

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](http://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 12th grade
 - No self-evaluation of reading level



Consumer teens

- $\frac{3}{4}$ 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.



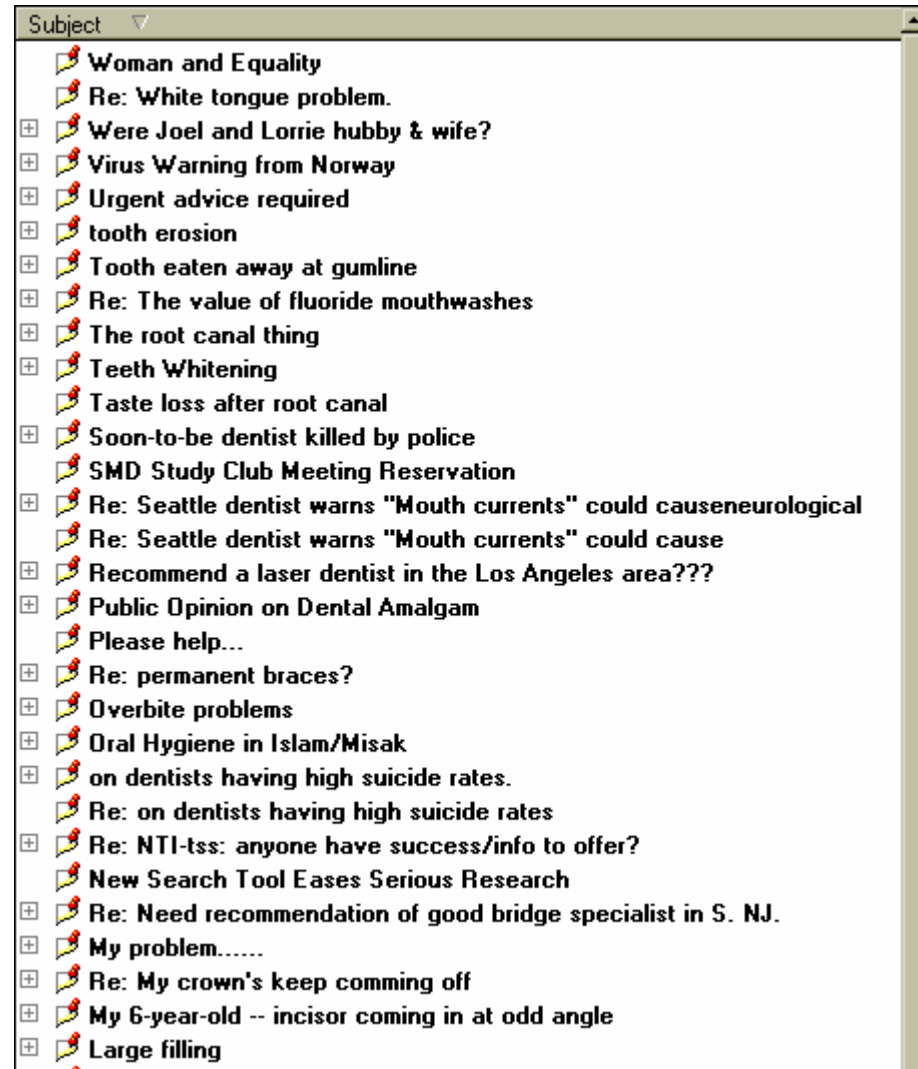
Providers

- Professional organizations
 - [ASCCA](#), [ACCP](#), [AMA](#)
- Continuing medical education
 - PACEP
- Provider-patient contact
 - [Usenet](#)
 - Email
- Patient data



