Internet and Medicine
Medicine on the Internet

• Consumers
• Providers
• Companies
Consumers

- 40-50% of Internet users look for healthcare info on the net – 70% of them feel the info affects their decision making

- Goals
  - Specific disease info
  - Educational services
  - Medications
    - Info, purchasing
  - Fitness
  - Alternative medicine
Consumers

• Disease info
  – 2/3 don’t receive info about their or their child’s disease(s) when in the MD’s office

• Medications
  – Most don’t receive info about medications they are prescribed

• Alternative medicine
  – Increased interest in alternative medicine (45%)
  – Many consider alternative medicine to be equal to traditional medicine
Providers

• Provider education
  – Literature,

• Provider-provider communication
  – Provider groups
  – Teleconsultation

• Patient information
  – Lab and radiology results

• Provider-patient communication
Companies

- Consumer education (marketing)
- B-B
  - Supply chain management
Healthcare info on the net

• Provider sites
  – MayoClinic Home - MayoClinic.com

• Special interest sites
  – JAMA Migraine Information Center
  – The Migraine Relief Center
  – Migraine Awareness Group MAGNUM
  – Natural Migraine Treatment FAQ
Healthcare info on net

- Procedure information
  - Liposuction
  - Lipoinfo
- Usenet
- Medical search engine
  - Achoo Gateway to Healthcare
Healthcare quality on the internet

- California hospitals
  - Web sites difficult to locate
  - Underdeveloped content
  - 93% provided basic contact info, mission statements
  - 48% insurance information
  - 21% accreditation info
  - 36% quality measures
  - 11% patient appointments online
  - 5% allow on-line health profiles
Healthcare info quality

• JAMA study
  – Study of accessibility, quality, readability
  – 14 search engines
  – 25 web sites
  – Evaluated by MD’s
Accessibility or relevant content

- 10 English language and 4 Spanish language search engines
  - Ranking methods used: location and frequency of key words, cross-linking, payment from sites, human editing
- Search terms
  - Breast cancer
  - Childhood asthma
  - Depression
  - Obesity
Accessibility of content

• Links considered relevant if the search term itself or key terms (e.g. inhaler, gastric bypass surgery) present in the link itself or surrounding text
• Relevant links followed to determine whether they led to relevant content
• Pages assessed for content, promotional content and explicit advertisements
Accessibility

• 34% of discovered links were relevant with significant variation by search engine
• 74% of relevant links led to relevant content within ten clicks
• English: 56% contained explicit content and 44% contained promotional material
• Spanish: 36% explicit ads and 21% promotional material
Quality of content

- Web sites selected for ranking, reputation and the absence of a need for subscription or payment (open sites)
- Panel developed condition-related questions that one would expect to be answered by a site
  - “When should I start having regular mammograms?”
- Panel developed clinical elements (recommendations/statements that should be included)
  - “most breast cancers occur in women without a family history of the disease”
Quality

• Web sites retrieved and abstracted after having been stripped of identifying info
• Abstracted material evaluated by MD’s and rated re: clinical elements
  – Not addressed
  – Minimally addressed
  – More than minimally addressed
• Abstracts also rated for accuracy and conflicting info
Percentage of “required clinical elements not covered”

- English
  - Breast 16%
  - Asthma 27%
  - Depression 20%
  - Obesity 35%

- Spanish
  - Breast 49%
  - Asthma 33%
  - Depression 61%
  - Obesity 69%
Quality

• Material not covered
  – Alternatives to medical and surgical rx for breast Ca
  – Evaluation of depression
  – Safety and effectiveness of dietary supplements
Accuracy (correctness of presented material)

• English
  – Breast 91%
  – Asthma 84%
  – Depression 75%
  – Obesity 86%

• Spanish
  – Breast 96%
  – Asthma 53%
  – Depression 63%
  – Obesity 68%
Inaccurate info

- Omega-3 fatty acid deficiencies causes major depression
- Cockroaches are the leading cause of childhood asthma
Conflicting info

• About half of English language sites had one or more conflicts re:
  – Treatment 35%
  – Diagnosis 13%
  – Definitions 7%
  – Adverse effects 5%
  – Etiology/Risk factors 5%
  – Incidence/Prevalence 4%

• Example
  – One point in web site says inhaled steroids do and another don’t stunt growth
Reading grade level

• English
  – Collegiate

• Spanish
  – 10th grade
Conclusions

• Consumers may have trouble finding complete and accurate information regarding a health problem
• Consumers relying on the Internet to make treatment decisions, deficiencies in information might negatively affect decisions
Conclusions

