Life of a Lab Value: Current and Future

MD-NP Collaborative Group 1

Bobby Azamian
Jennifer Broder
Maureen Cummings
Ryan Egeland
Ricky Grisson
Michelle Legeyt
Project Approach

- Interviews
  - John Halamka, MD, CIO BIDMC
  - Blackford Middleton, MD, MPH, Partners Clinical Informatics
  - Susan Schlade, CIO BWH
  - Deb Thomas, Manager IT, BWH
  - Eric Poon, MD, MPH Jonathan Wald, MD, Partners Bioinformatics
  - Erin Anderson, Clinical Manager, Brockton Pediatrics

- Observations
  - Nursing practice
  - Large hospitals
  - Outpatient clinics

- Literature
  - Primary research
  - Public Initiatives
Girl with a UTI

- A 7 year-old girl
- Abdominal pain, dysuria, fever 2 days
- Urine dipstick positive for nitrites/leukocyte esterase
- Cultures sent, ceftriaxone started
- One day later, fever spikes to 104, taken to MGH ER
- Another urine dipstick shows positive nitrites/leukocyte esterase, cloudy
- UA Spec. Grav. > 1.030, admitted to hospital
- PCP unreachable
- Continued on ceftriaxone
Hospital day 1

- Intern pre-rounding, can’t find results of urine culture
- Fever still 104, now CVA tenderness
- Intern finally finds results, aren’t yet available
- Intern calls lab; culture sample never received from ER
Hospital day 2

- Urine cultures again obtained, mother protests: “this is the third urine sample in three days and I have not heard any results!”
- Signout sheet deleted, overnight team doesn’t check results
- Next morning urine culture returns gram negative bacteria, but girl septic
Available Solutions

- Facilitation of patient-doctor communication
- Communication of critical lab values to care providers
- Electronic decision support tools
- Patient-appropriate access to clinical information
Patient Reporting and Education Functions

E G Poon et al., Journal of Biomedical Informatics 36 (2003) 80-91
Personalized Decision Support Functions

- Pharmaceuticals
  - Drug-allergies
  - Adverse drug interactions
  - Therapeutic monitoring and lab abnormalities
- Dosing
- Therapeutic/route substitutions
- Lab test interpretations
- Computerized practice guidelines

E G Poon et al., Journal of Biomedical Informatics 36 (2003) 80-91
Physician Perceptions Still Present
Barriers to Technology Adoption

- Email communication with patients will increase workload
- Technology use potentially jeopardizes patient confidentiality
- No reimbursement available for communicating with patients via email
- Patients haven’t requested this method of communication
- Email would increase staff workload
- No access to computer or email

Personal communication with Blackford Middleton, MD, MPH, MSc
Pediatric Primary Care: Brockton Pediatric Associates
Primary Healthcare Example: Brockton Pediatric Associates

- Private pediatric association with offices located in multiple communities.
- Currently using practice management system for scheduling of patients, access available from anywhere using the internet.
- Using “paper-charting” for patient visits, electronic medical record not yet instituted.
Issues at Pediatric Brockton Associates related to IT

- Difficulty of locating paper charts.
- Lab reports in 5 different formats need to be transcribed manually into office system manually.
- Illegible handwriting leading to miscommunication of pertinent information.
IT Goals for the Future of Brockton Pediatric Associates

- **3 specific goals:**
  - Off-site connectivity
  - Purchase a *usable* EMR system
  - Electronic prescriptions
- Training
- Flexibility to incorporate new features
- HIPAA compliance
- Contain costs
- Disaster recovery

*Erin Anderson, Office Manager of Brockton Pediatrics*
Networked Data

- Legible, Archivable
- Standardized
- Portable
- Automated
- Searchable
- “Network economics”
- Evolutionary
"Oh, these are his medical records."
MA-Share Current Initiatives

- Electronic Health Records
- Electronic Patient-Centered Communication
- Prescriptions
- Pathology
- Secure E-Mail

Laboratory Values?
Results Management – Who needs it anyway?

IT SEEMS WE HAD A MIX-UP WITH YOUR TEST RESULTS.
THEN I'M NOT DYING?

WE DOCTORS ARE AMAZINGLY SMART, BUT OCCASIONALLY WE MAKE A LITTLE ERROR.

WELL... I UNDERSTAND.

