You need to be able to:

- Define components of the healthcare IT environment
- Define the major types of software applications
- Describe the hardware and connectivity components
The Big Picture

- **Application Software** – acquires, processes, manages and outputs data and information

- **Hardware** – devices, processors, memory and data storage that runs the software

- **Network Connectivity** – system that connects hardware and enables transmission of information
Applications Environment

- Clinical
- Administrative
- Financial
- E-Health, E-Business, HIE
- Business Intelligence
### Figure 2-1 Application Technical Environment

<table>
<thead>
<tr>
<th>Clinical</th>
<th>Administrative</th>
<th>Financial</th>
<th>E-Business/HIE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic Health Record</td>
<td>Scheduling</td>
<td>Provider</td>
<td>Informational</td>
</tr>
<tr>
<td>- Physician Practice</td>
<td>• Physician Practice, Hospital/Facility</td>
<td>• Practice Management</td>
<td>• Searchable access to symptoms, disease information, medication information, interactive assessments, comparisons of provider organizations for quality and cost</td>
</tr>
<tr>
<td>- Hospital/Facility</td>
<td>Managing and Tracking</td>
<td>• Patient Accounting</td>
<td>Interactive Portals</td>
</tr>
<tr>
<td>PACS (Picture Archiving and Capture System)</td>
<td>• Rooms and Beds, Equipment, Medical Records, Supplies</td>
<td>• Contract Management and Decision Support</td>
<td>• Provider: Schedule appointments, view test results, e-Visits</td>
</tr>
<tr>
<td>Department Systems</td>
<td>Business Intelligence</td>
<td>Payer</td>
<td>• Payer: Research and choose health plan, reorder medications, find a physician</td>
</tr>
<tr>
<td>• Lab Radiology, Pharmacy, Dietary</td>
<td>• End-user Analysis, Date Marts, Executive Dashboards</td>
<td>• Enrollment</td>
<td>Personal Health Record</td>
</tr>
<tr>
<td>Care Setting Niche Systems</td>
<td>Common Financial</td>
<td>Claims Adjudication</td>
<td>• Maintain an electronic record of one’s health</td>
</tr>
<tr>
<td>• Emergency Department, Operating Room, Oncology, Labor and Delivery</td>
<td>• Budgeting</td>
<td>Care Management</td>
<td></td>
</tr>
<tr>
<td>Knowledge-Based</td>
<td>Common Business</td>
<td>• AR/AP</td>
<td></td>
</tr>
<tr>
<td>• Drug Interaction, Protocol</td>
<td>• Human Resources, Document Management, Facility Access, e-mail</td>
<td>• General Ledger</td>
<td></td>
</tr>
</tbody>
</table>

#### Integration
- Master Person Index
- Product Suite
- HL7 Standard
- Interface
- Single Sign on
- X12 Standard
Key Application Trends

- **Integration**
  - Master Patient Index (MPI)
  - Interface Engines, Product Suites
  - Single-Sign-on and context management
  - Medical Devices
  - Standards - HL7 (clinical) & X12 (admin – claims)

- **Vendor Application Delivery**
  - Products highly configurable, customizable
  - Speedier implementation, Less customization
  - Certification

- **Privacy and Security**
  - HIPAA & other regulations
  - Technical Controls – encryption, firewalls, etc.
  - Policy and training
The Foundation!

- Technical Infrastructure and systems
- Must adequately and reliably run application portfolio
- Must reliably deliver information and functionality wherever needed
- Must secure and protect the information
- Must be fault tolerant and recoverable
Where the Rubber Meets the Road... End-User Devices

- Personal Computers – thick/thin clients,
- POC Devices – where, how many?
- Medical Devices
- Tracking Technology - RTLS
- Voice communications – smartphones, etc.
- Audio and Video
Can We Talk?

- Ubiquitous network connectivity as a “utility”
- LAN – local area network
- WLAN – wireless LAN, 802.11x
- WAN – wide area network
- Converged voice, data and video
- Internet
- Remote access
Are you who you say you are?

And are you supposed to be here?

- Authentication and credentialing
- Access and security
- Single sign on and context management
The Engine that Drives IT

- Hardware and other systems
- Servers - physical and virtual
- Data Storage – SAN, NAS, etc.
- Firewalls and security appliances
- Data Centers and technology distribution spaces
We Do Healthcare, not IT!

