Biomedical Informatics
Year in Review

Notable publications and events in Informatics
since the 2007 AMIA Symposium

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Clinical Informatics Year in Review

Notable publications and events in Informatics since the 2007 AMIA Symposium

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Changes by Kahn

• Focus exclusively on the clinical informatics component of Dan’s original presentation
  – Slides are a subset of the original
  – Crafted to fit into 60 minutes

• Originals (complete set) can downloaded from:
Content for this session is at:

http://dbmichair.mc.vanderbilt.edu/amia2008/

including citation lists and links and this PowerPoint
Design for this Session

- Modeled on American College of Physician “Update” sessions
- Emphasis on ‘what it is’ and ‘why it is important’
- 1-2 examples of each in detail and others in synopsis
- Audience interaction for each category of item discussed
Source of [the Clinical Informatics] Content for Session

- Literature review of RCTs indexed by MeSH term “Medical Informatics”, “Telemedicine” & descendents
  - and Entrez date between November 2007 and October 2008
  - further qualified by involvement of >100 providers or patients (n=31)

- Poll of American College of Medical Informatics fellows list
It takes a village…

Thanks to

• Rebecca Jerome
• Russ Altman
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• Isaac Kohane
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• David States
• Justin Starren
• Mark Tuttle
Topics

• Representative New Literature
• Notable Events – the ‘Top Ten’ list
New Literature Highlights: Clinical Informatics

- Clinical Decision Support
- Personal Health Records
- Telemedicine
- The practice of informatics
Clinical Decision Support
Clinical Decision Support for Providers

- **Reference**
  - Stevens J et al. Pediatrics. 2008 Jun;121(6):1099-105. [Childrens Hospital, Columbus, OH]

- **Title**
  - Trial of computerized screening for adolescent behavioral concerns.

- **Aim**
  - to determine whether computerized screening with real-time printing of results for pediatricians increased the identification of injury risk, depressive symptoms, and substance use among adolescents.

- **Methods**
  - 878 primary care pts 11-20 yrs old from low income populations
Clinical Decision Support for Providers

- **Reference**

- **Methods, cont’d**
  - Clinics randomly assigned to have pediatricians receive screening results either just before face-to-face encounters with patients (immediate-results condition) or 2 to 3 business days later (delayed-results condition)
  - Measures: numbers of conditions identified and recognition rate by clinical providers.

- **Results**
  - 59% of respondents had 1 or more behavioral issues
  - Of those screen positive, 68% were identified and documented by clinicians in the immediate-results group vs. 52% in delayed results group
Clinical Decision Support for Providers

• Reference

• Importance
  – Adds to an extensive literature that patient provided information via a variety of care setting input methods (portals, waiting room kiosks and workstations, tablet PCs) can influence identification and care planning for health conditions
Clinical Decision Support for Providers

- **Reference**

- **Title**
  - An international multicenter randomized study of computer-assisted oral anticoagulant dosage vs. medical staff dosage.

- **Aim**
  - To compare the safety and effectiveness of computer-assisted warfarin dosage with dosage by experienced medical staff at the same centers.

- **Methods**
  - A randomized study of dosage of two commercial computer-assisted dosage programs (PARMA 5 and DAWN AC) vs. manual dosage at 32 centers in 13 countries.
Clinical Decision Support for Providers

- **Reference**

- **Methods, cont’d**
  - Safety and effectiveness of computer-assisted dosage were compared with those of medical staff dosage.

- **Results**
  - 13,219 patients participated, 6503 patients being randomized to medical staff and 6716 to computer-assisted dosage.
  - International Normalized Ratio (INR) tests numbered 193,890 with manual dosage and 193,424 with computer-assisted dosage.
  - In the 3209 patients with deep vein thrombosis/pulmonary embolism, 37 fewer clinical events (24%, P = 0.001) for computer assisted dosage.
Clinical Decision Support for Providers

- **Reference**

- **Results, cont’d**
  - Time in target INR range improved with computer assisted dosage (P<.0001)

- **Importance**
  - Adds to an extensive literature on anticoagulant dosage clinical decision support that has consistently shown outcomes improvement vs. unaided clinician judgment.
  - First international multicenter study (32 sites) to show that effects are robust across a large number of care settings worldwide
Clinical Decision Support for Providers

- **Reference**

- **Title**
  - An electronic medical record (EMR)-based intervention to reduce polypharmacy and falls in an ambulatory rural elderly population.

- **Aim**
  - To evaluate an EMR-based intervention to reduce overall medication use, psychoactive medication use, and occurrence of falls in an ambulatory elderly population at risk for falls.

- **Methods**
  - Standardized medication review conducted and recommendations made to the primary physician via the EMR. Randomized by clinic to intervention vs. normal care
Clinical Decision Support for Providers

- **Reference**

- **Methods, cont’d**
  - Patients contacted to obtain self reports of falls at 3-month intervals over the 15-month period of study.
  - Fall-related diagnoses and medication data were collected through the EMR.