BY THE WAY, YOUR PAP SMEAR WAS NORMAL.
References

- EG Poon et al., Journal of Biomedical Informatics 36 (2003) 80-91
- S Maviglia et al., Article In Review
- EG Poon et al., Arch Intern Med 164 (2004) 1-6
MA-SHARE Clinical Connectivity Vision Model

**CLINICAL DATA**
- Physician Notes
- Problem List
- Radiology Results
- Lab Test Results
- Medical Dx and Procedures
- Drug Claims

**COMMUNITY UTILITY SERVICES**
- Patient Centered/MPI
- Standards
- Privacy
- Security
- Inter-operability of
  - data sources
  - data users

**MedsInfo-ED Proof of Concept Project**

**DATA SOURCES**
- PBM
- Inpatient Clinical Systems
- Pharmacies
- Clearinghouses
- Labs

**DATA USERS**
- Emergency Department
- Inpatient Treatment
- Community Health Centers
- Outpatient Clinics
- Physician Offices
- Nursing Homes
- Pharmacies
- Patients
- VNA, Home Health

Visit us on-line at:
www.mahealthdata.org
Conclusions

- Lack of
- Current IT solutions available, should be embraced
IT Goals for the Future of Brockton Pediatric Associates

• 3 specific goals:
  – Off-site connectivity
  – Purchase a **usable** EMR system
  – Electronic prescriptions
• Training
• Flexibility to incorporate new features
• HIPAA compliance
• Contain costs
• Disaster recovery

• Erin Anderson, Office Manager of Brockton Pediatrics
Deb Thomas, manager, It, BWH

- **5-year goals**
  - Bedside computing, wireless computing,
  - integrated network

- **Currently:**
  - Physicians can opt to be automatically paged or e-mailed with critical lab values
IT from primary healthcare: Brockton Pediatric Associates

- Private,
- 3 goals
  - Access internet for real-time off-site practice management software
  - Purchase a usable EMR system
  - Electronic prescriptions
- Clinicians will need training for each system
- Need for flexibility to incorporate new features
- Paper reports of labs from outside using Meditech, Quest (multiple i.e. 5+ independent systems), need to be transcribed into office’s system
- Current systems are HIPAA compliant
- Costs: internet access, practice management system ($100 K for 80 k patient visits in community health center), no EMR yet
- Practice management software can be accessed on internet
- Only flagging for physician signatures
- In the event of failure, revert to paper systems
MA-SHARE

- Statewide initiative to fund new project proposals with following overarching principles:
  - Patient safety
  - Cost of care
- Incubator for IT, also for anything to do with communications
- 5, 50 M$ per year over next 5 years
- Public private partnership; BCBS, Novell, others
- No education plan explicit in document
- No plans for decision support or AI
- HIPAA compliance a priority
- Patient involvement is a priority
How lab values in IT could be better

1) 
2) 
3) 
4) 
5)
Lab values in 2004: how it goes wrong

- Kid in ER with UTI, urine culture doesn’t get sent
- Pregnancy test results: interface counterintuitive, value confused with another number
- Pregnancy #2: hCG levels can be falsely elevated with inflammation
- Lab values come up but don’t get read
- Child had blood chemistry of Na 121, lab reports correction of 131 but doesn’t call team
- Lab values that aren’t in the computer system: vitals, blood sugars, feeds, drugs
- Lady comes in with GI symptoms, d dimer lab value read but interpretation disagreed upon by different specialties, woman died while waiting for decision
- Interpretation attached to lab value, taken as indisputable, people don’t interpret for themselves
- Transcription errors: community physicians and standards
- Docs get different values reported on different websites, difficult to organize or retrieve
IT in big hospitals: BI Careweb

(John Halamka, CIO BIDMC)

- 5-year plan
  - Regional data-sharing among payers, providers, patients
- Currently
  - High and low lab values are flagged
  - Patients can view labs along with educational material about them
  - Doctors can view “lab manuals” while looking at labs
  - Fully compatible with incorporating new tests, new ranges of normal, new technologies to perform testing
- Congressional testimony: need to be able to transmit information between venues, repeating 5-year goals of BI
- HL7: Universal standard for communicating lab values between systems, currently collaboration between Joslin, others web-based
- HIPAA compliant
- Cost: 2% of operating budget of hospital
- Automatically includes lab values in sign-outs
- Labtestonline.org: for educating patients
- $50 M computer center, 100 tB of redundant storage, 200 redundant servers