• Reading level is “quite high”
  – 48% of the overall population and
  – 75% of current welfare recipients have “low or very low” reading skills
Conclusions

• Study limitations
  – Internet is a moving target
  – Small set of search engines
  – Simple search terms
  – Not a “natural experiment” with real people, real problems
  – Use of medical terms (rather than lay terms) in search strategy may have skewed results
  – Searchers may have missed important material
Recommendations

• Variation among search engines suggest that overall search efficiency could be improved
• Lack of critical information can be fixed
• Information should be accurate and free of conflict of interest
• Uniform rating scale would be of use
• Information needs to more “readable” or reader friendly”
Consumer kids

• Study similar to that in JAMA but for kids
  – Reading level 12\textsuperscript{th} grade
  – No self-evaluation of reading level
Consumer teens

• ¾ teens and young adults have used the Internet to find health info
  – Topics include
    • Depression, mental illness, drugs and alcohol (25%)
    • Birth control, sexually transmitted diseases (44%)
  – Plus: Internet can be a resource for education parents can’t provide

• 39% changed their personal behavior as a result of the info found online, 14% had seen an MD as a result of the info
Lab result education

• News and info about a variety of tests
• Sponsored by six clinical lab groups
• Lab Tests Online: Welcome!
Medical web site accreditation

- American Accreditation Healthcare Commission
  - Disclosure and linking
  - Health content and service delivery
  - Privacy and security
  - Quality oversight
  - Standards
Drug purchase

• “Rx-running seniors saving money online
• “Black market” drugs bought online from outside the US
Fraud

- **FTC, FDA** anti-scam efforts
  - Devices, herbal products, dietary supplements
  - Treat or cure cancer, HIV, arthritis, hepatitis, diabetes etc.
Providers

• Professional organizations
  – ASCCA, ACCP, AMA
• Continuing medical education
  – PACEP
• Provider-patient contact
  – Usenet
  – Email
• Patient data
Usenet

• Unmoderated groups
# Usenet

- Moderated groups

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<td>URGENT ALERT: HIV+ Inmate Charged w/ Attempted Murder</td>
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<td>Tat vaccination of rhesus macaques &amp; 4/15/02 Journal of Virology</td>
<td>The first section, which covers general information including the editorial guidelines, is particularly useful for avoiding potential problems with articles.</td>
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<td>Request for Endorsement / Support: Rally for Global AIDS Fund</td>
<td>Submissions or suggestions for the FAQ are encouraged. Please send them to:</td>
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<td>How to get the latest version of the sci.med.aids FAQ (READ BEFORE POSTING)</td>
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Email

- There are potential efficiencies in provider-patient communication
- Providers have been slow to adopt
- Issues to be resolved re: what’s OK, what are the laws, storage, turnaround etc.
- Consider the following email
I feel as if I can trust you, and I don’t know where else to turn. I have moved to Seattle in the last couple of weeks and left my husband. I thought this would be a solution, but it only seems to have made things worse. My family has turned against me since they learned about the AIDS test, and I feel as if I have nowhere to turn. I think constantly about taking a lot of those pills you prescribed for me and just going to sleep. What should I do?
Email

• Strange medium
• May be characterized by
  – Disinhibition
  – Abnormal behavior/communication patterns
  – Mutual misunderstanding
Questions re: sample email

• Is it analogous to a phone message?
• Should it be included in the patient’s record?
• Does the content carry the weight of a medical emergency?
• Would the same statement have the same weight if it were a voice message, a letter?
• Should this be regarded as a confidential communication by you? By the carrier?
• What are the provider’s legal responsibilities
• Is the time devoted to email reimbursable?
Email recommendations

- AMIA
- AMA
- AAFP
Email issues

• Patient provider email defined as
  – Computer based communication between clinicians and patients within a contractual relationship in which the health care provider has taken on an explicit measure of responsibility for the client’s care

• Provider-provider

• Provider “client” without contractual relationship
  – Provider takes on an advice giving role with a disclaimer
Email advantages

• Advantages
  – Asynchronous
  – Less formal than a letter, more so than a phone message
  – Good format for follow-up communication, reinforcement, provision of supplemental information (educational material, lab/radiology results)
  – Readily stored to create a paper trail
Email disadvantages

• Disadvantages
  – Informality and lack of verbal cues make email susceptible to miscues
    • “take that with a grain of salt”
    • Sarcasm and wit misinterpreted
    • emoticons
Email emotions

- One can expect anger or frustration from patients
- Should respond dispassionately
- Document trail
Encryption techniques

- Encryption techniques can be used to “guarantee” important components of correspondence
  - Authenticity of the sender
  - Privacy/confidentiality of the communication
  - Tamper-proofing
  - Time stamping
  - Non-repudiation
Email communication guidelines

• Many medical societies recommend the development of a contract between the provider and the patient
  – Turnaround
  – Privacy
  – Transaction types
This is a CONFIDENTIAL medical communication

Your cholesterol value is 211.

