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 12th 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

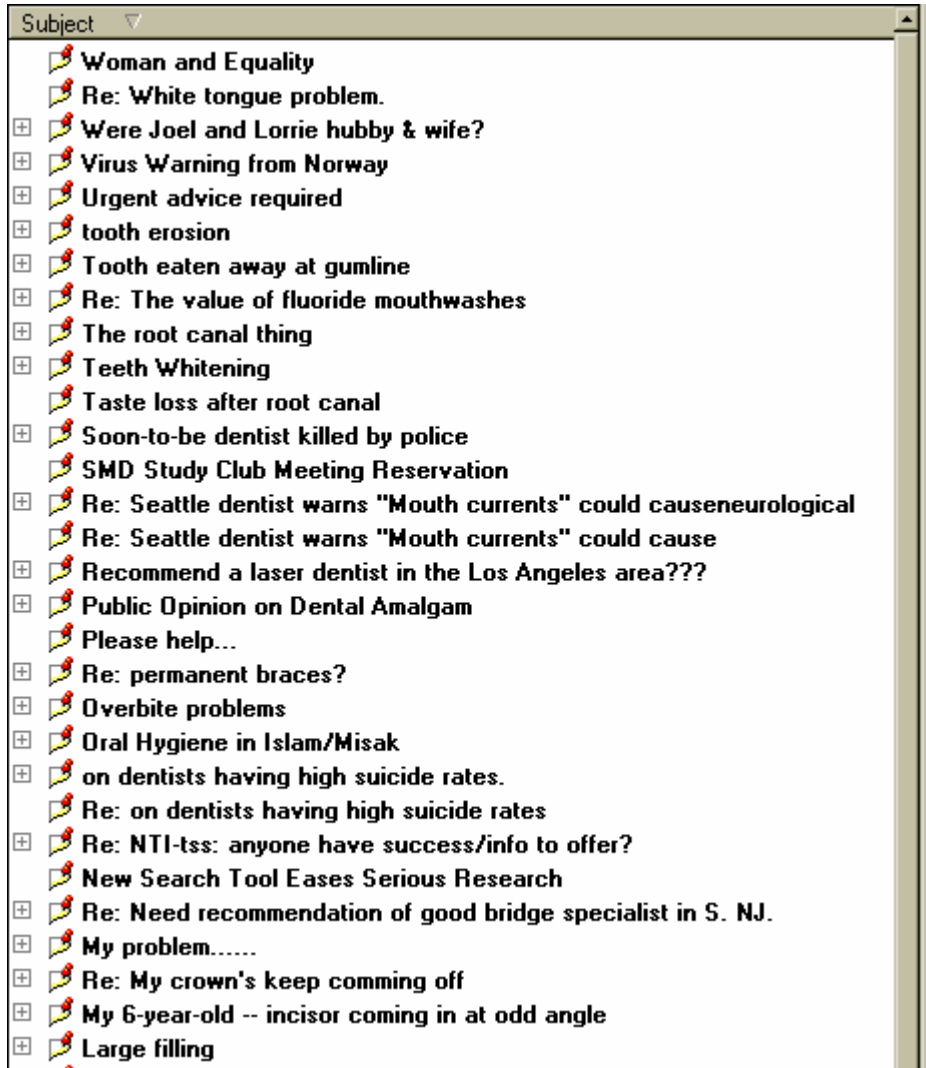
- FTC, FDA anti-scam efforts
  - Devices, herbal products, dietary supplements
  - Treat or cure cancer, HIV, arthritis, hepatitis, diabetes etc.