- **Results**
  - 620 Pts over age 70 enrolled.
  - Intervention did not reduce the total number of medications, but reduced prescribing of psychoactive meds (P < .01)
  - Intervention group had 0.38 risk of falls vs. controls as documented by EMR (P < .01) but no difference when self report data added.
Clinical Decision Support for Providers

- **Reference**

- **Conclusion**
  - EMR to assess medication use in the elderly may reduce the use of psychoactive medications and falls in a community-dwelling elderly population.

- **Impact**
  - Looking only inside the EMR may miss real world health events. Best to gather independent observations if possible in interventional studies.
Clinical Decision Support for Providers

• Reference

• Title
  – Electronic alerts versus on-demand decision support to improve dyslipidemia treatment: a cluster randomized controlled trial.

• Aim
  – To study the effect of both alerting and on-demand decision support with respect to screening and treatment of dyslipidemia based on guidelines of the Dutch College of General Practitioners.

• Methods
  – Cluster randomized trial 38 Dutch general practices (77 physicians) who used the ELIAS electronic health record, and 87,886 of their patients.
Clinical Decision Support for Providers

- **Reference**

- **Methods, cont’d**
  - Each practice assigned to receive alerts, on-demand support, or no intervention.
  - Outcome: percentage of patients screened and treated after 12 months of follow-up.

- **Results**
  - In alerting group, 65% of Pts requiring screening were screened vs. 35% of Pts in the on-demand group and 25% of Pts in control group.
  - In alerting group, 66% of patients requiring Rx were treated vs. 40% of Pts in on-demand group and 36% of Pts in the control group.
Clinical Decision Support for Providers

• Reference

• Conclusions
  – Alerting version of the clinical decision support systems significantly improved screening and treatment performance for dyslipidemia by general practitioners.

• Impact
  – Magnitude of improvements in guideline adherence historically associated with inpatient settings can be observed in primary care outpatient settings for common disorders, using a practice-based EMR (in the Netherlands).
  – More evidence of Northern Europe leading in ambulatory practice innovations vs. US
Clinical Decision Support for Providers

• **Reference**

• **Title**
  – A randomized effectiveness trial of a clinical informatics consult service: impact on evidence-based decision-making and knowledge implementation.

• **Aim**
  – To determine the effectiveness of providing synthesized research evidence to inform patient care practices via an evidence-based informatics program, the Clinical Informatics Consult Service (CICS).

• **Methods**
  – Consults randomly assigned to CICS Provided, where clinicians received synthesized information from literature addressing the consult question or No CICS Provided, in which no information was provided.
Clinical Decision Support for Providers

• **Reference**

• **Methods, cont’d**
  - Outcomes measured via online post-consult forms that assessed consult purpose, actual and potential impact, satisfaction, time spent searching, and other variables.

• **Results**
  - 226 consults made during 19-month study period.
  - Clinicians primarily made requests in order to update themselves (65.0%, 147/226) and were satisfied with the service results (Mean 4.52 of possible 5.0, SD 0.94).
  - Intention to treat (ITT) analyses showed that consults in the CICS Provided condition had a greater actual and potential impact on clinical actions and clinician satisfaction than No CICS consults.
Clinical Decision Support for Providers

- **Reference**

- **Results**
  - Evidence provided primarily impacted the use of a new or different treatment (OR 8.19 95% CI 1.04-64.00).
  - Reasons for no or little impact included a lack of evidence addressing the issue or that the clinician was already implementing the practices indicated by the evidence.

- **Conclusions**
  - Clinical decision-making, particularly regarding treatment issues, was impacted by the service.

- **Impact**
  - Programs such as the CICS may provide an effective tool for facilitating integration of research evidence into management of patient care and may foster clinicians' engagement with the biomedical literature.
Clinical Decision Support for Patients

• **Reference**

• **Title**

• **Aim**
  – To determine whether mailing to Pts plus nurse telephone call more effective than standard CDSS reminders to physicians for prescribing ASA to diabetics.

• **Methods**
  – Cluster-randomized design, 19 physicians caring for 334 eligible patients at least 40 years of age randomized.
  – All clinicians received computerized reminders at office visits.
Clinical Decision Support for Patients

- Reference

- Methods, cont’d
  - Intervention physicians received e-mails asking whether aspirin was indicated for each patient.
  - If so, patients received a mailing and nurse telephone call addressing aspirin.
  - Primary outcome was self-reported regular aspirin use.

- Results
  - Outcome assessment telephone interviews completed for 242 (72.5%) patients.
  - At follow-up, aspirin use was reported by 60 (46%) of the 130 intervention patients and 44 (39%) of the 112 reminder-only patients, a nonsignificant difference.
Clinical Decision Support for Patients

- **Reference**

- **Results, cont’d**
  - In subgroup reporting no aspirin use at baseline and no contraindications, 33 (43%) of the 76 intervention and 22 (30%) of the 74 reminder-only patients began using aspirin, a 10% difference accounting for clustering (P = .013).

