INTERNAL MEDICINE RESIDENT ROTATION

COMPUTERS IN MEDICINE

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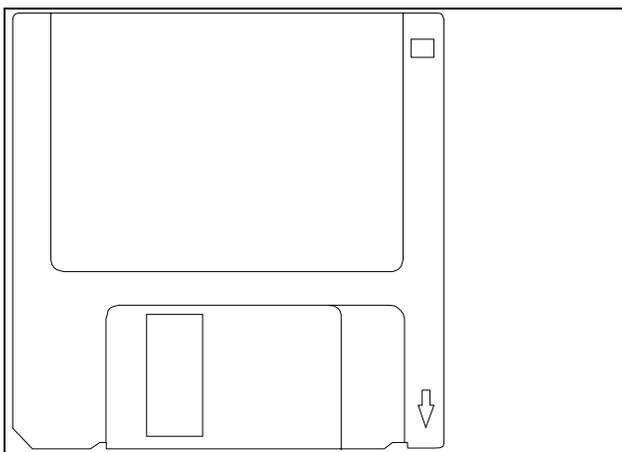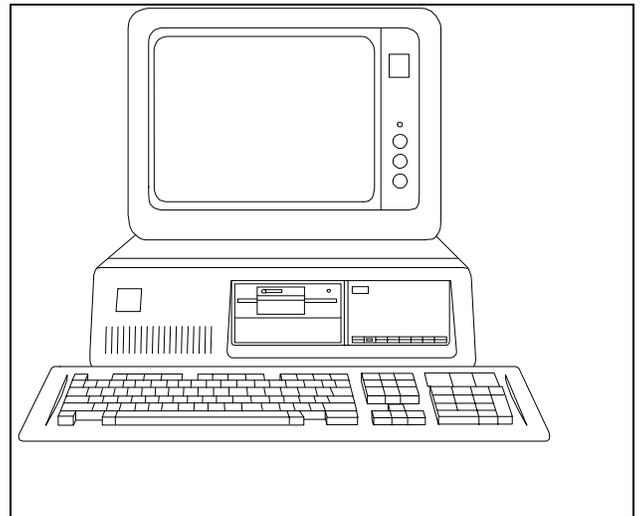**REFERENCE MATERIALS**

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INTERNAL MEDICINE RESIDENT ROTATION: COMPUTERS IN MEDICINE

GOAL

To provide training and experience in computing and medical informatics to enable physicians to competently and successfully use computer systems to collect, store, manage, communicate and exchange information for the purposes of life-long medical education, patient care, research and for personal and professional growth.

The "Core Objectives" section includes the set of knowledge and skills that the authors believe all graduating residents should possess to enable them to productively use computers for medical purposes and facilitate the acquisition of additional medical computing skills over time. The "Non-core Objectives" section includes a collection of optional or advanced experiences that can augment medical computing capabilities but are generally not considered essential at the introductory level.

CORE OBJECTIVES

Objective 1.   General Computer Literacy: Demonstrates knowledge of fundamental computing principles to enable informed decision making around the issues of hardware and software use, installation, maintenance, purchase and protection.

I.   "Computer literacy for PC-based computers"

    1. How Computers Work:

        Lecture/Multimedia Demonstration

        Tutorial: How Multimedia Computers Work (CD-ROM)

        Individual review and practice

    2. Introduction to Microsoft Windows and Windows 95

        Lecture/Demonstration: Introduction to Microsoft Windows

        Tutorial: Microsoft Windows 95 Made Easy (CD-ROM)

        Windows command terminology

GUI	window
left vs right click	double click

drag and drop	sizing, moving windows
opening folders, files	cut/copy and paste/delete
minimizing vs closing windows	scroll bars
switching between windows	menu bars
tool bars	task bar
Start button	File: Run
Getting Help	ROM
Control Panel	My Computer
Recycle bin	Windows Explorer
Installing new hardware, software	Desktop properties
Creating, naming shortcuts	arranging icons

