Slide 1

Installation and Maintenance
of Health IT Systems

Unit 1
Elements of a Typical EHR
System

Component 8/Unit 1   Health IT Workforce Curriculum   1
                            Version 1.0 Fall 2010

Topic 8-1: Elements of a Typical
EHR system.

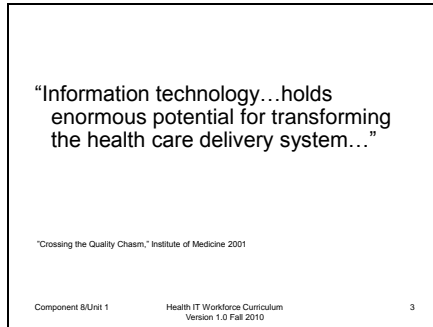Slide 2

What We'll Cover…

- The IOM's Healthcare Improvement Initiative and Technology's Role
- EHR Systems
  - Defined
  - Then and Now
  - Advantages to EHR Systems
- EHR Software Elements
  - Client - Server Model
  - Server Applications vs Client Applications
  - EHR Model and Components
- EHR Hardware Components
  - Server
    - Internal vs External
  - Clients
    - Workstations
    - Laptops and Tablets
  - Miscellaneous Hardware
    - PDAs
    - Scanning and Medical Equipment
- Network Elements
  - WAN, LAN
  - Remote Access
  - Assessing Network needs

Component 8/Unit 1   Health IT Workforce Curriculum   2
                            Version 1.0 Fall 2010

Welcome to heath IT
Workforce's 8th component:
Installation and Maintenance of
Health IT Systems.

Today's first lecture, Health IT
System Elements, is designed to
give you a brief overview of a
typical Electronic Health Record
(EHR) system. Today, we will
discuss The Institute of
Medicine's six aims torward
improving healthcare, what is an
EHR and how it has evolved.
Additionally, we also will outline
types network elements an EHR
system needs to function as well
as typical hardware and software
components found in an EHR
system.

Slide 3

> "Information technology…holds enormous potential for transforming the health care delivery system…"
>
> "Crossing the Quality Chasm," Institute of Medicine 2001

Component 8/Unit 1   Health IT Workforce Curriculum   3
Version 1.0 Fall 2010

The Institute of Medicine serves as adviser to the nation to improve health. As an independent, scientific adviser, the Institute of Medicine strives to provide advice that is unbiased, based on evidence, and grounded in science. The mission of the Institute of Medicine embraces the health of people everywhere.

In 2001, the United States ranked 37th worldwide for quality of healthcare. That same year, the Institute of Medicine compiled a report listing 13 recommendations designed to revamp the nation's healthcare system. One of these core recommendations was a call for a renewed effort on the part of the government and private sectors to build an information infrastructure to support healthcare delivery, community health, quality measurement and improvement, public accountability, as well as improving research and clinical education.

The committee further noted that information technology…holds enormous potential for transforming the healthcare delivery system" and challenged the healthcare arena to virtually eliminate handwritten clinical data by the end of the decade.

The Electronic Heath Record system, though not born from this effort, certainly has seen renewed life and product evolution as the healthcare arena struggles to meet the IOM's challenge to improve healthcare delivery on a national scale. Today, nearly 25 percent of physicians reported using full or partial electronic medical records in their practices in 2005, which represents a 31 percent increase from 2001 data.

Reference: http://books.google.com/books?id=vAfn5LFcGfEC&printsec=frontcover&dq=Crossing+the+Quality+Chasm&source=bl&ots=7FrNdxx_SJ&sig=H-mEij5yiFUvIH-

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Slide 4

A New Health System for the 21stCentury

Six Aims for Improving
Health Care Quality
   1. Safe
   2. Effective
   3. Patient-centered
   4. Timely
   5. Efficient
   6. Equitable

Component 8/Unit 1   Health IT Workforce Curriculum   4
                              Version 1.0 Fall 2010

The IOM listed six aims in improving health care quality:

1. To make healthcare environments more safe for their patients
•To provide more effective healthcare
•To make health care more patient centered - that is ensure that the patient is more involved in the decision making process and that the patient has a better understanding of the healthcare choices available to him or her
•To improve the timeliness of healthcare service
•To make the procees of providing healthcare, as a whole, more efficent
•To work toward the elimination of helthcare disparities among diverse populations… ensuring that all patients have equal access to healthcare

Throughout the remainder of our course, think about each of the EHR systems you will be evaluating and ask yourself how each of them adequately addresses these six aims.