- **Conclusions**
  - A patient-directed intervention modestly increased aspirin use among diabetes patients beyond that achieved using computerized clinician reminders for ideal candidates.
  - Obstacles included difficulty contacting patients, real or perceived contraindications, and failure to follow the nurse's advice.
Clinical Decision Support for Patients

- **Reference**

- **Impact**
  - Person-intensive best practice strategies, like automated CDSS’s, encounter diminishing returns vs. ideal guidelines and outcomes.
Clinical Decision Support for Patients

- **Reference**

- **Title**
  - Long-term effectiveness of computer-generated tailored patient education on benzodiazepines: a randomized controlled trial.

- **Aim**
  - To examined the long-term effectiveness of a tailored patient education intervention on benzodiazepine use.

- **Methods**
  - Controlled trial with three arms, comparing (i) a single tailored letter; (ii) a multiple tailored letters and (iii) a general practitioner letter. More info in tailored letters.
  - 508 Pts using benzodiazepines recruited by their general practitioners and assigned randomly to one of the three groups.
  - Post-test took place after 12 months.
Clinical Decision Support for Patients

• **Reference**

• **Results**
  – Participants receiving tailored interventions were twice as likely to have quit benzodiazepine use compared to the general practitioner letter.
  – Among participants with the intention to discontinue usage at baseline, both tailored interventions led to high percentages of those who actually discontinued usage (single tailored intervention 51.7%; multiple tailored intervention 35.6%; general practitioner letter 14.5%).

• **Conclusions**
  – Tailored patient education can be an effective tool for reducing benzodiazepine use, and can be implemented easily.
Clinical Decision Support for Patients

• **Reference**

• **Impact**
  – Adds to literature on CDS for Pts that suggests it is easier to get Pts to stop than start medications.
Clinical Decision Support for Patients

- **Reference**

- **Title**
  - Randomized controlled trial of web-based alcohol screening and brief intervention in primary care.

- **Aim**
  - To determine whether an electronic Screening and Brief Intervention (e-SBI) reduces hazardous drinking.

- **Methods**
  - RCT in a university primary health care service.
  - 975 students (age range, 17-29 years) screened using the Alcohol Use Disorders Identification Test (AUDIT).
  - 599 students (61%) scored in hazardous or harmful range.
Clinical Decision Support for Patients

• Reference

• Methods
  – 576 (300 women) in high risk group consented and were randomized to receive an information pamphlet (control group), a Web-based motivational intervention (single-dose e-SBI group), or a Web-based motivational intervention with further interventions 1 and 6 months later (multidose e-SBI group).
  – Measures: self-reported alcohol consumption at 12 months

• Results
  – Single-dose e-SBI group at 6 months reported a lower frequency of drinking, less total consumption, and fewer academic problems that were sustained at 12 months.
  – Multidose e-SBI group at 6 months reported same plus modestly reduced episodic heavy drinking (NS), sustained at 12 months.
Clinical Decision Support for Patients

• **Reference**

• **Conclusions**
  - Single-dose e-SBI reduces hazardous drinking, and the effect lasts 12 months.
  - Additional sessions seem not to enhance the effect.

• **Impact**
  - Adds to literature that college students are a unique population willing to report hazardous behaviors and respond to information interventions directed at reducing those behaviors.
Clinical Decision Support for Patients

- **Reference**

- **Title**
  - Impact of an automated test results management system on patients’ satisfaction about test result communication.

- **Aim**
  - To assess the impact of physicians’ use of a test results management tool embedded in an electronic health record on patient satisfaction with test result communication.

- **Methods**
  - Cluster-randomized, trial of 570 patient encounters in 26 outpatient primary care practices
  - Physicians in intervention practices were trained, given access to test results management tool with imbedded patient notification functions.
Clinical Decision Support for Patients

• **Reference**

• **Methods, cont’d**
  – Patient satisfaction surveys conducted by telephone after the patient underwent the test and were administered before and after the intervention in both arms.

• **Results**
  – The survey response rate after successful patient contact was 74.2% (570/768).
  – After adjusting for patient age, sex, race, socioeconomic status, and insurance type, the intervention significantly increased patient satisfaction with test results communication (odds ratio, 2.35; 95% confidence interval, 1.05-5.25; P = .03) and more satisfied with information given them for medical treatments and conditions regarding their results (odds ratio, 3.45; 95% confidence interval, 1.30-9.17; P = .02).
Clinical Decision Support for Patients

- Reference

- Conclusions
  - Automated test results management system can improve patient satisfaction with communication of test results ordered by their primary care provider and
  - can improve patient satisfaction with the communication of information regarding their condition and treatment plans.

- Impact
  - Knowledge is power and contributes to customer satisfaction in healthcare.
Clinical Decision Support for Patients

• Reference

• Title
  – Structured patient-clinician communication and 1-year outcome in community mental healthcare: cluster randomised controlled trial.

• Aim
  – To test a computer-mediated intervention structuring patient-clinician dialogue (DIALOG) focusing on patients' quality of life and needs for care.