3. Terminology: Residents will know basic terminology important to the use of computers

microcomputers	autoexec.bat
mainframe computers	config.sys
directories	batch (*.bat) files
files: filename.ext(ension) long file names	baud
bits	boot
bytes	boards/cards
DOS	RAM
K (KB)	ROM

MB, GB, TB	files vs directories
*.exe files	FAT
floppy disk drive	A: B: C: etc. drives
hard disk drive	hardware
CD-ROM/optical drives	software
tape drives, zip drives	modem
monochrome	input/output
CGA, EGA, VGA, SVGA	programs/programming
CPU/microprocessor	8088, 286, 386, 486, Pentium
serial/parallel ports, devices	mouse/trackball
SCSI ports, devices	printers (dot-matrix, laser)
.	device=
.___ ___.	ctrl-alt-del MHz
prompt pg (e.g., C:\>)	path=
A:	COM ports
C:	multi-tasking
CPU time-sharing	high-memory area (HMA)
expanded memory	640 KB DOS memory limit

How objective accomplished: Lecture/discussion (Introduction to Computers)

Computer-based tutorial (How Multimedia
Computers Work)
Practice/problem-solving sessions with attending

4. Disk organization: Residents will understand the principles of disk
files, directories, sub-directories. Can organize hard
and floppy disks to facilitate information storage,
retrieval, preservation and transfer

How objective accomplished: Learning to use DOS commands when needed (see
objective 3)

5. DOS Commands: Residents will be familiar with basic DOS
commands

e.g. assign   chkdsk (/f)
      chdir (cd\)   copy
      copy con   date
      del   dir (/p, /w)
      diskcomp   diskcopy
      erase   format (± /s)
      mkdir (md\)   move
      print (device=lpt1)   prompt
      rename   rmdir (RD\)
      time   tree
      type   ctrl commands: ctrl-C, ctrl-S

      DOS shell programs (e.g., MS-DOS Window, Norton Commander)

How objective accomplished: Lecture/discussion (Using DOS)
DOS shell program training (see above choices)
Computer-based tutorial (DOS Help)
Practice/problem-solving sessions with attending

6. Purchase/Protection: Residents will understand basic principles for
selecting and protecting computers for
personal/professional use:

a. variables relevant to selecting a computer or software program

    e.g. cost, power, memory (dynamic vs mass storage), speed,
          compatibility, expandability, graphics, color, multi-tasking,
          WYSIWYG, portability, back-up, communication

b. protecting computers from data loss or damage

e.g.   temperature, humidity, dust, sun exposure, food, static electricity, power surges, sudden power loss, interference, computer "viruses", backup disks, automatic timed backup, floppy disk handling, file security (locking files, passwords, etc.), avoiding unintentional formatting, disk recovery programs, restoring deleted files

How objective accomplished: Lecture/discussion (Purchasing and Protecting your Computer)

7.   Computers and Copyright Laws: Residents will be aware of basic issues related to software copy-protection, copyright, copying programs, etc.

How objective accomplished: Lecture/discussion (Computing and the Law)

Objective 2.   Understand and apply the principles of computer-assisted bibliographic retrieval

1.   MEDLINE and other National Library of Medicine database searching

2.   Other remote databases (online, CD-ROM)

3.   ACP Journal Club on Disk

How objective accomplished: Lecture/discussion (Introduction to MEDLINE Searching)

Computer-based tutorial ("How-To" Grateful Med Tutorial)

Practice searching sessions with attending

Practice with WINSpirs program

Objective 3.   Learn to use electronic textbooks to allow rapid, comprehensive access to medical information

1.   Example: clinical internal medicine

Scientific American Medicine (SAM-CD)

Stein Internal Medicine

ACP Library on Disk

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2. Examples: basic science textbooks

Keyboard Publishing TextStacks (microbiology, pathology, pharmacology)

How objective accomplished: Lecture/discussion (Use of Electronic Textbooks in patient care)

