false claims and inappropriate use will slow physician endorsement of use by consumers
Why move forward?

Costs versus Benefits
Given those barriers, why move forward?

- Improved quality of care
  - Catch problems right then when they happen
  - Earlier detection/understanding by consumer can lead to more effective action
- Reduce cost of inappropriate care
  - Reduce use of high cost Emergency Department for minor care
  - Reduce use of under-equipped under-qualified providers for acute need
- Mass availability to those who don’t have access or won’t avail themselves to hands-on face to face care
  - More people in the world have mobile devices than have face-to-face access to a knowledgeable care provider
  - Some people will be more willing to access information on their own device rather than make face-to-face contact with a care provider
- Evidence-based consumer-oriented clinical decision support versus unproven advice from unproven sources
  - If some entity is willing and able to enforce truth-in-labeling consumers will be able to self-select applications which provide evidence-based medical advice
Why move forward? (continued)

- Mobile devices may one day have better memories, better access to user’s clinical data, better access to clinical knowledge, better clinical decision algorithms and better analytic capability than alternative sources.
  - Knowing when and where and if this is true will be critical for regulation.
  - Fear of false claims and inappropriate use will slow physician endorsement of use by consumers.

- The really big reasons? Potential for:
  - Higher Quality
  - Improved Safety
  - Better Access
  - Lower Cost
  - Financial success for those who:
    - Develop
    - Deploy
    - Support
mHealth Networking Conference

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