• Methods
  – Cluster-randomized, trial of 134 providers in six countries were allocated to DIALOG or treatment as usual; 507 people with schizophrenia or related disorders included.
Clinical Decision Support for Patients

- **Reference**

- **Methods, cont’d**
  - Every 2 months for 1 year, clinicians asked patients to rate satisfaction with quality of life and treatment, and request additional or different support.
  - Responses fed back immediately in screen displays, compared with previous ratings and discussed.
  - Primary outcome was subjective quality of life, secondary outcomes were unmet needs and treatment satisfaction.

- **Results**
  - Of 507 patients, 56 lost to follow-up and 451 were included in intention-to-treat analyses.
  - Patients receiving the DIALOG intervention had better subjective quality of life, fewer unmet needs and higher treatment satisfaction after 12 months.
Clinical Decision Support for Patients

• **Reference**

• **Conclusions**
  – Structuring patient-clinician dialogue to focus on patients' views positively influenced quality of life, needs for care and treatment satisfaction.

• **Impact**
  – CDSS tools that facilitate communication complement those that provide information from data/knowledge sources.
New CDSS RCTs showing no difference for intervention vs. control


2. Hicks LS. Impact of computerized decision support on blood pressure management and control: a randomized controlled trial. J Gen Intern Med. 2008 Apr;23(4):429-41. [Brigham & Women’s, Boston]

New CDSS RCTs showing no difference for intervention vs. control

4. Thomas KG et al. Use of a registry-generated audit, feedback, and patient reminder intervention in an internal medicine resident clinic--a randomized trial. J Gen Intern Med. 2007 Dec;22(12):1740-4. [Mayo Clinic]


Personal Health Records
Personal Health Records

• **Reference**

• **Title**
  – Practice-linked online personal health records for type 2 diabetes mellitus: a randomized controlled trial.

• **Aim**
  – To evaluate effects of web-based PHR linked to EMR on Type 2 diabetes care.

• **Methods**
  – randomized 11 primary care practices.
  – Intervention practices received access to a DM-specific PHR that imported clinical and medications data, provided patient-tailored decision support, and enabled the patient to author a "Diabetes Care Plan" for electronic submission to their physician prior to upcoming appointments.
Personal Health Records

- **Reference**

- **Methods, cont’d**
  - Active control practices received a PHR to update and submit family history and health maintenance information. All patients attending these practices were encouraged to sign up for online access.

- **Results**
  - 244 patients with DM enrolled (37% of the eligible population with registered online access, 4% of the overall population of patients with DM).
  - Study participants were younger (mean age, 56.1 years vs 60.3 years; P < .001) and lived in higher-income neighborhoods (median income, $53,784 vs $49,713; P < .001) but had similar baseline glycemic control compared with nonparticipants.
Personal Health Records

• **Reference**

• **Results**
  – More patients in the intervention arm had their DM treatment regimens adjusted (53% vs 15%; P < .001) compared with active controls.
  – No significant differences in risk factor control between study arms after 1 year (P = .53).

• **Conclusions**
  – Pre-visit use of online PHR linked to the EMR increased rates of DM-related medication adjustment.
  – Low rates of online patient account registration and good baseline control among participants limited the intervention's impact on overall risk factor control.
Clinical Decision Support for Patients

• **Reference**

• **Impact**
  - Motivated, engaged patients with personal resources constitute the majority of PHR and portal users. These well-educated ‘good patients’ can make it difficult to detect outcomes differences due to high baseline compliance.
Telemedicine
Telemedicine

10 new RCTs published
November 2007 – October 2008

• 3 hypertension
• 1 each diabetes care, stroke, coronary disease, heart failure, transplantation follow-up, implantable cardioverter, robotic telerounding
Telemedicine

• 3 RCTs on hypertension


Telemedicine

• **Methods**
  - Group Health Study: 778 hypertensive Pts in 3 grps: use secure website +/- pharmacist web communication vs. usual care. Outcome variable: Percent of Pts with controlled BP at 12 months
  - Temple study: 464 hypertensive pts given recording sphygmomanometer. Entered BP reading on website, compared to downloaded BP values at clinic visits.
  - Denmark study: 236 hypertensive pts randomized to entering BP into PDA synchronized over net, with web provider-pt feedback. Outcome variable: mean systolic BP change over 6 months.
Telemedicine

• **Results**
  - Group Health Study found web + pharmacist care increased numbers of Pts with controlled BP but not web alone vs. standard care.
  - Temple study found Pt entered accurate BP readings, including underserved and low literacy patients
  - Denmark study found both groups had BP fall during study, telemonitoring ‘as good as’ office visit monitoring

• **Impact**
  - Adds to substantial literature showing therapeutic equivalency of telemedicine vs. in person monitoring of chronic conditions.
Telemedicine

- **Reference**

- **Title**
  - Efficacy of site-independent telemedicine in the STRokE DOC trial: a randomised, blinded, prospective study.

- **Aim**
  - To assessed whether telemedicine (real-time, two-way audio and video) or telephone was superior for decision making regarding use of thrombolytics in acute stroke.

