



Personal Medical Computing

Most physicians are still computer illiterate. Our lives and medical practice are depending more and more on our ability to use computers and to take advantage of what they have to offer. The lecturer will review how computers can assist in our everyday lives and in our practice of medicine; this will include a brief discussion of the Internet, research, presentations, word processing, spreadsheet, statistical programs, and QA/CQI.

- Provide basic information on how to become computer literate in the 1990s.
- Explain the different computer applications pertinent to medical practice.
- Assess how and what type of computer system to purchase.

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Room # N227
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FACULTY

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Personal Medical Computing

Jonathan M. Teich, MD, PhD

I. Course Description

1. Computer Literacy 101 -- an overview of computers and the information world from a functional standpoint -- what can they *do* for you?
2. Major concepts to help you effectively understand computers in personal use and in medical practice

II. Objectives

1. Become conversant with major computer concepts
2. Understand major classes of applications
3. Have an introductory sense of how you can use these applications in your work and your practice
4. Be aware of trends in medical uses of computers by providers and patients
5. Have a fighting chance of understanding what your 9-year-old is talking about

III. Course Outline

A. *Hardware*

1. **FOR SALE: HEWLETT PACKARD Vectra VL
PII-400/64/8.4/24X/10-100T WIN NT \$1298**

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- a) Trade name/ model: Vectra VL
 - b) Processor type: Pentium II
 - c) Processor Speed: 400 MHz
 - d) Supplied RAM: 64 Megabytes
 - e) Hard disk: 8.4 Gigabytes
 - f) CD-ROM: 24X speed
 - g) Ethernet connection ("10-100T")
 - h) Operating system: Win NT
2. What makes a difference?
 - a) In general, system performance is most driven by the amount of RAM and by the processor type/speed
 - b) RAM can usually be expanded cheaply

B. Operating Systems

1. The environment within which your applications run
 - a) How you get to the app you want
 - b) Provides services for the application to access the user interface and the data stores
2. Windows 95 (or 98) – by far the most common.
Also: Macintosh OS, Linux
3. Windows NT – for servers, serious workstations.
Also: Unix

4. A Web browser is sort of a mini-operating system, layered on top of a real one and hiding much of it

C. Practical Applications

1. Word Processor
2. Presentation (e.g., PowerPoint)
 - a) To make real slides and overheads, electronic slides
 - b) Bring in graphs, tables, images
3. Spreadsheet
 - a) For data that requires calculation or graphing
4. Database
 - a) For data that requires complex filtering, querying and reporting
5. Organizers and PIM's
6. Microsoft dominates the market (Word, PowerPoint, Excel, Access, Outlook) although there are other contenders (Lotus: WordPro, Freelance, 1-2-3, Approach, Organizer; Corel: WordPerfect, etc.)

D. The Internet

1. History: ARPAnet of the 60's-70's; academic network of the 80's; worldwide phenomenon since 1995
2. Domains and Internet routing

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- a) E-mail: bob@acep.org
 - b) Web: <http://www.acep.org>
 - c) IP address: 38.252.233.6
3. E-mail
- a) E-mail clients
 - b) attachments
4. The Web
- a) Started with the invention of HyperText Transfer Protocol (http) – a method by which a file belonging to one domain could access a file from any other domain directly
 - b) Invention of the Web browser (Mosaic) made it possible to render that file on screen as text – the access points became “links”
 - c) HyperText Markup Language (HTML) provided a standard so the browsers could show fonts, colors, graphics...
 - d) Modern Web browsers (Internet Explorer, Netscape, Lynx, Opera) compete for features, HTML improvements
 - e) Now in over 1/3 of US homes, most businesses, libraries
5. Web Search engines
- a) Find Web content by topic
6. Plug-ins, Javascript, Java, and ActiveX
- a) Enhancements to run applications that do things that HTML can't – interactive

games, movies, tickers...

