Information Technology in the Healthcare System of the Future

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and
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Cybermedicine for the Clinician
Clinical Use

Φ Provides clinical information upon request
1. All Labs
2. Blood Bank
3. Blood Gas
4. Cardiology
5. Chemistry
6. Cytogenics
7. Cytology
8. Demographics
9. Electrocardiograms
10. Hematology
11. Result Over Time
12. Microbiology
13. Neurophysiology
14. Online Medical Record
15. Outside/Lexington Lab
16. Pharmacy
17. Pulmonary Function
18. Radiology
19. Clinical Pathology
20. Urinalysis
Clinical Use

- Provides clinical information upon request
- Gives support with decisions
Clinical Use

Φ \textit{Gives support with decisions}
  
    – Advice and consultation
Clinical Use

- Gives support with decisions
  - Advice and consultation
  - Bibliographic retrieval (PaperChase)
Clinical Use

- Gives support with decisions
  - Advice and consultation
  - Bibliographic retrieval (PaperChase)
  - Searching the clinical database

Please enter the year or range of years (e.g. 85-90) you are going to search.

Year(s): 1999
Look For: age

1. Admin/Demography
2. Laboratory Results
3. Blood Bank
4. Medications
5. Surgical Pathology
6. Radiology
7. Cardiac Cath
8. Outpatient
9. Diagnosis/procedure
10. DRG

Or enter ? for more information
<table>
<thead>
<tr>
<th>Choice</th>
<th>Values</th>
<th>Admissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1)</td>
<td>&lt;--- .9</td>
<td>5145</td>
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<tr>
<td>2)</td>
<td>1.0-9.9</td>
<td>1</td>
</tr>
<tr>
<td>3)</td>
<td>10.0-17.9</td>
<td>91</td>
</tr>
<tr>
<td>4)</td>
<td>18.0-19.9</td>
<td>261</td>
</tr>
<tr>
<td>5)</td>
<td>20.0-29.9</td>
<td>2723</td>
</tr>
<tr>
<td>6)</td>
<td>30.0-39.9</td>
<td>5614</td>
</tr>
<tr>
<td>7)</td>
<td>40.0-49.9</td>
<td>3427</td>
</tr>
<tr>
<td>8)</td>
<td>50.0-59.9</td>
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</tr>
<tr>
<td>9)</td>
<td>60.0-64.9</td>
<td>1847</td>
</tr>
<tr>
<td>A)</td>
<td>65.0-69.9</td>
<td>2009</td>
</tr>
<tr>
<td>B)</td>
<td>70.0-79.9</td>
<td>4278</td>
</tr>
<tr>
<td>C)</td>
<td>80.0 ---&gt;</td>
<td>3961</td>
</tr>
</tbody>
</table>

Choices:
Clinical Use

- Gives support with decisions
  - Advice and consultation
  - Bibliographic retrieval (PaperChase)
  - Searching the clinical database
  - Alerts and reminders
Clinical Use

- Provides clinical information upon request
- Gives support with decisions
- Assists with communication
E-Mail

Retract Mail

Read Mail
Write Message
Retract Mail
Inquire If Message Read
Personal Menu
Help
Clinical Use

- Provides clinical information upon request
- Gives support with decisions
- Assists with communication
- Assists with clinical practice
Clinical Use

Assists with clinical practice

1. Assists with requests (order entry)
2. Assists with administrative chores
3. Adverse Drug Reaction Reporting
4. Cross Coverage Options
5. Personal Patient Lookup
6. Resident/Medical Student
7. Confidential Counseling for House Staff
Clinical Use

- Assists with requests (order entry)
- Provides clinical information upon request
- Gives support with decisions
- Assists with communication
- Assists with clinical practice
- Assists with education
Instructional Programs
Learning by Doing

In the tradition of John Dewey (1859-1952), cybermedicine promotes learning in the context of caring for real patients.
Evaluating Cybermedicine
Use of the system by voluntary users (A behaviorist’s paradigm)
Beth Israel Deaconess Use of Patient Lookup: Inpatients and Outpatients

Number of Lookups During a Typical Week

- Inpatients
  - 1984: 12,688
  - 1988: 27,707
  - 1992: 34,614
  - 1994: 30,264
  - 1998: 35,229