- **Methods**
  - Stroke patients at four remote sites in California randomized to video and DICOM image telemedicine vs. telephone consultation with neurologists at academic center.
  - Cases reviewed for correctness of decision regarding use of thrombolytics and incidence of intracerebral hemorrhage
Telemedicine

• Reference

• Results
  – 234 patients assessed Jan 2004 – Aug 2007. 111 randomized to each arm, 207 completed study.
  – Correct treatment decisions were made more often in the telemedicine group than telephone grp 98% vs 82%, p=0.0009).
  – Intravenous thrombolytics were used at an overall rate of 25% (31 [28%] telemedicine vs 25 [23%] telephone, 1.3, 0.7-2.5; p=0.43).
  – No difference in mortality (1.6, 0.8-3.4; p=0.27) or rates of intracerebral hemorrhage.

• Conclusions
  – Telemedicine results in more accurate stroke decision making

• Impact
  – Telemedicine useful way to project specialized neurology svcs
Telemedicine

• **Reference**

• **Title**
  - The Informatics for Diabetes and Education Telemedicine (IDEATel) project.

• **Aim**
  - To comparing telemedicine case management to usual care for diabetes in low socioeconomic status patients.

• **Methods**
  - 1,665 Medicare recipients with diabetes, aged 55 years or greater, living in federally designated medically underserved areas of New York State.
  - Specialized home telemedicine unit with web-enabled computer, video, glucose and BP monitoring, upload to Columbia EMR
  - Primary endpoints were HgbA1c, blood pressure, and low density lipoprotein (LDL) cholesterol levels.
Telemedicine

- **Reference**

- **Results**
  - In New York City, 98% of participants were black or Hispanic, 69% were Medicaid-eligible, and 93% reported annual household income < or =$20,000.
  - In upstate New York, 91% were white, 14% Medicaid eligible, and 50% reported annual household income < or =$20,000.
  - 95% of NYC participants did not know how to use a computer.
  - BP, LDL, and HBA1C all decreased in intervention grp relative to usual care grp at 1 year of follow-up.
  - Same effects observed in urban and rural populations.
  - User satisfaction high.
Telemedicine

• **Reference**

• **Conclusions**
  – Telemedicine is an effective method for translating modern approaches to disease management into effective care for underserved populations.

• **Impact**
  – Telemedicine effects seen in low income, non-computer literate population
  – No analysis of cost-effectiveness provided
Telemedicine

- **Reference**
  - Ellison LM et al. Arch Surg. 2007 Dec;142(12):1177-81 [Penobscot Bay Medical Center, Rockport, ME]

- **Title**
  - Postoperative robotic telerounding: a multicenter randomized assessment of patient outcomes and satisfaction.

- **Aim**
  - To assess patient safety and satisfaction when robotic videoconferencing (telerounding) is used in the postoperative setting.

- **Methods**
  - 270 adults undergoing a urologic procedure requiring a hospital stay of 24 to 72 hours were randomized to receive either traditional bedside rounds or robotic telerounds.
Telemedicine

• **Reference**
  - Ellison LM et al. Arch Surg. 2007 Dec;142(12):1177-81 [Penobscot Bay Medical Center, Rockport, ME]

• **Methods, cont’d**
  - The primary outcome measure was postoperative patient morbidity.
  - Secondary outcomes were patient-reported satisfaction and hospital length of stay.
  - Other variables assessed included demographics, procedure, operative time, estimated blood loss, and mortality.
  - Patients also completed a validated satisfaction instrument 2 weeks after hospital discharge.

• **Results**
  - Morbidity rates and length of stay were similar between the study arms (standard rounds vs telerounds: 16% vs 13%; P = .64, 2.8 days LOS both groups, P=.94).
  - Patient satisfaction was equivalently high in both groups.
Telemedicine

- **Reference**
  - Ellison LM et al. Arch Surg. 2007 Dec;142(12):1177-81 [Penobscot Bay Medical Center, Rockport, ME]

- **Conclusions**
  - Robotic telerounds matched the performance of standard bedside rounds after urologic surgical procedures.

- **Impact**
  - Provocative in-hospital telemedicine report
  - Telemedicine provider skills somewhat different than in person skills; some clinicians natural ‘TV doctors’, some not
Telemedicine RCTs with no difference between intervention and control


Practice of Informatics
Practice of Informatics

- **Reference**

- **Title**
  - Electronic medical record-assisted design of a cluster-randomized trial to improve diabetes care and outcomes.

- **Aim**
  - To describe the design of a CRT of clinical decision support to improve diabetes care and outcomes.

- **Methods**
  - EMR-derived Pt characteristics used to partition Pts into groups with comparable baseline characteristics for two different cluster-randomized interventional trials of diabetes care using two different EMRs (Systems A and B).
  - Measures: distributions of important eligibility and covariates compared to traditional means of identifying groups.
Practice of Informatics

• Reference

• Results
  – In System A, 4,306 patients assigned to 2 groups of practices; 8,369 patients in system B assigned to 3 groups of practices.
  – Nearly all baseline outcome variables and covariates were well-balanced, including several not included in the initial design.
  – Study design balance was superior to alternative partitions based on volume, geography or demographics alone.