Outsourcing

- HIT is a highly sophisticated ecosystem
- Application Service Providers
- Remote Hosting
- The “Cloud”
$#&% Happens! … and you had better be ready

- Business Continuity and Disaster Recovery
- This is Life Critical Information!
- Must reduce time to recovery
  - Tape backups – oh the good ol’ days…
  - Cold Sites – hours to days for recovery
  - Hot Sites - minutes to recovery
- If you don’t practice it, the plan is just words on paper
## CPHIMS Examination Detailed Content Outline

(effective March 01, 2013)

<table>
<thead>
<tr>
<th>Cognitive Level</th>
<th>Recall</th>
<th>Application</th>
<th>Analysis</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Healthcare Environment</td>
<td>22</td>
<td>6</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>1. Articulate characteristics and services of different types of healthcare organizations (e.g., hospitals, clinics, ambulatory centers, community health organizations, healthcare payers, regulators, research and academic)</td>
<td>10</td>
<td>4</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>2. Articulate characteristics of interrelationships within and across healthcare organizations (e.g., health information exchange, public, private, continuity of care)</td>
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</tr>
<tr>
<td>3. Differentiate the roles and responsibilities of healthcare information and management systems professionals within the organizational structures in which they work</td>
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</tr>
<tr>
<td>4. Describe roles of governmental, regulatory, professional, and accreditation agencies related to healthcare and their impact on clinical outcomes and financial performance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B. Technology Environment</td>
<td>12</td>
<td>2</td>
<td>0</td>
<td>14</td>
</tr>
<tr>
<td>1. Articulate characteristics of applications commonly used in healthcare (e.g., clinical, administrative, financial, consumer, business intelligence)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Articulate characteristics of technology infrastructure that support the healthcare environment (e.g., network, communications, data integration, privacy and security)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Question 1**

Patients have an expectation that healthcare providers will keep health information entrusted to them:

A. Private and secure.
B. Available Monday through Friday.
C. On paper.
D. Available for research.

**Question 2**

Data warehouses include:

A. Data from one hospital only.
B. Information from the patient.
C. Data from many different applications.
D. Financial data only.
■ Question 3

Interface engines support:
A. Interoperability and data integration.
B. Manual connections to financial systems.
C. Cloud storage of patient information.
D. Encryption of patient identifiable data.

■ Question 4

Telehealth can be used to:
A. Constrain patients to specific providers.
B. Provide specialist care to patients in rural areas.
C. Prohibit transfers of patients.
D. Mandate admissions to academic medical centers.

■ Question 5

mHealth applications can address:
A. Medical records.
B. Global health initiatives.
C. Issues concerning supply-chain inventory.
D. Only cell phones.
Question 7

Which of the following application types would be considered an example of an administrative application?

A. electronic health record (EHR)
B. picture archiving and communication system (PACS)
C. bed management system
D. general ledger system
Question 7

Correct answer: C. Bed management is primarily an administrative application. General ledger is considered a financial application.
Question 8

The pathology department has identified the need for a new application. One of the requirements for the application is that it integrates with the existing lab system. Which of the following should be considered to ensure it would meet this need?

A. hardware is compatible with the lab system hardware.
B. the application is HL7 compliant.
C. the application is made by the same vendor as the lab system.
D. the system has an export/import function for trading files.
Correct answer: B. Applications that are HL7 compliant are likely to be able to integrate with other applications more easily.
Question 9

A small physician practice is looking at implementing an EHR but is concerned about its ability to find and fund a person to support the application and the hardware it will require. Which of the following options should be considered?

A. merge with another practice that already has an EHR.
B. have the head of the practice provide support.
C. provide no support but have a “hot site” for back-up.
D. look at an EHR that is delivered by an application service provider.
Question 9

Correct answer: D. Application service providers host the hardware and software remotely and provide all support, relieving the practice from technical responsibilities.
Question 10

Which of the following are among the end-user computing devices that may be found in a healthcare setting?

1. servers
2. tablet PCs
3. medical devices
4. network routers

A. 1 and 2 only
B. 2 and 3 only
C. 1 and 4 only
D. 3 and 4 only
Question 10

Correct answer: B. Tablet PCs and medical devices are examples of end-user devices. Servers and network routers are not typically used directly by the end-user.
Question 11

Which of the following are common applications available to healthcare consumers?

A. EHRs
B. personal health records (PHRs)
C. bed scheduling applications
D. data warehouse applications
Question 11.

Correct answer: B. Personal health records are available to healthcare consumers. The other applications listed are more likely to support the clinical and administrative applications in a hospital.