- Outpatients
  - 1984: 4,080
  - 1988: 13,229
  - 1992: 21,497
  - 1994: 27,023
  - 1998: 44,383
<table>
<thead>
<tr>
<th></th>
<th>Inpatients</th>
<th>Outpatients</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Labs – Most Recent Results</strong></td>
<td>17,018</td>
<td>10,044</td>
<td>27,062</td>
</tr>
<tr>
<td><strong>Demographics</strong></td>
<td>3,277</td>
<td>9,420</td>
<td>12,697</td>
</tr>
<tr>
<td><strong>Chemistry</strong></td>
<td>4,310</td>
<td>4,793</td>
<td>9,103</td>
</tr>
<tr>
<td><strong>Radiology</strong></td>
<td>2,681</td>
<td>6,028</td>
<td>8,709</td>
</tr>
<tr>
<td><strong>Narrative Notes</strong></td>
<td>1,163</td>
<td>3,893</td>
<td>5,056</td>
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<tr>
<td><strong>Cardiology</strong></td>
<td>1,548</td>
<td>2,697</td>
<td>4,245</td>
</tr>
<tr>
<td><strong>Pathology</strong></td>
<td>528</td>
<td>3,562</td>
<td>4,090</td>
</tr>
<tr>
<td><strong>Microbiology</strong></td>
<td>1,990</td>
<td>1,001</td>
<td>2,991</td>
</tr>
<tr>
<td><strong>Hematology</strong></td>
<td>1,014</td>
<td>1,786</td>
<td>2,800</td>
</tr>
<tr>
<td><strong>Blood Bank</strong></td>
<td>743</td>
<td>439</td>
<td>1,182</td>
</tr>
<tr>
<td><strong>Pharmacy</strong></td>
<td>753</td>
<td>282</td>
<td>1,035</td>
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<td><strong>Neurophysiology</strong></td>
<td>96</td>
<td>251</td>
<td>347</td>
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<td><strong>Pulmonary Function</strong></td>
<td>108</td>
<td>187</td>
<td>295</td>
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<td><strong>Total</strong></td>
<td>35,229</td>
<td>44,383</td>
<td>79,612</td>
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Use of the system by voluntary users
Attitude toward the system
## Effect on Work

<table>
<thead>
<tr>
<th></th>
<th>Accuracy</th>
<th>Speed</th>
<th>Ease</th>
<th>Interest</th>
</tr>
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<tbody>
<tr>
<td>Definitely worse</td>
<td>4</td>
<td>15</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Probably worse</td>
<td>13</td>
<td>24</td>
<td>13</td>
<td>10</td>
</tr>
<tr>
<td>No difference</td>
<td>88</td>
<td>54</td>
<td>48</td>
<td>147</td>
</tr>
<tr>
<td>Probably better</td>
<td>204</td>
<td>192</td>
<td>182</td>
<td>190</td>
</tr>
<tr>
<td>Definitely better</td>
<td>236</td>
<td>260</td>
<td>294</td>
<td>195</td>
</tr>
<tr>
<td>Total</td>
<td>545</td>
<td>545</td>
<td>545</td>
<td>545</td>
</tr>
</tbody>
</table>
- Use of the system by voluntary users
- Attitude toward the system
- Educational power of the system
Use of the system by voluntary users
Attitude toward the system
Educational power of the system
Effect of the system on quality of care
Φ Indirect Evidence
Indirect Evidence

Computing that offers information requested and advice on how to use it, with more ease, speed reliability, and accuracy than otherwise possible, is improving the quality of care.
Φ Direct Evidence
Direct Evidence

The time to act on important clinical events is significantly reduced when the physician is reminded or alerted by the computer of the need to act.
Direct Evidence

(Bates, Kuperman, Teich, et al.):

Physicians at Brigham and Women’s Hospital, who now routinely use the computing system to request laboratory tests and prescribe medications...
Φ Direct Evidence

(Bates, Kuperman, Teich, et al:)

...make significantly fewer errors.