Slide 5

A Patient Record System

• Any patient record system includes:
  – People
  – Data
  – Rules and Procedures
  – Processing and Storage Devices

So, what is an electronic health record anyway?

According to the *Computerized Patient Record*, published in 1991 by the Institute of Medicine, an electronics health record system is defined as "The set of components that form the mechanism by which patient records are created, used, stored, and retrieved." A patient record system is usually located within a health care provider setting. It includes people, data, rules and procedures, processing and storage devices (e.g., paper and pen, hardware and software), and communication and support facilities."

Reference: http://www.himss.org/Content/Files/EHR_Functional_Model_Ballot.pdf

Slide 6

A Complete EMR System

- Computerized orders for prescriptions
- Computerized orders for tests
- Reporting of test results
- Physician notes.

Component 8/Unit 1   Health IT Workforce Curriculum   6
                           Version 1.0 Fall 2010

The federal government has defined a complete EHR system as containing four basic functions: computerized orders for prescriptions and other therapies, computerized orders for tests, reporting of test results, and physician notes. To date, however, no official standard based on this definition has been reached and which of these records are stored electronically is determined largely by each individual healthcare practice.

http://patients.about.com/od/electronicpatientrecords/a/emr.htm

Slide 7

The EHR System

- Key Components
  – Provides "longitudinal health data" on individuals
  – Provides immediate, yet secure, electronic access
  – Enhances quality, safety and efficiency of patient care
  – Makes health care more efficient

Component 8/Unit 1   Health IT Workforce Curriculum   7
                           Version 1.0 Fall 2010

Likewise, the Institute of Medicine has also listed the key capabilities any EHR system should address as "(1) a longitudinal collection of electronic health information for and about persons, where health information is defined as information pertaining to the health of an individual or health care provided to an individual; (2) immediate electronic access to person- and population-level information by authorized, and only authorized, users; (3) provision of knowledge and decision-support that enhance the quality, safety, and efficiency of patient care; and (4) support of efficient processes for health care delivery."

It is important to note these definitions while evaluating your present and prospective EHR systems …as an effective EHR system will ultimately be judged

by how well it can adequately satisfy all these objectives.

Note: Longitudinal data collection involves repeated observations of the same items over long periods of time — often many decades.

Reference: http://www.himss.org/Content/Files/EHR_Functional_Model_Ballot.pdf

Slide 8

EHR Systems…Then and Now

Then…
- Earlier EHR systems required extremely expensive computer hardware
- Core components usually ran on UNIX and often incurred expensive training costs
- Rapid progression of technology meant technology was outdated almost as soon as it was installed

Component 8/Unit 1   Health IT Workforce Curriculum Version 1.0 Fall 2010   8

The Electronic Health Record, (or EHR or EMR) has undergone a wide variety of important innovations over the past ten to fifteen years, most of them on a cost reduction basis for the practitioner.

Earlier electronic medical record systems required extremely expensive computer hardware, as an example. Most of these systems usually ran on UNIX, a powerful, but somewhat limited operating system which basically meant that training for these systems was costly. What's more, during the 1990s computer technology was experiencing a significant boom which meant that days after a system was installed, there was frequently a far better one being released, making that system near obsolete right out of the box. The lack of usability of these made adoption a very scary idea for most doctors, which undoubtedly kept only the most cutting edge institutions from adopting the EMR software.

Slide 9

EHR Systems…Then and Now

Now…
- Fast, low cost PC systems permeate the workplace often less than $500 each.
- Improved Network protocols make updating and Maintenance easier and more cost effective.
- Windows compatible systems reduced training costs.