Providers

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

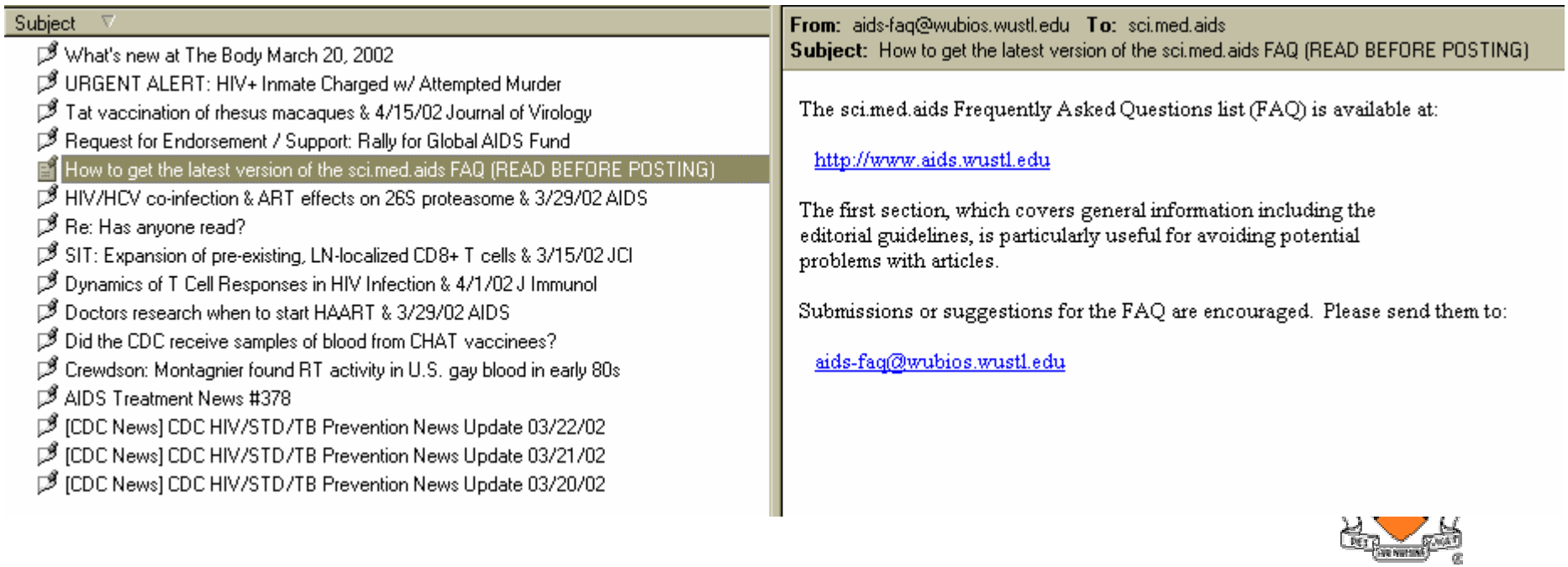
Usenet

- Unmoderated groups



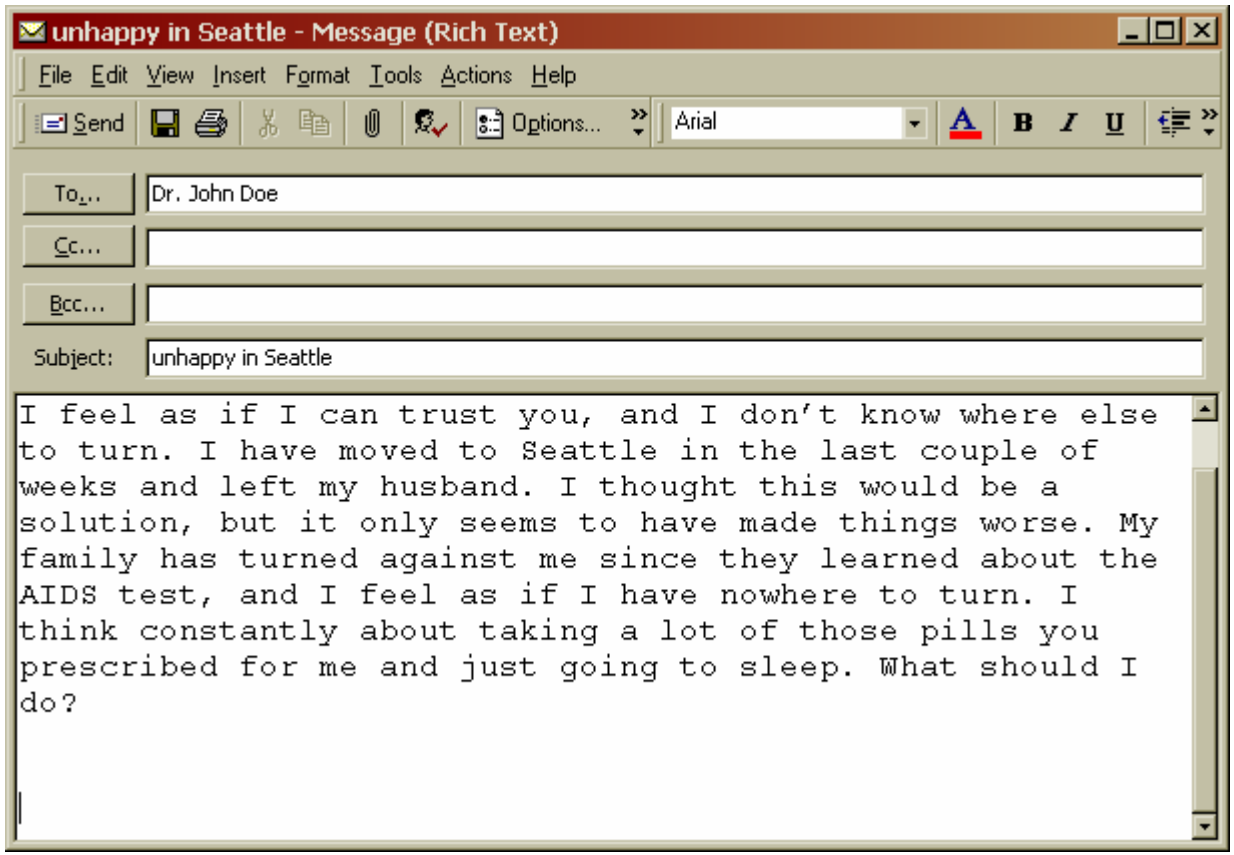
Usenet

- Moderated groups



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


unhappy in Seattle - Message (Rich Text)
File Edit View Insert Format Tools Actions Help
Send
Options...
Arial
B I U
To...
Dr. John Doe
Cc...
Bcc...
Subject:
unhappy in Seattle
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

your cholesterol - Message (HTML)

File Edit View Insert Format Tools Actions Help

Send Options... Book Antiqua B I U

This message has not been sent.