Computer-based practice

Objective 4. ***Productively use other computer-assisted instruction (CAI) programs for advancing education and training***

1. Examples:

Scientific American Medicine - DISCOTEST

Cardiac Auscultation: Clinical cardiology auscultatory simulation

ACLS program

MKSAP X and Subspecialty MKSAP - ACP Library on Disk

How objective accomplished: Computer-based practice

Objective 5. ***Gain facility with expert system applications for computer-assisted diagnosis/decision support***

1. Example:

Quick Medical Reference (QMR)

How objective accomplished: Lecture/discussion (Computer-assisted diagnosis)

Computer-based practice

Objective 6. ***Use patient management programs to facilitate patient care***

1. Drug Information, Side Effects and Interactions programs

DrugREAX

PDR Drug Interactions and Side Effects

2. Health maintenance reminder and advice programs

3.   Patient information and advice programs

Adult Health Advisor

How objective accomplished: Lecture/discussion (Computerized patient management tools)

Computer-based practice

Objective 7.   Understand the principles, challenges and potential implementation of electronic medical records

1.   Data capture, input and display

2.   Database management, reporting and archiving

3.   Relationship to larger medical/hospital information systems

How objective accomplished: Lecture/discussion

Objective 8.   Demonstrate competence in word processing for patient care, communication and scholarly productivity

How objective accomplished: Lecture/discussion (Introduction to Word Processing using Microsoft Word)

Produce a Curriculum Vita or prepare a lecture handout

Objective 9.   Effectively use electronic communication strategies

1.   Understand fundamentals of computer telecommunications (modems, fax)

2.   E-mail via MSU Pilot Mail and Eudora

3.   Remote computing

4.   InterNet and World Wide Web via Netscape

5.   Remote database access

How objective accomplished: Lecture/workshop (Introduction to e-mail and the InterNet)

Regular electronic communication during and following computing elective

***Objective 10. Establish and maintain a computerized personal reference and
bibliographic database***

       1.   Example: Papyrus Bibliography System

<u>How objective accomplished</u>: Lecture/demonstration (Introduction to Bibliographic
Management Systems)

          Import citations from a MEDLINE search

          Prepare lecture handout or manuscript with citations and
bibliography

NON-CORE OBJECTIVES

***Objective 11. Use presentation graphics applications to facilitate effective educational
and scholarly communications***

       1.   Examples:

          Microsoft PowerPoint

          Visio

<u>How objective accomplished</u>: Lecture/demonstration (How to make your own
presentation slides)

          Prepare lecture slides or poster materials for presentation

***Objective 12. Recognize the role of office computerization in facilitating delivery of
effective patient care***

       1.   billing

       2.   appointment calendar

       3.   transcription (word processing programs)

       4.   health maintenance prompting programs

       5.   patient education materials programs

       6.   computerized history forms (patient vs. physician-completed)

7. computerized medical records

8. card files (name, address, phone #, etc.)

How objective accomplished: Lecture and demonstration

Objective 13. *Be able to use statistics programs to analyze data for administrative or scholarly purposes*

    1. Examples:

        SigmaStat

How objective accomplished: Lecture/demonstration (Computer-assisted statistical analysis of research data)

        Select and use a program to complete statistical analysis of a data set

Objective 14. *Understand central concepts necessary to enter data into a database program for later query and analysis*

    1. Examples:

        Microsoft Access

    2. Example applications:

        procedure logs
        program evaluation
        residency applicants
        research data

How objective accomplished: Lecture/demonstration (Principles of computer-assisted database management)

        Build, enter data and query a data set

Objective 15. *Be able to set up a computerized spreadsheet for data input, retrieval and analysis*

    1. Examples:

        Microsoft Excel

Lotus 1-2-3

2.   Example applications:

procedure logs
call schedules
conference attendance/evaluation
research data

How objective accomplished: Lecture/demonstration (Using spreadsheet programs)

Build, enter data and perform several functions on a spreadsheet

Objective 16. Learn computer-assisted strategies for improving professional productivity using time and self management applications