Component 8/Unit 1   Health IT Workforce Curriculum   9
                            Version 1.0 Fall 2010

During the mid 2000s, however, PCs sprang up virtually everywhere. And with this came a real cutting of startup costs. Today, extremely fast computers are available for less than $500 per terminal in some cases, making EHR adoption much easier. What's more, electronic medical record systems are simply better thanks to the adoption & evolution of graphical user interfaces, most commonly on the Windows platform . This interface makes learning electronic medical record systems extremely easy.

With training costs being dramatically cut, along with networking of computers making updating and fixes a breeze to install, the need of an additional on-staff IT people was dramatically decreased.

Today the installation of an EHR system makes more sense than ever before.

Slide 10

Advantages to EHR Systems

- Better and more accurate documentation
- More efficient storage/ retrieval of records
- Higher quality of care and fewer errors
- Lower insurance premiums and operating costs

Component 8/Unit 1   Health IT Workforce Curriculum   10
                            Version 1.0 Fall 2010

EHR systems offer many advantages to the typical clinical environment

As an example, it's well known in the industry that doctors tend to have illegible handwriting which can often lead to inaccurate and often costly data entry errors. With an EHR system, the physician enters the data directly into system interface itself, thereby dramatically reducing handwriting errors.

Massive amounts of data can be now stored digitally in a substantially smaller space, eliminating storage problems and virtually eliminating record search time. With and EHR system, healthcare staff will now have critical patient information readily at their fingertips.

These realized efficiencies combined with value-added software designed to minimize procedural and prescription errors will, over time, improve overall patient safety in clinic. Because the ability of records can be updated on the fly equates to more physician- patient interaction.

The introduction of EHR systems show a huge potential for cost savings and decreasing workplace inefficiencies. It's expected that these cost reductions combined with a reduction in patient care errors should eventually result in lower malpractice premiums, less litigation fees, and substantial cost savings.
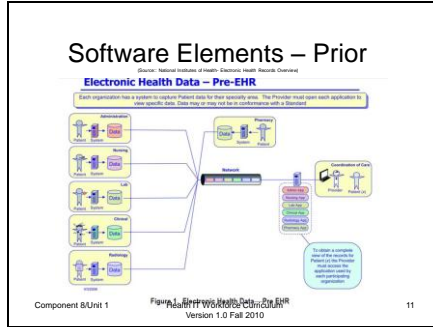
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Slide 11

Software Elements – Prior

As this illustration depicts…Prior to centralized EHR system management software, each organization or department maintained its own system and software designed to capture the data required for each specialty area. This meant that multiple databases and patient records existed and the healthcare provider was required to open a specific client application for each department and compile the data using a manual process. Additionally, data may or may not be in conformance with a standard.
 - image source page 3
http://www.ncrr.nih.gov/publications/informatics/EHR.pdf

Slide 12

Software Elements with EHR
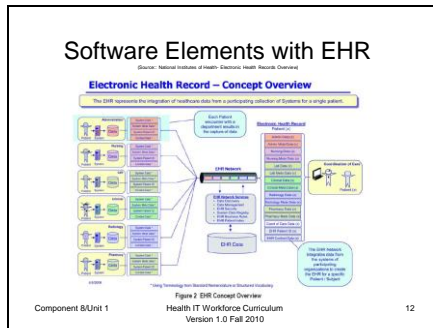
As this illustration depicts… EHR systems are designed to compile data from each of these organizational silos and compile the data within a centralized database. EHR software is designed to compile the data in a more efficient manner, allowing the healthcare provider to access and cross reference data from all available sources from one convenient client interface. This allows the provider to more effectively manage patient care.
- Image source page 5
http://www.ncrr.nih.gov/publications/informatics/EHR.pdf