Usenet

- Unmoderated groups



Usenet

- Moderated groups

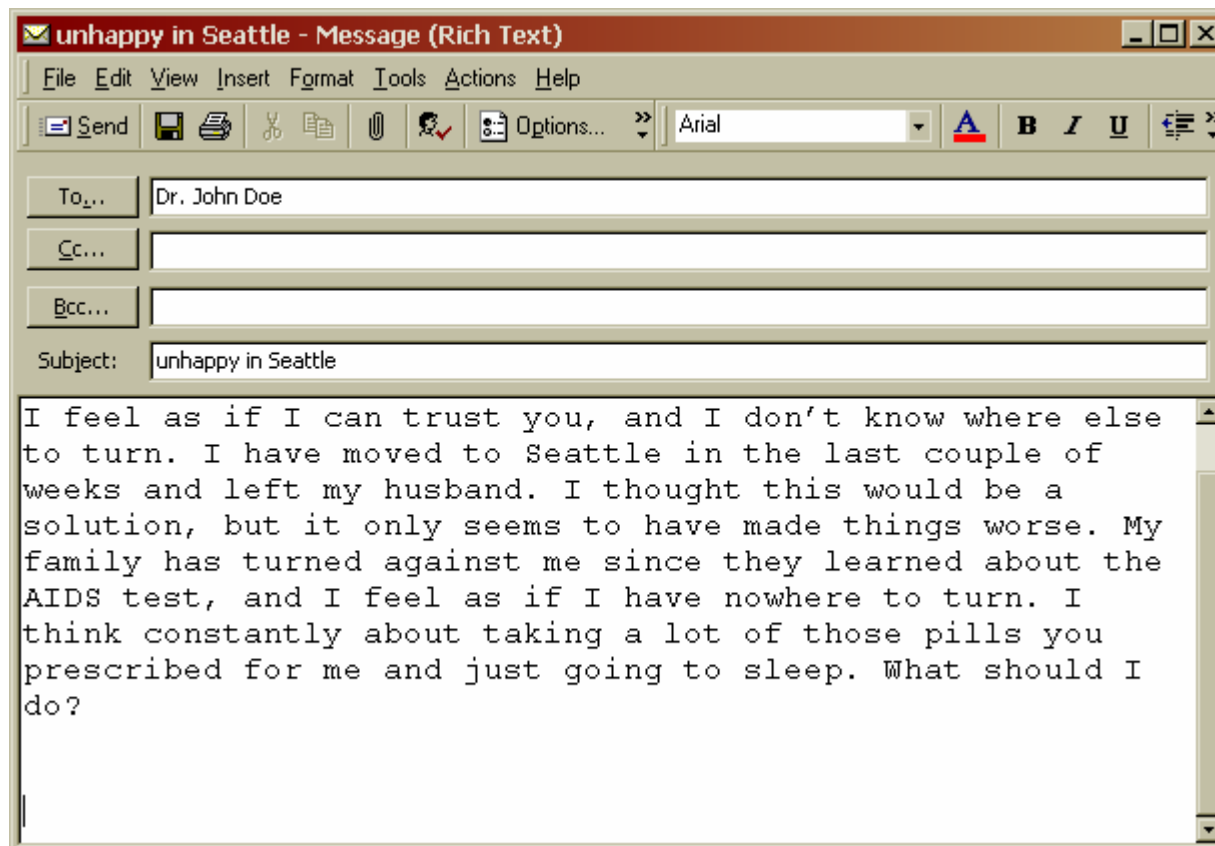
Subject ▾	From: aids-faq@wubios.wustl.edu To: sci.med.aids Subject: How to get the latest version of the sci.med.aids FAQ (READ BEFORE POSTING)
- What's new at The Body March 20, 2002 - URGENT ALERT: HIV+ Inmate Charged w/ Attempted Murder - Tat vaccination of rhesus macaques & 4/15/02 Journal of Virology - Request for Endorsement / Support: Rally for Global AIDS Fund - How to get the latest version of the sci.med.aids FAQ (READ BEFORE POSTING) - HIV/HCV co-infection & ART effects on 26S proteasome & 3/29/02 AIDS - Re: Has anyone read? - SIT: Expansion of pre-existing, LN-localized CD8+ T cells & 3/15/02 JCI - Dynamics of T Cell Responses in HIV Infection & 4/1/02 J Immunol - Doctors research when to start HAART & 3/29/02 AIDS - Did the CDC receive samples of blood from CHAT vaccinees? - Crowdson: Montagnier found RT activity in U.S. gay blood in early 80s - AIDS Treatment News #378 [CDC News] CDC HIV/STD/TB Prevention News Update 03/22/02 [CDC News] CDC HIV/STD/TB Prevention News Update 03/21/02 [CDC News] CDC HIV/STD/TB Prevention News Update 03/20/02	The sci.med.aids Frequently Asked Questions list (FAQ) is available at: http://www.aids.wustl.edu The first section, which covers general information including the editorial guidelines, is particularly useful for avoiding potential problems with articles. Submissions or suggestions for the FAQ are encouraged. Please send them to: aids-faq@wubios.wustl.edu