• Conclusion
  – EMRs facilitated rigorous CRT design by identifying large numbers of patients with diabetes and enabling fair comparisons through preassignment balancing of practice sites.
Practice of Informatics

• **Reference**
  

• **Impact**
  
  – In the era of Clinical and Translational Science Awards (CTSAs) increasingly sophisticated methods are being developed to data mine EMRs for observational studies, eligibility and design for interventional studies.
Practice of Informatics

• Reference
  [Univ of Tasmania, Australia]

• Title
  – Data-mining of medication records to improve asthma management.

• Aim
  – To use community pharmacy medication records to identify patients whose asthma not well managed, implement and evaluate a multidisciplinary educational intervention to improve asthma management.

• Methods
  – 42 pharmacies ran software application to "data-mine" med records, generating a list of patients w/ >= 3 canisters of inhaled short-acting beta(2)-agonists in the preceding 6 months.
Practice of Informatics

• **Reference**

• **Methods, cont’d**
  - Pts randomized to be contacted by the community pharmacist via mail, and sent educational material & letter encouraging them to see their general practitioner for an asthma management review.
  - Outcome variable: ratio of preventer meds (steroids) to reliever meds (beta2 agonists)

• **Results**
  - 702 intervention and 849 control Pts.
  - Threefold increase in preventer-reliever ratio in intervention vs. control group
Practice of Informatics

• **Reference**

• **Conclusion**
  – Community pharmacy medication records can be effectively used to identify patients with suboptimal asthma management, who can then be referred to their GP for review

• **Impact**
  – Similar to post-Katrina experience in US, commercial pharmacy records can be merged and data mined to improve care
Practice of Informatics

• Reference

• Title
  – Randomized controlled trial of an automated problem list with improved sensitivity.

• Aim
  – To improve the completeness and timeliness of an electronic problem list.

• Methods
  – Authors developed a system using Natural Language Processing (NLP) to automatically extract potential medical problems from clinical, free-text documents.
  – Problems then proposed for inclusion in an electronic problem list management application.
Practice of Informatics

• **Reference**

• **Methods, cont’d**
  - 247 patients enrolled intensive care unit and in cardiovascular surgery unit)
  - All patients had their documents analyzed by the system, but the medical problems discovered were only proposed in the problem list for intervention patients.
  - Measured the sensitivity, specificity, positive and negative predictive values, likelihood ratios and the timeliness of the problem lists.

• **Results**
  - System increased sensitivity of problem lists in ICU, from 9% to 41%, and to 77% if problems automatically proposed but not acknowledged also considered.
Practice of Informatics

• Reference

• Results, cont’d
  – Timeliness of addition of problems to the list was greatly improved, with a time between a problem's first mention in a clinical document and its addition to the problem list reduced from about 6 days to less than 2 days in ICU.
  – No significant effect was observed in the cardiovascular surgery unit.

• Impact
  – NLP is coming of age for extraction of structured content from unstructured clinical documents.
Top Ten List of Notable Events in the Past 12 months
“Top Ten” Events

#10 – Personal Genome Project data available 10/20/08
BOSTON (AP) - A group of scientists and researchers fascinated with the human genome said Monday they will post online their most private personal information—their medical records and DNA sequence of some of their own genes—all for the sake of research.

Led by Harvard Medical School genetics professor George Church, nine people plan to post their records and the DNA sequence of about one-fifth of their genes on the Web.

The participants also include Harvard psychology professor Steven Pinker and Dr. John Halamka, chief information officer at Harvard Medical School. A tenth participant, Misha Angrist, science editor at the Duke University Institute for Genome Sciences & Policy, said he plans to make his medical records public, but is still deciding on whether to make his sequencing information public.

Harvard said this is the first phase of a major initiative to make personal genome sequencing more affordable and accessible.

The release is part of the "Personal Genome Project," which is designed to serve as a resource for researchers investigating the genetic basis of diseases and other traits.

Members of the group received the protein-coding regions of their genomes Monday. After reviewing the information with a doctor, they were given the option of sharing it with the research community and general public by posting it on the project's Web site.

Participants discussed their decisions at a news conference at Harvard on Monday afternoon.
“Top Ten” Events

#10 – Personal Genome Project data available
#9 – ONC Strategic Plan published, 6/3/2008
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“Top Ten” Events

#10 – Personal Genome Project data available

#9 – ONC Strategic Plan published

#8 – Massachusetts and Nevada pass laws requiring encryption of PHI on portable devices. September 2008
Even organizations that have no facilities or personnel in Massachusetts should anticipate that they will be subject to the regulations if they maintain personal information of any Massachusetts residents. Personal information is defined as: first name and last name or first initial and last name in combination with Social Security number; driver’s license number or state-issued identification card number; and financial account or credit or debit card number with or without any required security code, access code, personal identification number or password that would permit access to an individual’s financial account.