Slide 13

The Client- Server Model

- Most of today's EHR systems are based on the client –server model
- **Software** - The collection of computer programs and related data that provide the instructions telling a computer what to do.
- **Servers** – Service Providers
  – Run "server application" software designed to meet client requests
- **Clients** – Service Requesters
  – Client software is designed to "request" information from a server and then present that data to the requestor in an efficient manner.
- A server and client may reside on the same "box"

Component 8/Unit 1   Health IT Workforce Curriculum   13
Version 1.0 Fall 2010

Most of today's in-house EHR systems are based on the client - server model. The Client–server model in the computing world is a structure that separates tasks or workloads between service providers, called servers, and service requesters, called clients . Usually, A client computer and a server computer are usually two separate devices, each customized for their designed purpose and communicate over a computer network. For example, a Web client works best with a large screen display, while a Web server does not need any display at all to parse out requested web pages and can be located anywhere. In some rare instances, however, both client software and server software may reside in the same system.

Software can best be defined as the collection of computer programs and related data that provide the instructions telling a computer what to do. EHRs use several different types of Application software.

A server machine is a host that is running one or more server programs which share its resources with clients. Server software is usually installed and operated from dedicated "server" hardware designed to reliably and efficiently handle large numbers of client requests.

A client machine does not share any of its resources, but requests a server's (or more than one serve's) content or service function. Client software therefore initiates communication sessions with servers which await (*listen* to) incoming requests.

Many business applications being written today use the client–server model.

http://en.wikipedia.org/wiki/Client%E2%80%93server

Component 8 / Unit 1   Health IT Workforce Curriculum   10
Version 1.0/Fall 2010

Slide 14

Typical Server Elements

Types of servers:
- Application server: computer on which the EMR/PM application resides
- Database server: computer on which the database software resides
- Citrix or terminal server: computer that supports thin client network
- Application, database, and terminal services may reside on the same computer for small installations (less than 10 users)

Typical server elements for a EHR system include:

• An application server (or group of servers) which house the EMR/ Patient management application.

• A database server where compiled patient data is stored

• Citrix or terminal servers allow the support of thin clients. Thin clients computers that require the server to fulfill much of the system's functional role. A computer terminal is an example of a thin client. It holds no real computational programming. Instead it is programmed only to focus on graphically displaying information requested to the server by the user.

In some cases, application, database, and terminals services may reside on the same computer system. However, due to the potential performance requirements each of these services, this is not recommended except in only the smallest of workplace environments.

Reference

http://www.physicianspractice.com/files/audioconference/pdfs/id_7.pdf?CFID=1675309&CFTOKEN=75588070
http://en.wikipedia.org/wiki/Thin_client

Slide 15

Server Software Elements of the EHR

- 8 Core Components (IOM)
  – Health Information and Data
  – Results Management
  – Order Entry/ Management
  – Decision Support
  – Electronic Communication/ Connectivity
  – Patient Support
  – Admin Processes
  – Reporting/ Pop. Health Management

Component 8/Unit 1   Health IT Workforce Curriculum   15
                              Version 1.0 Fall 2010

The Institute of Medicine lists 8 crucial core server elements for an Electronic Health records system. These include:

•Health information and data storage component (i.e. a database)
•Results Management application – essentially, software that actively **manages** the results - particularly lab & radiology results - that come into the EHR to try to assure that they are seen & dealt with appropriately by a clinician.
•Order Entry/ Management application – Designed to effectively route clinician orders to their proper destinations
•Decision Support application – Computer logic that presents information to help clinicians make correct decisions, such as displaying relevant reference information on the screen while orders are written or popping up warnings if an order appears inappropriate based on a patient's known allergies Electronic Communication and Connectivity software – which allows the various applications to efficiently "talk" to one another over a network
•Patient Support
•Administration Processes applications
•Reporting / Population Health management software

Vendors often supply additional modules and components customized

to meet the specific needs of individual organizations and practices.

Reference
http://patients.about.com/od/electronicp atientrecords/a/emr.htm
http://en.wikipedia.org/wiki/Decision_su pport_system

Slide 16

EHR Clients

- EHR systems make medical records available to multiple simultaneous users. Tablets, laptops and PCs allow instantaneous access for the healthcare staff who move around in the health centers.
- Clients use application software to securely connect to and poll the EHR server to fulfill user requests

Component 8/Unit 1   Health IT Workforce Curriculum   16
Version 1.0 Fall 2010

We've defined servers and their role…so what's a client do?

