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Becoming Board Certified in Healthcare Management and a Fellow of the American College of Healthcare Executives

Knowledge Area Covered in the Board of Governors Exam:

Healthcare Technology and Information Management

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Healthcare Technology/Information Management

Introduction

This subject covers both management information and clinical information systems, including computer-based support for management, assessing how current technologies and major innovations are changing the way healthcare executives manage, using information systems for short – and long-range planning, using clinical information systems, and information systems acquisitions.

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18 questions (9%) from this specific knowledge area will be asked on the Board of Governor's Exam related to the following:

- Knowledge of the role and function of information systems in operations
- Knowledge of the trends and changes in clinical technology
- Knowledge of security requirements for information management
- Knowledge of research and development of information and clinical technology

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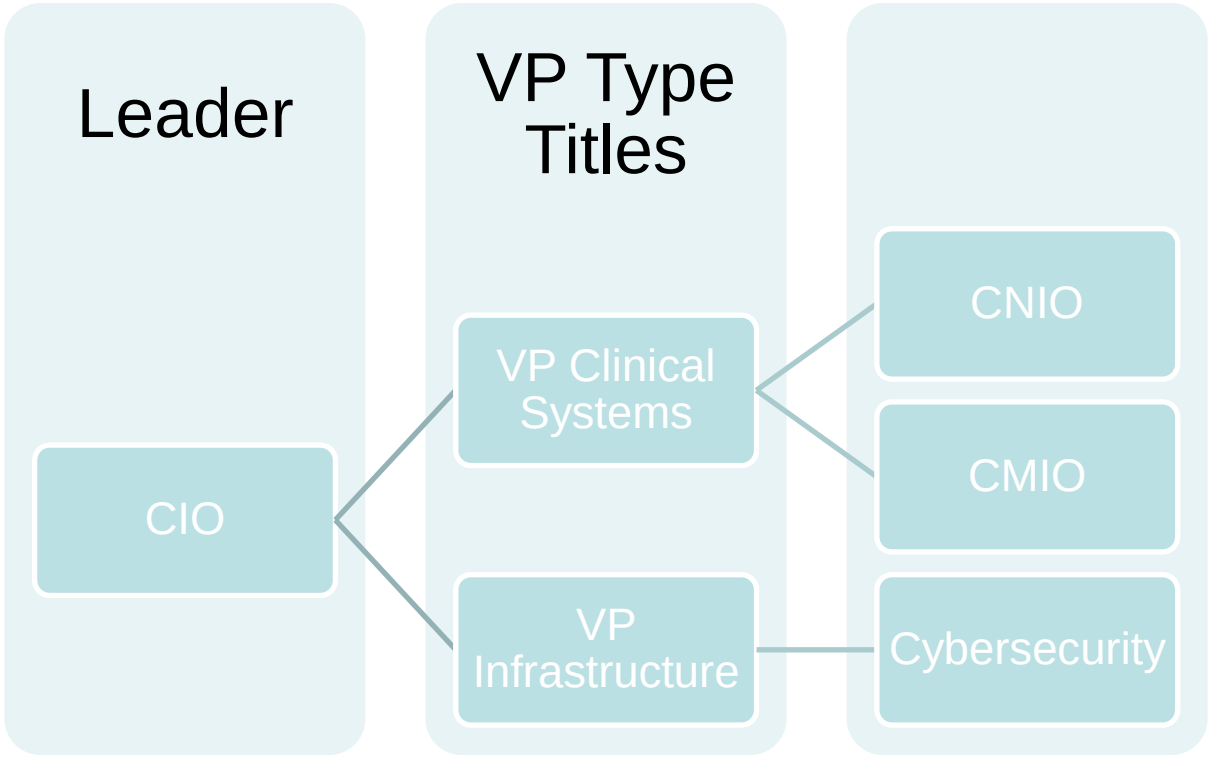
It Starts At The Top. . . CIO



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CIO

- **Member of the exec management team**
- **Chief Planner and Manager**
- **Advisor on use of information**
- **Strategic alignment of IM/IT across the enterprise**
- **Oversee IT areas**

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What Does Infrastructure Mean. . . .

- IT Service Desk
- Incident Management
- Problem Management
- Change Management
- Release Management
- Configuration Management

Q1

Why is it Important for the IT strategy to align with the organization's goals and objectives

A. To increase Medicare payments
B. To improve access to data for management, providers and consumers
C. To allow the CEO to control IT spending
D. To give the CIO a seat at the Exec Committee

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Q1 Answers

- **B**
- **Decision makers must have access to the right information in order to effect changes to processes that not only help to improve quality, outcomes and organization performance, but, also help to increase Medicare payments**
- **Ultimately, the CEO is already responsible for IT spending whether or not the IT strategy is aligned with the business strategy**

Q2

What competencies do not matter in selecting a CIO?