(serious errors in medications have been reduced by 55%)
Use of the system by voluntary users
Attitude toward the system
Educational power of the system
Effect of the system on quality of care
Cost of the system
Use of the system by voluntary users
Attitude toward the system
Educational power of the system
Effect of the system on quality of care
Cost of the system
Effect of system on hospital finances
Time needed to collect bills in relation to use of computing programs at Beth Israel Hospital

![Bar chart showing time to collect bills in relation to fiscal years and program types.](chart.png)
Time needed to collect bills in relation to use of computing programs at Brigham & Women’s Hospital

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Registration Programs</th>
<th>Clinical Programs</th>
<th>Financial Programs</th>
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</thead>
<tbody>
<tr>
<td>1982</td>
<td>100</td>
<td>80</td>
<td>50</td>
</tr>
<tr>
<td>1983</td>
<td>100</td>
<td>80</td>
<td>50</td>
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<td>1984</td>
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<td>80</td>
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<td>1985</td>
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<td>1986</td>
<td>100</td>
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<td>1987</td>
<td>100</td>
<td>80</td>
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</tr>
<tr>
<td>1988</td>
<td>100</td>
<td>80</td>
<td>50</td>
</tr>
</tbody>
</table>
“Analysis of 1353 questionnaires from 12 lectures showed that student concentration rose sharply to reach a maximum in 10-15 min, and fell steadily thereafter. The data suggest that the optimum length of a lecture may be 30 instead of 60 minutes.”

Cybermedicine for the Patient
Fig. 6.1 The LINC (Laboratory Instrument Computer) in use in a medical interview in 1968. (Reproduced from Slack WV, Van Cura LJ. Patient reaction to computer-based medical interviewing. *Computers and Biomedical Research* 1968; 1:527-531 with permission.)

The First Study: A History of Allergies
Comparison Between Physicians and Computer when Interviewing Patients About Problems with Allergies

<table>
<thead>
<tr>
<th>Problems</th>
<th>Problems Detected by Both Physician &amp; Computer</th>
<th>Problems Detected by Physician Only</th>
<th>Problems Detected by Computer Only</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urticaria</td>
<td>0</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>Allergic rhinitis</td>
<td>2</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Asthma</td>
<td>4</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Drug allergy</td>
<td>7</td>
<td>0</td>
<td>1</td>
</tr>
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</table>

Slack, W.V. et al, New England Journal of Medicine, 1966
Yielding Control

Φ requesting permission to proceed
Yielding Control

Φ requesting permission to proceed
Φ providing sufficient information
Yielding Control

Φ requesting permission to proceed
Φ providing sufficient information
Φ respecting priorities
Yielding Control

- requesting permission to proceed
- providing sufficient information
- respecting priorities
- offering alternatives
Yielding Control

- requesting permission to proceed
- providing sufficient information
- respecting priorities
- offering alternatives
- respecting the right to decide
Yielding Control

- requesting permission to proceed
- providing sufficient information
- respecting priorities
- offering alternatives
- respecting the right to decide
- respecting the right not to decide
Yielding Control

- requesting permission to proceed
- providing sufficient information
- respecting priorities
- offering alternatives
- respecting the right to decide
- respecting the right not to decide
- helping with uncertainty
Yielding Control

- requesting permission to proceed
- providing sufficient information
- respecting priorities
- offering alternatives
- respecting the right to decide
- respecting the right not to decide
- helping with uncertainty
- respecting reluctance to respond
Patient-Computer Dialogue

A Computer-Based Health Care Interview for Hospital Personnel
The Seven Health-Related Sections of the Interview

- General medical history
- Nutrition history
- Exercise patterns
- Habits
- Safety
- Environment
- Stress
Stress

In the PAST MONTH have you felt sad, discouraged or hopeless?

1. Yes
2. No
3. Maybe
4. Don’t understand
5. Skip it

Answer: 1
Stress

In the PAST MONTH has life sometimes seemed as if it’s not worth living?

1. Yes
2. No
3. Maybe
4. Don’t understand
5. Skip it

Answer: 1
Stress

When life seems like it’s not worth living, it’s often helpful to speak to someone about these feelings.
Stress

There are several places where you could call at any time to speak in confidence about these feelings.
Stress

Help is available any time day or night through the:
Employee Assistance Program - (617) 123-1234

Samaritans - (617) 222-3131

Or you can always contact the Emergency Room (Ext. 3337)

Please be assured that whatever you say will be kept confidential
**In the past month have you felt sad, discouraged, or hopeless?**

<table>
<thead>
<tr>
<th>Response</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>811</td>
<td>42%</td>
</tr>
<tr>
<td>No</td>
<td>890</td>
<td>46%</td>
</tr>
<tr>
<td>Maybe</td>
<td>190</td>
<td>10%</td>
</tr>
<tr>
<td>Don’t understand</td>
<td>12</td>
<td>1%</td>
</tr>
<tr>
<td>Skip it</td>
<td>34</td>
<td>2%</td>
</tr>
</tbody>
</table>
In the past month has life sometimes seemed like it’s not worth living?