EHR systems make medical records available to multiple simultaneous users. Tablets, laptops and PCs allow instantaneous access for the healthcare staff who move around in the health centers.

Clients use client application software to securely connect to and poll the EHR server to fulfill user requests. After receiving te requested data, the client software then organizes and displays the data in a manner that the user can efficiently view.

Using an EHR system to read and write a patient's record is not only possible through a workstation but depending on the type of system and health care settings may also be possible through mobile devices that are handwriting capable.

Slide 17

EHR Hardware - Defined

Hardware consist of the physical components that make up a computer system.

These objects are needed to make the computer work and run properly.

Component 8/Unit 1   Health IT Workforce Curriculum   17
                           Version 1.0 Fall 2010

Let's talk briefly about hardware found in an EHR system.

Hardware can best be described as the nuts and bolts that make things work. The physical components of servers, workstations, laptops…the boxes and all the "stuff" that goes inside them are all hardware. As is printers, scanners, routers and switches.

Having the proper hardware to run your EHR system is just as important and the software components. Without the proper hardware, the system will not run as efficiently and may exhibit compatibility issues.

http://en.wikipedia.org/wiki/Hardware

Slide 18

EHR Hardware - Defined

Types of hardware most often affiliated with EHR systems include…

- Servers
- Workstations
- Laptops
- Tablets
- PDAs / Smartphones

- Flat Panel Monitors
- Scanners
- Printers
- Storage and Backup
- Shredders
- Medical Diagnostic and Treatment Items

Component 8/Unit 1   Health IT Workforce Curriculum   18
                           Version 1.0 Fall 2010

Some of the many hardware components most often attributed to EHR systems include:
Servers, workstations, laptops and tablets, PDAs (also known as Portable Digital Assistants) and smart phones, flat panel monitors, scanners, storage and backup devices including tape drives, shredding devices, and medical diagnostic and treatment devices.

These are just some of the more major hardware components you'll find in an EHR system and the network it operates on.

Slide 19

EHR Hardware - Servers

The server(s) are the "Home base" of the core EHR system components Including:
• Storing the Patient Database (Index)
• Real-time, dynamic compilation of patient information from varied sources
• Parsing user requests
• User Management tools
• Customization tools

Component 8/Unit 1   Health IT Workforce Curriculum   19
                        Version 1.0 Fall 2010

A server, in the hardware sense, is a computer designed to efficiently run server applications. In the EHR arena that includes the patient index (where patient data resides), the patient managements software and various modules designed for the parsing of user requests. They also may house user management tools for making administrative changes to the software including updates and error correction and for applying updates.

Slide 20

EHR Hardware - Servers

Picking the right server is extremely important!
• You should consult your Information Systems staff, hardware vendor, and/or consultant to determine the hardware specs required for your organization. Consult with your EHR vendor as well.
• Important items to consider include:
    – Reliability
    – Performance
    – Scalability

Component 8/Unit 1   Health IT Workforce Curriculum   20
                        Version 1.0 Fall 2010

As stated earlier, a server essentially "serves" other computers on the network. It typically houses applications and databases required by desktops or laptops to access information or run centralized programs. Because servers are a critical infrastructure component, they are usually located in a protected environment not generally accessible to the general public. Servers are expected to run pretty much continuously throughout their entire life cycle. Most enterprise – level servers are known to be very fault tolerant, and come with built in redundant hardware systems to ensure reliable operation. In many healthcare environments, even a short-term failure can cost more than purchasing and installing the system. Most of these systems come with "hot swappable" accessories (parts that can be changed out without turning off the server) to minimize downtime due to failure

or maintenance.