A. **Prior management experience**
B. **Knowledge of healthcare organization and delivery**
C. **Personal relationship with Board Member**
D. **Finance and Budgeting Skills**

Q2 Answers

- **C**
- **The CIO must have management experience, technology expertise, finance and budgeting knowledge and knowledge of healthcare organization and delivery**
- **The CIO may have a relationship with Board members but that will not directly facilitate his/her ability to lead IT functions**

Q3

How do CIO and CEO job responsibilities differ

A. Financial Management
B. HR Management
C. Strategic Planning
D. Fundraising and Development

Q3 Answers

- **D**
- **The CIO must master many of the same job skills as the CEO including strategic planning, financial management, HR management, and others**
- **The CIO does not generally have "fundraising" responsibilities in his/her portfolio**

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Q4

Membership of the IT Steering Committee should comprise of. . . .

A. **CEO, CIO, CFO, CMO, and Chair of Board**
B. **Representatives of administration, physician leadership, IS management, and major user departments**
C. **CIO and senior systems analysts**
D. **CIO and outside technical consultants**

Q4 Answers

- **B**

- **The Steering Committee will recommend priorities for system development and allocation of resources to meet strategic goals of organization**
- **The Committee should be user focused with representatives from major segments of the organization. It should not be comprised only of IS specialists**
- **Strategic IT planning decisions should be based on user needs and not dominated by current tech**

Planning and Implementation

Strategic IT Planning is. . .

Definition 1

- The process of identifying and assigning priorities to the applications of IT to assist an organization in executing its business plans and achieving its strat goals and objectives

Definition 2

- Planning that is guided by a management IS Steering Committee with representation from admin, med staff, and system users and the IS development of the organization

Planning and Implementation

Elements of a Strat Plan...

Strat Plan

- Corporate and IT goals and objectives
- Applications priority list
- Specs for architecture and infrastructure
- Software development plan
- IT management and staffing plan
- Statement of resource requirements

Implementation Plan

- Tasks, schedules, responsibilities and budget
- Examination of data, network, information and telecom needs
- Process redesigns
- Project manger identified
- Project team identified
- Quality control Plan

Success Characteristics

- Documented goals for vendor and organization
- Achieving end user buy-in
- Strong organizational sponsorship Adequate systems acceptance testing
- Well-planned end-user training
- Minimal business and service disruptions
- Plenty of data conversion time

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Q5

One of the most major elements of a strategic IT plan

A. **RFP from vendors**
B. **A list of detailed specifications for computer programs**
C. **Priorities for individual computer applications to be aligned with the strategic objectives of the organization**
D. **Specification for computer hardware installation and maintenance**

Q5 Answers

- C
- The plan should set priorities for computer applications to be developed based on the organization's strategic objectives
- Requests for proposals from vendors and hardware and software specifications are developed later in the process during design and acquisition of individual applications
- The master plan should state objectives, set priorities and estimate resources required for implementation of systems

Q6

The element *most* critical to the successful design and implementation of an executive decision support system in a healthcare organization is …

a) Availability of software for updating the database

b) Maintaining data confidentiality

c) Involvement of top management

d) Availability of network computer equipment

Q6 Answers

- **C**

- Development of an information systems plan that supports the organization's existing strategic objectives ensures that the other steps are moving the organization in the right direction.
- Hiring an information systems consultant to help the organization determine its strategic needs could be part of developing the information systems plan or even selecting the right technology, but isn't necessarily required to support either task … depends on expertise and resources available within the organization.

- Meeting with several information systems vendors to determine the scope of available technology and evaluating available hardware and software to best determine what meets the organization's needs comes after the organization has already determined its strategic objectives.

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Q7

The element most critical to the successful design and implementation of an executive decision support system in a healthcare organization is. . . .

A. Availability of software for updating the database
B. Maintaining data confidentiality
C. Involvement of top management
D. Availability of network computer equipment

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Q7 Answers

- **C**
- Availability of software for updating the database is not the correct answer because good design is not based on tools used to update a database.
- Maintaining data confidentiality should be part of the design, but is not the most critical part.
- Availability of network computer equipment does not factor into the design process.
- Involvement of top management is the most critical as it will help ensure design is aligned with organization's strategic objectives.