1.   Examples:

personal planners
calendars
calculators
to-do lists
project management programs
fax modems
e-mail

How objective accomplished: Lecture/discussion (Time- and self-management)

Demonstration and practice with several of the above

Objective 17. Gain familiarity and experience with computer-based testing systems

1.   Future computerization of board examinations, specialty review

How objective accomplished: Lecture/demonstration (Computer-based testing systems: NBME-CBT project)

Objective 18. Gain familiarity and experience with handheld computing devices

1.   HP200LX palmtop computer and applications

How objective accomplished: Lecture/demonstration

Practice on own palmtop

PERFORMANCE SITES

1.   B-301 Clinical Center (Dr. Zaroukian's office)
2.   A-225 Clinical Center - Internal Medicine Module
3.   MCMC-Penn clinic
4.   The ECHT Laboratory (Educational Computing for Health Training):

    1st Floor Life Sciences Building, West End (Doug Waggott,
    director)
    many Windows and Macintosh systems with a large number of
    programs
5.   Michigan Capital Medical Center
        Medical Library
6.   Sparrow Hospital
        Library
        Critical Care conference room
7.   Home or other sites with attending permission

REFERENCE MATERIALS

1.   Dr. Zaroukian's office (B-301 Clinical Center)
        Handouts
        Articles, brochures, files, programs
        Computer Magazines: PC Magazine
                                 M.D. Computing
        Manuals/User's Guides
        Help screens/documents: on-disk
                                 see individual programs
        Additional Materials: Michigan Capital Medical Center Library
                                 and Clinic
                                 ECHT Laboratory
                                 MSU Computer Center (esp. User
                                 Information Center)

RESIDENT COMPUTER PROJECTS

Residents completing this rotation are expected to generate several products that demonstrate their ability to use the computer to retrieve, organize and manage information. Producing presentation quality materials is one measure of these skills. As such, residents are expected to produce and submit or present:

1.   A Curriculum Vita using Microsoft Word

2.	Lecture, paper or poster materials (overheads, text, graphics, slides) for their own or other resident's upcoming presentations (e.g., ACP Associate's Meeting, senior resident conferences, clinic didactic sessions, M & M conferences)

3.	Completing MEDLINE search on topic agreed to in discussion with attending

4.	Down-loading MEDLINE search results into Papyrus bibliography system

5.	Write (i.e., word process) a review of at least one software program or hardware item of your choice for future use by other residents

6.	Elective Research Project:	may complete an independent research project (discuss with attending in advance)

7.	See assignment sheet for updated assignments.

END-OF-ROTATION EXAMINATION

1.	A brief mastery quiz on terminology and techniques taught and practiced during the rotation (see sections on computer literacy)

2.	A single GRATEFUL MED MEDLINE searching assigned exercise

3.	A set of corrections and changes to make in a document created in WordPerfect

4.	Creating a finished bibliography of articles using the Papyrus Bibliography program and a chosen Journal format

5.	Others (to be announced in advance)

RESIDENT EVALUATION CRITERIA

Residents will be evaluated using an evaluation form on a 1 to 9 grading scale as follows:

1-3	Unsatisfactory
4-6	Satisfactory
7-9	Superior

Criteria will be based on evidence of the accumulation and practice of <u>newly-</u> acquired skills in view of the resident's set of skills at entry. As in most intellectual endeavors, enthusiasm, curiosity, initiative and problem-solving creativity are the hallmarks of successful self-learning as it relates to learning computer skills. These attributes will be observed by the attending physician during the rotation and evaluated in part by the **RESIDENT COMPUTING PROJECT REQUIREMENTS** and **END-OF-ROTATION EXAMINATION** as described above.

Since it is the desire of the attending physician of this rotation to customize the educational experience to the specific perceived needs of the resident, trainees are requested to describe previously obtained competencies and state any specific educational requests early in (or even prior to) the rotation to optimize the usefulness of the experience.