Servers come in all shapes and sizes. You should consult your Information Systems staff, hardware vendor, and/or consultant to determine the hardware specs required for your organization. Consult with your EHR vendor as well. In general, your server should be extremely reliable, with as many built in redundancies as possible to minimize system downtime.

Slide 21

EHR Hardware - Servers

- Storage requirements dependent on EHR/PM application, volume of scanned documents
- Rule of Thumb: 5 GB per year per provider (check with your EHR vendor)

Component 8/Unit 1   Health IT Workforce Curriculum   21
                            Version 1.0 Fall 2010

Data storage is a critical component you will have to address when deciding on the installation of an EHR system.

The storage requirements of an EHR system are largely dependent on the specific EHR/PM (patient management) application, and the volume of scanned documents.For a typical practice, a Rule of Thumb includes 5 GB/per year/per provider. It's important to discuss your patient load with your vendor to determine your short and long term storage capacity needs.

http://www.physicianspractice.com/files/audioconference/pdfs/id_7.pdf?CFID=1675309&CFTOKEN=75588070

Slide 22

EHR Hardware - Servers

• Brand (i.e. Dell vs. "white box")

• Operating system (i.e. Windows 2003)

• Processors (e.g. 2.4 Hz Xeon)

Component 8/Unit 1   Health IT Workforce Curriculum   22
                           Version 1.0 Fall 2010

Some things to consider when choosing a server include:

•Brand: is the brand of server consider reputable? How do reviews fair for the particular model you are looking at? Do they provide a warranty consistant with the instituional needs?
•Operating System: is the server designed to work well with the operating system needed to run the EHR software?
•Processors and processing speed - The higher the processing speed, the faster the computer can make computations. Is the procesor specs in line with the EHR requirements?

Slide 23

EHR Hardware - Servers

• RAM (i.e. 1 GB)

• Hard drive configuration (i.e. RAID 5)

• Network Card (e.g. 1 GB per second)

• Requires: monitor, keyboard, CD/DVD drive, UPS (un-interrupted power supply)

Component 8/Unit 1   Health IT Workforce Curriculum   23
                           Version 1.0 Fall 2010

Additional items to consider:

•RAM (Random Access Memory) - RAM is the "working memory" of the computer. Computers use RAM to store short term computations. Additional RAM allows a computer to work with more information at the same time which can have a dramatic effect on total system performance.
•Hard Drive Configuration – is there enough hard drive space to accommodate your expanding storage needs over the next year..5 years? Will it support redundant HD configurations such as RAID 5 bearing in mind that many RAID configurations dramatically increase the amount of hard drive space needed?
•Network Card – Does the network card adequately support the amount of network traffic expected on the server? Is there the capacity to add additional network cards and options for load balancing/
•Other feature s to think about for your server include monitor, keyboard, CD/DVD drive, and a UPS (un-interrupted power supply)

system in case of power outages

Slide 24

EHR Hardware - Servers

Internal vs External (hosted) Solutions

- Cost
  - Internal - Higher initial costs
  - External - Monthly fees
- Management
  - Internal - Staff needed to implement and manage the server(s) and perform software and hardware maintenance and backup duties
  - External - The customer is at the mercy of the vendor for scheduled maintenance
- Power
  - Internal - Your organization is capable of utilizing the full power of the server
  - External – Hosted solutions often share resources
- Connectivity
  - Internal – You control the speed and connectivity to the server(s)
  - External - All locations are remote, and connectivity means may be shared with other customers, reducing the speed available to you

Component 8/Unit 1   Health IT Workforce Curriculum   24
                            Version 1.0 Fall 2010

For smaller practices, the added costs of a server infrastructure may not be warranted. Hosted solutions are available for such situations. When considering a hosted solution, the se variables should be considered:

Cost

Internal - Higher initial costs

External (hosted) - Monthly fees - Will monthly fees outpace the costs of purhasing and maintaining an in house infrastructure?