Please follow the directions for weight reduction and exercise on our office web site: elevated cholesterol.

Please acknowledge receipt of this email using the reply function

From the office of Dr. John Doe
555 Front Ave
Amityville, NO
Office phone (8AM-5PM M-F) 222-555-1212
Emergency contact (off-hours) 222-555-1313
Out of Office AutoReply: ague

Your message has been received by Dr. John Doe
I will attempt to process your message within one business day.
If you need immediate assistance please call my nurse practitioner at 222-555-1313.
Telemedicine

- Patient care
  - Consultations, monitoring, triage from home
- Professional education
  - CME, online info, individual mentoring
- Patient education
- Research
  - Aggregated databases
- Public health
  - Access, poison centers, disease reporting
- Health care administration
  - Video conferencing, quality monitoring
Classifying telemedicine

- Initial urgent evaluation of patients
- Supervision of primary care
- One-time provision of specialty care
- Consultation/second opinions
- Monitoring or tracking of a patient
- Use of remote sources to guide concurrent patient care
Telemedicine history

• 1924
  – Cover of Radio News magazine “The Radio Doctor”

• 1950’s
  – Teleradiology systems using phone

• 1961
  – Radio telemetry of vital signs
Current sorts of telemedicine applications

- Teleradiology, telepathology
- Telemonitoring
  - ICUSA
- Telesurgery
- Emergency systems
- Telemedicine for prisoners
- Telepsychiatry
- Teleconsultation
  - Managed care
Technological challenges

- Rapid pace of change
- Variety of hardware and software
- Lack of standards for integration
- Space, training and support requirements
- Diversity of needs and requirements
- Need to accommodate diverse types of communication links
Key information technologies

- HCI
  - Hand-held computing
  - Handwriting and speech recognition
  - PDA’s
  - Biometrics
  - Automated data collection
  - Structured data entry
Key technologies

- Storage and processing
  - CPR’s
  - Magnetic stripe cards, smart cards
  - Picture archiving, medical imaging
  - Optical storage
  - Image compression
  - Digital signal processing
  - Object oriented software
Key technologies

• Connectivity
  – CIS’s
  – Cabled, optical and wireless networking
  – Internet and email
  – Messaging standards
  – Security, encryption standards
  – Fault tolerance and redundancy
  – Bandwidth
Key technologies

• Data distillation
  – DSS
  – Pattern recognition
  – AI
    • Knowledge based systems, discovery
  – Relational databases
  – Natural language processing
Human factors

• Requirement for dedicated training, people to make computer systems work in medical environment

• Equipment issues
  – Problems with convenience, reliability
  – Training time
  – Equipment decisions wrong-headed
  – Lack of flexibility/too much flexibility with proprietary systems
Human factors

• Incorporating telemedicine into current practice
  – System already strained

• Analogous to telephones in the early days
  – Few phones
  – Inefficient networking
Human factors

• Current units are fixed desktop systems
• Email, fax, voice mail not yet integrated into systems
• Lack of CPR’s
Cultural issues

- Telemedicine may alter referral relationships
- Lack of documented benefits from telemedicine
- Lack of payment
- Medicine undergoing restructuring – will new players (managed care) embrace telemedicine
Policy context

• Telemedicine crossing state borders
• Federal vs. state role
• Licensure
• Malpractice issues
  – Defined as a deviation from accepted standard of care that causes harm to a patient for whom the physician has responsibility
• Privacy, confidentiality, security
• Payment policies
  – Fee for service barriers (compare government)
• Device regulation: devices used in telemedicine
Case example

• ICUSA
  – Technology
  – Issues pertaining to above licensure, malpractice coverage/suits, devices, resistance, outcomes and payments
Evaluation of telemedicine

• Does telemedicine improve quality of care compared to alternatives
• Does telemedicine improve outcomes
• Does telemedicine improve access to care
• Does telemedicine decrease costs
• Is telemedicine acceptable to users
Findings from national working group

• Limited adoption to date
  – Question of benefit
  – Inadequate assessment of practitioner and community needs
  – Practical difficulties integrating telemedicine into practice
  – Limited familiarity on the part of clinicians with telemedicine and telecommunications
  – Fears about telemedicine (what will it do to me)