To... Dr. John Doe

Cc...

Bcc... sickpatient@nowhere.com

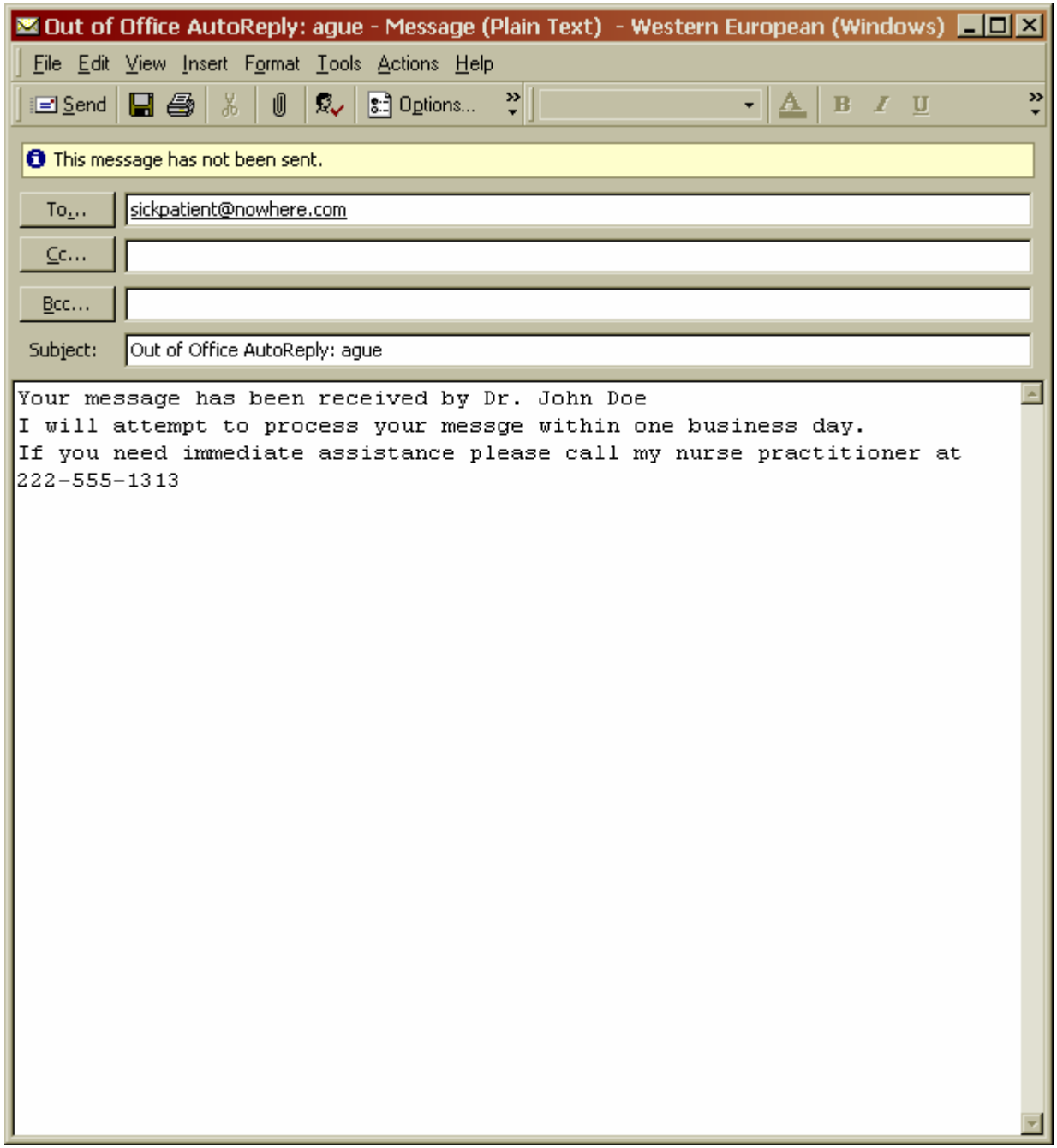
Subject: your cholesterol

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 - Message (Plain Text) - Western European (Windows)
File Edit View Insert Format Tools Actions Help
Send
Options...
This message has not been sent.
To...
sickpatient@nowhere.com
Cc...
Bcc...
Subject:
Out of Office AutoReply: ague
Your message has been received by Dr. John Doe
I will attempt to process your messge 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
- Monitioring 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
    - Knowwledge 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 telemedine 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)