Management

Internal - Staff needed to implement and manage the server(s) and perform software and hardware maintenance and backup duties

External (hosted) - The customer is at the mercy of the vendor for scheduled maintenance

Power

Internal - Your organization is capable of utilizing the full power of

the server
External (hosted)– Hosted solutions often share resources

Connectivity

Internal – You control the speed and connectivity to the server(s)
External (hosted) - All locations are remote, and connectivity means may be shared with other customers, reducing the speed available to you.

Slide 25

EHR Hardware - Clients

- Workstations
  - Connected to your server via a wired network
  - Strategically positioned throughout the work environment to facilitate convenient access
  - Most commonly used and often already in place
  - Economical

Component 8/Unit 1   Health IT Workforce Curriculum   25
Version 1.0 Fall 2010

Let's take a couple minutes to discuss client hardware.

Workstations are one of the most prevalent client systems in today's healthcare settings. A typical workstation is a high end microcomputer connected to the computer network via a wired (cabled) interface and is intended primarily to be used by one person at a time. Workstations can run a variety of operating systems including Windows 2000, XP, Windows 7, and some flavors of Linux.

Slide 26

EHR Hardware - Clients

Tablets / Laptops
- Laptops – portable computers
- A Tablet PC is a computer system that enables data entry and navigation with a stylus or electronic pen.
  - Booklets
  - Slate
  - Convertible
- Can connect Wirelessly to the server
- Uses rechargeable Batteries

Component 8/Unit 1   Health IT Workforce Curriculum   26
Version 1.0 Fall 2010

A tablet PC is a portable computer equipped with a touch screen and stylus. Also known as a **Slate** or a **Blade**, tablet PC are intended to offer a more mobile version of the PC which can used where notebooks are impractical or unwieldy, or do not provide the needed functionality. Tablet PCs usually use a wireless interface to connect to the network.

There are three types of Tablet PCs available:

•A **Booklet** PC has two separate screens and folds like a book.

•**Slate** PCs which resemble writing slates, are tablet PCs without a dedicated keyboard. For text input, users rely on handwriting recognition software via an active digitizer, or touching an on-screen keyboard using fingertips or a stylus.

•**Convertible** notebooks have a base body with an attached keyboard. Typically, the base of a convertible attaches to the display at a single joint called a swivel hinge or rotating hinge to allow for a 180 degree range of rotation.

Both laptops and tablets make use of rechargeable batteries to allow for several hours of extra mobility in the workplace without the use of a power cord.

Slide 27

EHR Hardware - Clients

Tablets / Laptops
- Advantages
  - Allow additional mobility compared to workstations
  - Saves time
  - Can be cheaper if additional infrastructure such as ports are needed
- Disadvantages
  - Typically more expensive than PCs
  - Subject to theft
  - Easily broken
  - Require additional support, cleaning, and maintenance

Component 8/Unit 1   Health IT Workforce Curriculum   27
                            Version 1.0 Fall 2010

Tablets and laptops offer several advantages as well as a few disadvantages when compared to workstations:

Advantages of laptops and tablets include:

•Laptops and tablets allow additional mobility compared to workstations
•Laptops and tablets saves time by providing a data interface at the provider's fingertips, negating the need of frequent trips to a workstation.
•Using laptops and tablets an be cheaper if additional infrastructure such as ports are going to be needed.

Disadvantages of laptops and tablets include:

•They're typically more expensive than PCs
•Their small size makes them subject to theft
•They're easily broken…the average lifespan is about three years.
•They will require additional support, cleaning, and maintenance.

Slide 28

EHR Hardware - PDAs

Personal Digital Assistants (PDAs) are devices that combine computing, telephone/fax, and networking features
- Like Tablets, most PDAs begin as pen-based, using a stylus rather than a keyboard for input.
- Allow users to remotely access patient data from any location with connectivity
- Similar advantages/ disadvantages to Tablets/ Laptops
- May require additional hardware/ infrastructure recourses to adapt

Component 8/Unit 1   Health IT Workforce Curriculum   28
                          Version 1.0 Fall 2010

Personal Digital Assistants (PDAs) are devices that combine computing, telephone/fax, and networking features Like Tablets, most PDAs begin as pen-based, using a stylus rather than a keyboard for input. PDAs allow users to remotely access patient data from any location with connectivity. They usually also contain other software specific to the user's tastes.