- Yes: 106 (6%)
- No: 812 (42%)
- Maybe: 57 (3%)
- Don’t understand: 3 (0%)
- Skip it: 33 (2%)
Cybermedicine for the Patient

Concerns about the computer as a negative, depersonalizing influence would prove unfounded.
Preference
Computer vs. Doctor or Nurse

- Doctor or nurse: 46%
- Computer: 39%
- No preference: 12%
- Skip it: 3%
Assessment of the Interview

Interview Worthwhile  90%
Easy to understand  93%
Informative about health  37%
Length about right  68%
Did you sometimes want to ask more than you wanted to tell? Did you sometimes want to tell the computer more than it asked?

- Yes: 16%
- No: 78%
- Uncertain: 6%

- Yes: 50%
- No: 42%
- Uncertain: 8%
Revelation in the Absence of a Face-to-Face Encounter

(Abreaction or Disinhibition)
Revelation in the Absence of a Face-to-Face Encounter

Computer-based interview of potential blood donors elicited more HIV-related factors in the health histories than the standard questionnaire and interpersonal interviewing methods currently in use at the Red Cross.
Computer-Based Screening for HIV Risk

More Honest with Computer

Equally Honest

More Honest with Human Interviewer

Locke SE, et al. JAMA, 1992
Cybermedicine for the Patient

Premise:
The largest, least well utilized health-care resource, worldwide is the patient or prospective Patient

Possible solution:
The Interactive computer is well positioned to help patients to help themselves.
When the forces of supply and demand dictate it, patients do very well in managing even complex medical problems.

Example: Type I Diabetes
Patient-Computer Dialogue

Φ Urinary Tract Infection
Patient-Computer Dialogue

- Teaching program for use of the computer
- General medical history, conditions for referral, and referral if indicated
- History referable to urinary tract infection
- Urine culture
- Discussion of therapy
- Patient’s Choice about treatment
- Therapy
- Return Visit
After mastery of the keyboard, the program offers a bit of reinforcement, e.g. “You have a nice touch with the keys.”
Patient-Computer Dialogue

If it is OK with you, we would now like to ask a few questions about urinary symptoms...
Are you bothered by pain or burning when you urinate?

1. Yes
2. No
3. Maybe (don’t know)
4. Don’t understand
5. Skip it
Patient-Computer Dialogue

Of these:  
1. How well does the medicine work?  
2. How much does it cost?  
3. How safe is it?  
4. How often must it be taken?  
5. Is it a pill or an injection?  
6. Can I get well without it?  

Which is most important to you:  1
Of these: 1. How well does the medicine work?
2. How much does it cost?
3. How safe is it?
4. How often must it be taken?
5. Is it a pill or an injection?
6. Can I get well without it?

Which is most important to you: 1
and which is least important: 5
You indicated that knowing how well sulfa works is perhaps most important to you...

Let’s consider this first.
Patient-Computer Dialogue

Before deciding about sulfa, would you like to go over anything again?

1. Yes
2. No
3. Maybe (don’t know)
4. Don’t understand
5. Skip it
Very well then...would you like to

1. Take sulfa
2. Take nothing
3. Consider another medicine
4. Uncertain (can’t decide)
Patient-Computer Dialogue

It seems that you took some extra time with your answer. Does this mean that you’ve been:

1. Thinking it over and feel you’ve made the right choice?
2. Trying to get things clear but aren’t sure about your choice?
Patient-Computer Dialogue

We hope it’s OK then, to ask again what is your decision?