Besides the new encryption obligation, the regulations require entities that maintain personal information of Massachusetts residents to:

• designate an employee to maintain security program;
• identify paper, electronic and other storage media (including laptops) that contain personal information;
• conduct risk assessments;
• develop and implement, according to the results of those risk assessments, a program that ensures the security of all records – whether maintained in paper or electronic form – that contain personal information of Massachusetts residents;
• document the security program;
• include in the security program:
  • processes for granting and withdrawing access privileges,
  • ensuring proper authentication of users,
  • appropriate access controls,
  • methods of assigning passwords,
  • maintaining up to date firewalls and malware protections,
  • training all affected employees and
• disciplining employees for violations of the security program;
• implement physical access controls and develop a written procedure;
• limit the amount of personal information to that which is reasonably necessary to accomplish the purpose for which the personal information was collected;
• limit the amount of time that personal information can be retained to only the time necessary to accomplish the purpose for which personal information was collected;
• limit access to only those individuals who need access in order to accomplish their job duties;
• regularly monitor compliance with the security program;
• conduct at least annual reviews of the security program and measures; and
• document response taken in connection with any security breach.

• Also, a Nevada statute, scheduled to take effect on October 1, 2008, will require encryption by entities doing business in that state of all personal information leaving an organization’s system and transmitted over electronic networks. Taken together, the Nevada and Massachusetts enactments go a long way toward moving encryption from a best practice to a nationwide legal obligation. Moreover, the Massachusetts regulations go significantly further than any other state law.
“Top Ten” Events

#10 – Personal Genome Project data available
#9 – ONC Strategic Plan published
#8 – Massachusetts, Nevada require encryption
#7 – Exchange of clinical data using HITSP standards orchestrated by ONC, 9/23/2008
FOR IMMEDIATE RELEASE
September 23, 2008

NHIN Progress Marks Milestone in Advancement of HIE for North Carolina

Early results of phase two of the US Department of Health and Human Services’ Nationwide Health Information Network project establish the North Carolina Healthcare Information and Communications Alliance as a champion for expansion of health information exchange efforts at the state level.

Washington, DC (September 23, 2008) – The North Carolina Healthcare Information and Communications Alliance, Inc. (NCHICA) announces successful early results with today’s demonstration of phase two of the Nationwide Health Information Network (NHIN) project. NCHICA is a nonprofit membership organization established in 1994 to improve health and care by accelerating the adoption of information technology and enabling policies. NCHICA intends to leverage the expertise gained throughout its NHIN collaboration among leading hospitals, physician practices and vendors to accelerate development of local and statewide health information exchange (HIE).

“NCHICA sees the direct correlation and practical application of its NHIN work for North Carolina residents and can leverage implementation and policy examples to ensure the state’s HIEs are built on nationally-accepted, data-sharing standards,” said Geoff Lawson, NCHICA Board Member and CIO of Morehead Memorial Hospital in Eden, NC. “NCHICA’s members have built expertise throughout the project that will help ensure North Carolina has the policies, business cases and collaborations in place to support these exchanges.”

During today’s American Health Information Community (AHIC) webcast of real-time data exchange, NCHICA and its partners will demonstrate successful Trial Implementations of the Wounded Warrior and Social Security Administration’s Authorized Release of Information to a Trusted Entity scenarios using test data.

“NCHICA’s work with NHIN is providing insight and foundational value to HIE development in North Carolina,” said David Dillehunt, CIO of FirstHealth of the Carolinas in Pinehurst, NC. “Working with others nationally, we have made significant progress on business plans, consent policies, data use agreements, deployment strategies and security considerations which should enable the robust development of all levels of HIEs. I believe this will give North Carolina a huge advantage in the adoption of best practices required to create a viable HIE.”
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#8 – Massachusetts, Nevada require encryption

#7 – Exchange of clinical data using HITSP standards orchestrated by ONC

#6 – AMIA organizes Rockefeller Global eHealth conference, Bellagio, Italy, July 2008
The Rockefeller Foundation
Bellagio Center
“Top Ten” Events

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#6 – AMIA organizes Rockefeller Global eHealth conference
#5 - CMS Medicare Improvements Act of 2008 pays more for e-prescribing
Medicare News

Medicare Bumps Pay to Physicians that E-Prescribe; Cuts Hospital Pay for Injury to Outpatients

Physicians in both the e-prescribing and PQRI initiatives would receive a 5.1% bonus in Medicare payments next year

Nov. 3, 2008 - CMS on Friday confirmed details of an electronic prescribing incentive program for physicians, scheduled to begin on Jan. 1, 2009, which would increase Medicare payments for doctors who use the technology, the Dallas Morning News reports. Under the new program, which was included in the new Medicare law in July, physicians who use e-prescribing technology to deliver medication prescriptions to pharmacies will be eligible for a 2% increase in their Medicare payments (Roberson, Dallas Morning News, 11/1).

Related Stories

Extra Payments to Private Fee-for-Service Medicare Advantage Plans to Reach $2.5B in 2008

Medicare Advantage Plans proving costly to government compared to traditional Medicare - early report found all MA plans cost extra $8.5B

Oct. 21, 2008

Free Flu Shots Just One of the Preventive Services Covered by Medicare

Medicare Rights Center

According to CQ HealthBeat, physicians who participate in the agency's Physician Quality Reporting Initiative also would qualify for a 2% payment increase in addition to the scheduled 1.1% payment increase for all physicians in 2009.

