MET System: A New Approach to m-Health Emergency Triage

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MET Project Outline

From Knowledge Discovery
- capturing the knowledge of the “experienced”

Through Clinical Decision Support
- using that knowledge to help the “inexperienced”

To m-Health
- bringing the support to the bedside
Outline

- Clinical workflow for the triage in the Emergency Department (ED)
- Clinical DSS and m-health
- MET system
- Abdominal pain in children and clinical trial
Assessment of a Child in the ED

The issue: To facilitate ED triage of acute childhood conditions at the point of care
Clinical DSS and m-Health

• Clinical decision support systems (Clinical DSS): “computer based tools using explicit knowledge to generate patient specific advice or interpretation”

• e-Health: providing clinical and medical advice using communication and information technologies

• m-Health: providing clinical and medical advice at the point of care using most suitable technologies
**Mobile Emergency Triage System**

**MET** is a *Clinical DSS* designed to assist physicians at the point of care with *tria"ge* decisions as to whether a child presenting to the ED with a specific acute complaint should be *discharged* to the family physician, needs *further investigation* or *observation*, or requires *urgent specialist consultation*.
Some Facts

Retrospective chart reviews were conducted during 1993-2003 at CHEO for abdominal pain, scrotal pain, hip pain:

- Inductive learning was used to develop a set of clinical rules (clinical algorithm)
- Clinical algorithm was verified with the medical specialists;
- Mobility was introduced by implementing clients on PDAs and tablet PCs
- Retrospective and prospective validation of the system was conducted in a hospital
Providing Clinical Support at the Point of Care

• Need to rely on portable (mobile) computing devices that can also work offline

• Need to have a versatile and context-aware system in order to support complex patient management problems
**MET Design**

- New design: extended client-server architecture
**MET Operations (#1)**

**EPRS/Interface Engine**
- New patient registered
- Patient data updated

**MET Server**
- Decode and update the temporal database
- Synchronize the temporal database
- Send required presentation modules
- Send requested presentation modules

**MET Client**
- Triage for a patient requested
- Synchronize the local database
- Synchronize required presentation modules
- Synchronize requested presentation modules
- Purge redundant presentation modules

**Logs**
- Admission message
- Observation report

**Events**
- Patient data updated
- Observation report
- Admission message
**MET Operations (#2)**

**EPRS/Interface Engine**
- New patient registered
- „Hospital-wide“ patient data updated

**MET Server**
- Receive, decode and store patient data
- Send required patient data
- Send required presentation modules
- Receive updated patient data
- Purge redundant patient data

**MET Client**
- Triage for a patient requested
- Receive and store patient data
- Receive and store presentation modules
- Data collected and updated, triage made
- Send updated patient data
- Purge redundant presentation modules and patient data

**Admission message**
- Request for synchronization

**Observation report**
- Patient data
- Presentation modules
MET Interactions: Aligning with the ED Workflow
MET Interactions:
Natural Mappings #1
MET Interactions:
Natural Mappings #2
Abdominal Pain in Children

Common presenting complaint
- Over 3000 patient visits per year
- 8-10 patients/day
- Other patients presenting with other complaints

Time-consuming process
- Average arrival to assessment 60-90 minutes
- Average MD to disposition 150-180 minutes
- 55% have lab, 26% have imaging
Trial Design

- Recruit patients with acute abdominal pain presenting to CHEO ED
- 24/7 recruitment by triage/registration/resident/staff
- Informed consent to collect patient data and make follow-up telephone call
- Where possible – 2 independent observations by staff/resident or resident/staff
- All clinicians blinded to MET recommendation
- Patients followed until final outcome is established
Trial Results

- Analysis of 457 patients with complete F/U 2x2 Consult vs Non-consult
  - Physicians: Sens 71%, Spec 95%, Accuracy 92%
  - MET: Sens 71%, Spec 92%, Accuracy 90%

Other successes
- Integration with hospital IS
- Structured and real-time data collection by physicians
Conclusions

Structured data capture

Contribution to timely patient management

Fit of the system to the ED workflow
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Thank You

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