1. Uncertain (can’t decide)
2. Consider another medicine
3. Take nothing
4. Take sulfa
Results (46 Patients)

10 referred by the program for further evaluation

35 decided to take sulfisoxazole

1 decided to wait for culture, which was negative
Patients’ Reaction to the Computer

Was the computer considerate?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>34</td>
</tr>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Maybe</td>
<td>0</td>
</tr>
<tr>
<td>Don’t understand</td>
<td>0</td>
</tr>
<tr>
<td>Skip it</td>
<td>2</td>
</tr>
</tbody>
</table>
Patients’ Reaction to the Computer

How has it been to decide for yourself about taking sulfa?

A good thing 30
Better left up to someone else 1
No preference either way 3
Not sure 2
Patient-Computer Dialogue
Comparison with the clinician
Patient-Computer Dialogue
Comparison with the clinician

Disadvantages
Patient - Computer Dialogue

Comparison with the clinician

Φ disadvantages
  – less interactive
Patient-Computer Dialogue
Comparison with the clinician

Φ disadvantages
  - less interactive
  - insensitive to most (but not all) nonverbal information
Response Latency vs. Age

- **8 seconds**
- **NSE LATENCY**
- **MEAN RESPONSE LATENCY**

Age (years)
- 18-30: 265
- 31-40: 88
- 41-50: 36
- 51-60: 36
- 61-70: 17
- 71-80: 16

- **“No” Responses**
- **“Yes” Responses**
- **“All” Responses**
Patient - Computer Dialogue
Comparison with the clinician

Φ disadvantages

- less interactive
- insensitive to most (but not all) nonverbal information
- difficulty with free text and spoken words
Patient-Computer Dialogue
Comparison with the clinician

Φ disadvantages

– less interactive
– insensitive to most (but not all) nonverbal information
– difficulty with free text and spoken words
– lacking existential human qualities
Patient-Computer Dialogue
Comparison with the clinician

Φ advantages
Patient-Computer Dialogue
Comparison with the clinician

Φ advantages

– reliability and consistency
Patient-Computer Dialogue
Comparison with the clinician

Φ advantages

– reliability and consistency
– automatic processing
Patient-Computer Dialogue
Comparison with the clinician

Φ advantages

– reliability and consistency
– automatic processing
– economy: the patient does the data entry
Patient-Computer Dialogue
Comparison with the clinician

Φ advantages

– reliability and consistency
– automatic processing
– economy: the patient does the data entry
– availability (of increasing importance)
Patient-Computer Dialogue
Comparison with the clinician

Φ advantages
– reliability and consistency
– automatic processing
– economy: the patient does the data entry
– availability (of increasing importance)
– anonymity (when desirable)
Patient-Computer Dialogue
Comparison with the clinician

Φ advantages
– reliability and consistency
– automatic processing
– economy: the patient does the data entry
– availability (of increasing importance)
– anonymity (when desirable)
– individualization without accusation
Patient-Computer Dialogue
Comparison with the clinician

Φ advantages
– reliability and consistency
– automatic processing
– economy: the patient does the data entry
– availability (of increasing importance)
– anonymity (when desirable)
– individualization without accusation
– tracking
Patient-Computer Dialogue
Comparison with the clinician

Φ advantages

– reliability and consistency
– automatic processing
– economy: the patient does the data entry
– availability (of increasing importance)
– anonymity (when desirable)
– individualization without accusation
– tracking
– multilingual
Patient-Computer Dialogue
Comparison with the clinician

Φ advantages
- reliability and consistency
- automatic processing
- economy: the patient does the data entry
- availability (of increasing importance)
- anonymity (when desirable)
- individualization without accusation
- tracking
- multilingual
- helpful with hearing disability
Patient-Computer Dialogue
Comparison with the clinician

Advantages
- reliability and consistency
- automatic processing
- economy: the patient does the data entry
- availability (of increasing importance)
- anonymity (when desirable)
- individualization without accusation
- tracking
- multilingual
- helpful with hearing disability
- endurance (unaffected by fatigue)
Cartoon removed due to copyright restrictions.
“Computers successfully replace psychotherapists in Boston experiment (News Item).”
Cybermedicine for the Patient

Dialogue between patient and doctor is the mainstay of clinical medicine, *but with problems*

Patient-computer dialogue is one possible Solution, *but is also with problems*

The “Interactive Benjamin Spock,” the Internet, and the Personal Health Record
Patient-Computer Dialogue

Patient Site (a secure Web Site)
Patient-Computer Dialogue

Patient Site (a secure Web Site)

view results of diagnostic studies
Patient-Computer Dialogue

Patient Site (a secure Web Site)