Physicians who participate in both the e-prescribing and PQRI initiatives would receive a 5.1% bonus in Medicare payments next year.

CMS acting Administrator Kerry Weems in a news release said, "The Institute of Medicine says more than 1.5 million Americans are injured every year by drug errors," adding, "E-prescribing lets providers know -- up front -- their patients' medication history and the risk of dangerous infections" (Carey, CQ HealthBeat, 10/31).

Other Payment Changes

In related news, CMS on Thursday announced that it will increase payments to outpatient departments by 2.8% beginning Jan. 1, 2009, but cuts payments to hospital outpatient departments by 1.1%.
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#6 – AMIA organizes Rockefeller Global eHealth conference
#5 – CMS Medicare Improvements Act of 2008 pays more for e-prescribing
#4 – Explosion of molecular data
• 2\textsuperscript{nd}, 3\textsuperscript{rd}, and 4\textsuperscript{th} full human genomes online in past year
• $500 personal genome expected in 3 years
• Proteomic labs generating a terabyte of mass spec data per experiment
• Straining communication, archiving and analysis infrastructure
“Top Ten” Events

#10 – Personal Genome Project data available
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#6 – AMIA organizes Rockefeller Global eHealth conference
#5 – CMS Medicare Improvements Act of 2008 pays more for e-prescribing
#4 – Explosion of molecular data
#3 – FDA Sentinel Initiative launched, May 2008
The Sentinel Initiative
A National Strategy for Monitoring Medical Product Safety

PDF Version [767 KB]

U.S. Department of Health and Human Services
Food and Drug Administration
May 2008

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Active Surveillance
- Linking, in a secure fashion, existing electronic databases run by private health plans, insurance plans, government agencies, industry
- Querying electronic health records, claims databases, etc. to pick up early warnings of adverse events
- Studying de-identified data on millions of people in something much closer to real time
- FDA will be able to identify priority safety questions and develop mechanisms to protect patients in a more efficient and timely fashion
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Overview

The NIH Public Access Policy ensures that the public has access to the published results of NIH funded research. It requires scientists to submit final peer-reviewed journal manuscripts that arise from NIH funds to the digital archive PubMed Central upon acceptance for publication. To help advance science and improve human health, the Policy requires that these papers are accessible to the public on PubMed Central no later than 12 months after publication.

How to Comply

Address Copyright

Before you sign a publication agreement or similar copyright transfer agreement, make sure that the agreement allows the paper to be submitted to NIH in accordance with the Public Access Policy. See “Whose approval do I need to submit my final peer-reviewed manuscript to PubMed Central” for more information.

Submit Papers

Authors may submit a paper to the journal of their choice for publication. There are four methods to ensure that a manuscript is submitted to PubMed Central in compliance with the NIH Public Access Policy.
And the #1 top event of 2008 is...
“Top Ten” Events

#10 – Personal Genome Project data available
#9 – ONC Strategic Plan published
#8 – Massachusetts, Nevada require encryption
#7 – Exchange of clinical data using HITSP standards orchestrated by ONC
#6 – AMIA organizes Rockefeller Global eHealth conference
#5 - CMS Medicare Improvements Act of 2008 pays more for e-prescribing
#4 – Explosion of molecular data
#3 - FDA Sentinel Initiative launched
#2 – NIH Public Access policy becomes mandatory
#1 – Obama wins Presidency on platform including $50B for EMR infrastructure
(1) **Invest in Electronic Health Information Technology Systems.** Most medical records are still stored on paper, which makes them difficult to use to coordinate care, measure quality, or reduce medical errors. Processing paper claims also costs twice as much as processing electronic claims. Barack Obama and Joe Biden will invest $10 billion a year over the next five years to move the U.S. health care system to broad adoption of standards-based electronic health information systems, including electronic health records. They will also phase in requirements for full implementation of health IT and commit the necessary federal resources to make it happen. Barack Obama and Joe Biden will ensure that these systems are developed in coordination with providers and frontline workers, including those in rural and underserved areas. Barack Obama and Joe Biden will ensure that patients’ privacy is protected. A study by the Rand Corporation found that if most hospitals and doctors offices adopted electronic health records, up to $77 billion of savings would be realized each year through improvements such as reduced hospital stays, avoidance of duplicative and unnecessary testing, more appropriate drug utilization, and other efficiencies.

(2) **Improve Access to Prevention and Proven Disease Management Programs.** Experts agree that several steps should be taken immediately to help patients get the care they need and to help providers improve medical practice. Barack Obama and Joe Biden will expand and support these and other efforts to lower costs and improve health outcomes.

**Help Patients**

- **Support disease management programs.** Over seventy-five percent of total health care dollars are spent on patients with one or more chronic conditions, such as diabetes, heart disease, and high blood pressure. A recent study by the American Diabetes Association found that patients who receive care from a team of doctors who are trained in diabetes management reduced their risk of complications by 30%, decreased their average HbA1c level by 1.3%, and reduced their health care costs by $2,674.

**In this Section**

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The only thing we know about the future is that it will be different.

Peter Drucker

The Village Inn