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





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

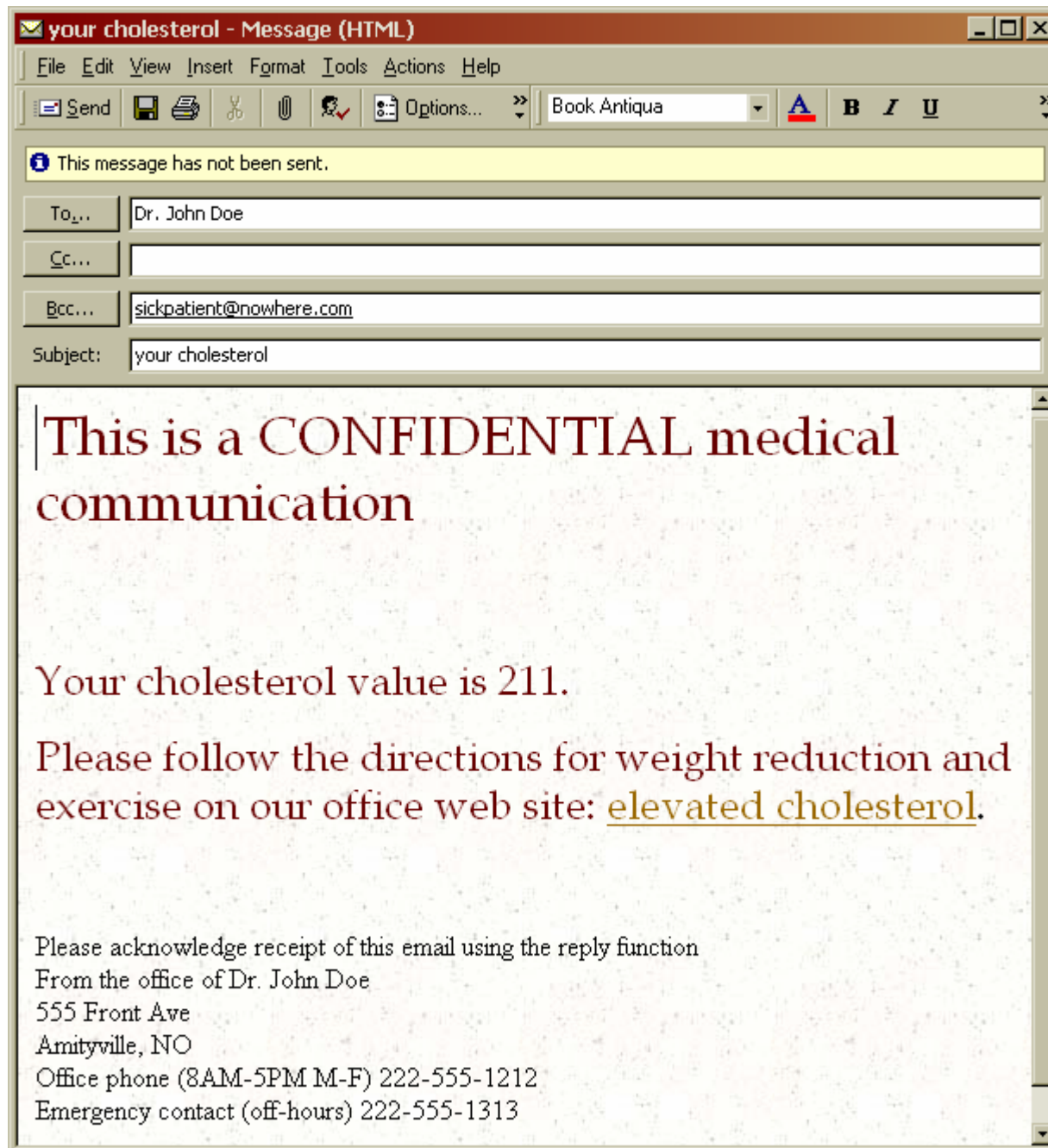
- Encryption techniques can be used to “guarantee” important components of correspondence
 - Authenticity of the sender
 - Privacy/confidentiality of the communication
 - Tamper-proofing
 - Time stamping
 - Non-repudiation



Email communication guidelines

- Many medical societies recommend the development of a contract between the provider and the patient
 - Turnaround
 - Privacy
 - Transaction types





Out of Office AutoReply: ague - Message (Plain Text) - Western European (Windows)

File Edit View Insert Format Tools Actions Help

Send [Icons] [Dropdown] [Text Formatting Icons]

i This message has not been sent.

To:

Cc:

Bcc:

Subject:

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)