They offer similar advantages/ disadvantages to Tablets/ Laptops. Many providers incur the expense of a PDA since they support personal notes and applications, phone capabilities a and calendar.

Integrating PDA support into the existing computer environment may require additional hardware/ infrastructure recourses to adapt.

Slide 29

The Network

A network is a collection of computers and devices connected by communications channels that facilitates communications among users and allows users to share resources with other users.
- Important Terms
  - Ethernet
  - LAN (Local Area Network)
  - WLAN (Wireless Local Area Network)
  - WAN (Wide Area Network)
  - Bandwidth
  - VPN

Component 8/Unit 1   Health IT Workforce Curriculum   29
                          Version 1.0 Fall 2010

Let's discuss briefly the Network the EHR system will sit on and use to communicate with it's users.

First, let's define a network.

A **network** is a collection of computers and devices connected by communications channels that facilitates communications among users and allows users to share resources with other users.
Wired cabling and a protocol called Ethernet to communicate between the various components.
Ethernet uses physical wiring to connect devices. Frequently deployed devices include hubs, switches, bridges and/or routers.

Wireless LAN technology is designed to connect devices without wiring. These devices use radio signals as a transmission medium.
 Some additional terms to know include:

• **LAN (local area network)**
– Connects workstations and servers within a single demographic location
• **LWAN**
- Wireless Local Area Network
• **WAN (wide area network)**
– Connects workstations across multiple locations, often great distances.
• **Point to Point T-1 and fractional T-1**
– Dedicated broadband lines that connect locations in a WAN
• **Bandwidth**
– A rate of data transfer usually measured in bits per second
• **VPN: virtual private network**
– A way of securely accessing a specific network over the internet.
• **Firewalls**
– Firewalls are software or hardware that prevents unauthorized access to network.
– Monitors network traffic, may include VPN, virus scanning

Slide 30

The Network - Assessing Usage

• Your network must be able to support the data requirements of your EHR application.

• Insufficient network capabilities will degrade application performance and increase the risk of user rejection.

Component 8/Unit 1   Health IT Workforce Curriculum   30
Version 1.0 Fall 2010

Your network infrastructure must be able to reliably support the data requirements of your EMR application.

Insufficient network capabilities will degrade application performance and increase the risk of user rejection.

Slide 31

The Network - Assessing Usage

- How many users will need simultaneous access to the network?

- What are the bandwidth requirements of the EHR system (vendor)?

- Special bandwidth needs of scanning equipment or other medical equipment

- Sufficient connectivity between the internal resources and remote resources such as satellite facilities

Component 8/Unit 1   Health IT Workforce Curriculum   31
                           Version 1.0 Fall 2010

Some things to consider when assessing network usage:

•How many users will need simultaneous access to the network?

•What are the bandwidth (How much data can traverse the network at a given moment) requirements of the EHR system (vendor)?

•Special bandwidth needs of scanning equipment or other medical equipment

•Sufficient connectivity between the internal resources and remote resources such as satellite facilities

Slide 32

The Network - Assessing Usage

- Conduct a wireless connectivity Survey

- Explore remote connectivity options including VPN (Virtual Private Networks)

Component 8/Unit 1   Health IT Workforce Curriculum   32
                           Version 1.0 Fall 2010

In ost healthcare settings today, the use of wireless infrastructure has become a prominent medium for connecting a wide range of devices to the EHR system, making access to patient records even more efficient.

 Be sure before adding additional wireless infrastructure to your system you have adequately addressed these wireless needs…for the short and long term. Because many IT departments have limited experience at deploying wireless systems in an enterprise environment, it's important to have a consultant conduct a wireless connectivity survey to

ensure adequate coverage throughout the entire facility and to adeqautely address and potential wireless bandwidth issues.

Also, as demand for remote off-site access continues to grow, be sure to explore with your vendor how efficiently the EHR system will integrate with your existing VPN network.