7. Security on the Internet

- a) Concerns: multiple waystations; browser cache left on the computer; easy to go "back" and find others' work; viruses and worms and Trojan horses (oh my!); easy to fake being someone else; password theft
- b) Resolution: Secure Sockets Layer (SSL, the little 'lock' or 'key' on your browser); page expiration and tight browser control; encryption of mail and digital certificates; SecureID cards
- c) By Christmas season 1998, the public became convinced that they could put their Visa card number onto the Internet safely. This opened the floodgates for e-commerce

8. High-speed connections

- a) Typical "28.8" Modem: about 2800 bytes/second
- b) Cable modem, digital subscriber line (DSL, sometimes ADSL): up to 100,000 bytes/second; access is patchy

9. Remote connections

- a) Multiple ports, e.g., local access numbers for AOL
- b) Virtual private networks (VPN's) – secure access to data from anywhere

E. Whiz-Bang Concepts -- facts and fantasy

1. Voice recognition

2. Wireless

3. PDA's

F. Y2K

1. Anything I put into the syllabus in June will be obsolete by October
2. Relates to old practice of aggressive saving of memory space, when memory was expensive; the "19" seemed unnecessary. No one expected that the programs would still be running by now
3. Typical problem: a service shuts itself off because it thinks it's 1900, which is out of its preprogrammed dates of safe operation
4. Multi-billion \$\$ cost of remediation
5. Cottage industries, survivalists, opportunists, arising in droves
6. Probably more problem from hoarding by those in fear of the bug than by the bug itself
7. Best stance: moderate safety precautions

IV. Computers in Medical Practice

A. Hospital information systems

1. Main classes of applications:
 - a) Administrative
 - (1) ADT (admit/discharge/transfer), registration, provider database, CME
 - b) Clinical
 - (1) See below

- c) Financial
 - (1) Billing, accounts, supply, payroll
- d) Research
 - (1) Grants administration, queryable databases

B. Clinical information systems

1. Data review (labs, reports, EKG's, images) – traditional and still most used application
2. Documentation systems
 - a) May help in navigating the managed care morass: HIPAA, E&M coding, payor rules
3. Order entry and clinical decision support
 - a) Shows substantial ability to reduce adverse events and reduce costs
 - b) Complex to implement
4. Specialized ED software
 - a) Tracking and alerting
 - b) Documentation
 - c) Coding
 - d) Patient instructions
 - e) Communication: 'expects', PCP letters

C. Access to knowledge

1. Many journals are available on-line; almost all have TOC's and abstracts on the Internet

2. On-line or CD-ROM textbooks, reference sources (e.g., Micromedex)
3. Next step: interactive access to knowledge directly from an application

D. Information for patients

1. Commercial 'portal' sites provide news articles and light-to-moderate information for patients: drkoop, WebMD, Intellihealth, Oasis
2. Patients glean info (good or bad) through chat groups and Usenet groups ("newsgroups"); special-interest Web sites (e.g., NCI); random Web searches
3. Efforts starting to determine and show the quality of a site's information
4. Future: patient-to-doctor communication, access to personal records, telemedicine and home care

E. Research

1. Access to national databases and registries
2. Standards – HL7, DEEDS, UMLS

V. For Further Information

A. Organizations

1. AMIA – www.amia.org
2. ACP – www.acp.org

B. Reading

1. Springer-Verlag series on medical informatics – many titles, at medium level

2. Handbook of Medical Informatics – higher level, online at
http://www.mieur.nl/mihandbook/r_3_3/handbook/home.htm
(note: those are underscores, not spaces)

C. Courses

1. AMIA summer tutorial and fall tutorials (DC, November)
http://www.amia.org/meetings/f99/general_info.html
(note underscore between “general” and “info”)
2. Stanford Informatics course (CA, summertime) --
<http://scpd.stanford.edu/pd/campus.html>

VI. To Contact Dr. Teich:

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