- view results of diagnostic studies
- view medications
Patient-Computer Dialogue

Patient Site (a secure Web Site)

view results of diagnostic studies
view medications
request prescriptions
Patient-Computer Dialogue

Patient Site (a secure Web Site)

- view results of diagnostic studies
- view medications
- request prescriptions
- request appointments and referrals
Patient-Computer Dialogue

Patient Site (a secure Web Site)

- view results of diagnostic studies
- view medications
- request prescriptions
- request appointments and referrals
- communicate with doctors & staff
Patient Site (a secure Web Site)

- view results of diagnostic studies
- view medications
- request prescriptions
- request appointments and referrals
- communicate with doctors & staff
- computer-based medical interview (exp)
Cybermedicine Medical Interview
Preliminary Study – 48 patients

- 6400 Total screens available
- 249 Screens presented to all patients
- Screens presented per patient
  - Median 622
  - Mean 545
  - Range 374–753
- Estimated time to complete interview 44 – 88 minutes
Cybermedicine Medical Interview Outline

- Reason(s) For Appointment
- Problem List (in patient’s words)
- Medications
  - Current medications
  - Allergies or adverse reactions
- Preventive Measures
- Positive Findings (taken from review of systems)

Personal and Social History
- Residence
- Marital history
- Living conditions
- Children
- Education
- Occupation
- Habits
- Dietary supplements
- Exercise

Review of Systems
- General Health
- Lymph Nodes
- Skin
- Hematopoetic System
- Rheumatology
- Allergies
- Endocrine system
- Immunizations
- Childhood Infections
- Eyes, Ears, Nose, Mouth, and Throat
- Sexually Transmitted Diseases
- Gastrointestinal System
- Respiratory System
- Genitourinary system
- Psychiatric History
- Nervous System

Family History
Have you been having any pain in your chest?

- Yes
- No
- Uncertain (Don't know, Maybe)
- Don't understand
- I'd rather not answer
Cybermedicine Medical Interview
Cardiovascular System

* Chest pain: most recently within the past month; onset within the past month; left sided in location; sharp in nature; intermittent in occurrence; typically seconds in duration; no radiation to shoulder; not brought on by activity; no relief with rest; moderate in intensity; unrelated to breathing; no diagnosis of angina

* Hypertension: first diagnosed within the past 10 years; currently taking a thiazide, which has been helpful; pressure 'moderately high' before starting medication, in 'normal range' now

History Negative for: orthopnea, feet or ankle edema, calf pain, hypersensitivity to cold, palpitations, skipped heart beats, tachycardia, diagnosis of arrhythmia, diagnosis of coronary artery disease, myocardial infarction, cholesterol elevation, rheumatic fever, phlebitis, and anticoagulant therapy
Cybermedicine Medical Interview

Personal and Social History

   Residence: house; one flight of stairs
   Marital History: currently married; uncertainty about year of marriage; living with wife; spouse in good health; no previous marriages; never fearful of anyone in the home
   Biological children: none
   Education: college graduate
   Occupation: currently employed with job(s) described as 'engineer'; other daily activities listed as work about the home, visiting with friends, and 'skiing, reading, photography'
   Habits: never smoked cigarettes, cigars, or a pipe; no coffee; no tea; alcohol, typically 1-2 drinks several times a week; usually wine; always careful not to drink and drive; uses seat belts regularly; no unsanctioned drugs or unsanctioned use of prescription medications
   Exercise: exercises regularly by walking and bicycling, at a moderate level of activity
   Dietary Supplements: none reported
# Cybermedicine Medical Interview Preliminary Study Evaluation

**How easy were the questions to understand?**

<table>
<thead>
<tr>
<th>Very hard</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Very easy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>2</td>
<td>4</td>
<td>7</td>
<td>35</td>
<td></td>
</tr>
</tbody>
</table>
How respectful of your feelings were the questions?

Not at all  1  2  3  4  5  6  7  8  9  10  Most

0  0  0  0  0  2  0  2  9  35
Information Technology in the Healthcare System of the Future

A Hope for the Future: The ClinHaven
Cartoon removed due to copyright restrictions.
Poking fun at doctor’s handwriting.
Information Technology in the Healthcare System of the Future

Questions for the Future