Government Role: to protect health and welfare of the population

- **Privacy Act**
- **HIPAA**
- **ARRA (HITECH)**
- **Affordable Care Act**

HIPAA

- Portability and Simplification
- Establish technology transaction standards
- Improve admin efficiency and effectiveness

ARRA (HIPAA updates

- Breach notification requirements
- Expanded definition of Business Associate
- Accounting of disclosures

Security Role (Cyber-Security and Asset-Security): protect sensitive information contained in IT

- People
- Facilities
- Policies
- Technology
- Equipment

Data Security

Data security

- Corporate and IT goals and objectives
- Applications priority list
- Specs for architecture and infrastructure
- Software development plan
- IT management and staffing plan
- Statement of resource requirements

Information Security Policy

- Physical Security
- Technical controls over access
- Management policies that are well known/enforced

Information Confidentiality Policy

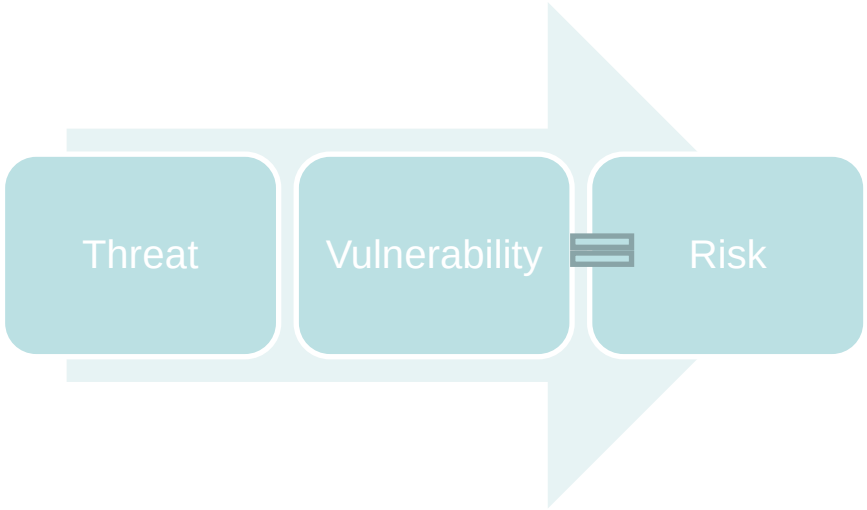
- Access Rights
- Release of information
- Special Handling
- Approved methods for communication

Management Policies

- **Written security policies, employee training, disciplinary actions for violations**
- **Technical Safeguards: Passwords, Encryption, and audit logs**
- **Physical Security: Hardware and Facilities, Data files**

Business Continuity

- **Prepare**
- **Mitigate**
- **Respond**
- **Recover**
- **Educate**



Terms You Might Hear with Data Security

- Encryption
- Biometrics
- SSO
- Data Center
- Back-Up
- Off-site
- Disaster Recovery

Q8

Which of the following is *NOT* an important component of an information security program?

a) Maintenance of user audit logs to record who has accessed data files

b) Encryption of critical information

c) Policies that require all employees to be aware of security procedures

and include training programs and disciplinary action for violations

d) Use of computer software that is HL7 compliant for data compatibility

Q8 Answers

- D

- An information security program should include physical security, technical safeguards, and management policies including automatic logging of access to data files by all users, encryption of sensitive information, and other policies to be sure employees are properly informed and trained.

- HL7 is designed to support data exchange across systems, but it is not focused primarily on information security.

Q9

The goal of HIPAA in terms of security and privacy was to …

a) Improve the efficiency and effectiveness of the healthcare system via electronic data interchange

b) Expand the privacy and security requirements of the American Recovery and Reinvestment Act

c) Provide financial incentives for implementing secure electronic health records

d) Establish privacy standards for federal government organizations only

Q9 Answers

- **A**
- The goal of HIPAA was to improve the efficiency and effectiveness of the healthcare system via electronic data interchange.
- The ARRA expanded the privacy and security requirements of HIPAA and it provides financial incentives for implementing secure electronic health records.
- The Privacy Act of 1974 established privacy standards for federal government organizations; HIPAA expanded coverage to the private sector.

Q10

What types of potential situations do not call for healthcare organization disaster planning related to information systems?

a) Hurricanes, tornados or other natural disasters

b) Terrorist, disgruntled employee, or cyber attacks

c) Unscheduled information systems downtime

d) Stock market downturn

Q10 Answers

- **D**

- All threats to disruption in services (through power failure, forced evacuation, or building damage) need to be considered when developing the organization's disaster response plan. Organizations must be able to adequately respond to the cause of service disruptions, whether fires, floods, bombings, or earthquakes, internal threats, or unscheduled information systems downtime.

- Drops in the stock market usually do not cause problems with an organization's services provided.

Q11

The best location to store a backup copy of the organization's data and information is …

a) In a building nearby the primary data center

b) In the basement of the hospital for quick access in an emergency

c) Preferably in another city in a different region of the country

d) No need to create a backup copy if your data center is hardened against attacks

Q11 Answers

- **C**

- The worst place to store backup data and information is in a building nearby the primary data center or in the basement of the hospital. If the hospital or area where the primary data center and backup data are stored is destroyed, then how can you recover?
- The best place to store backup data and information is in another city in a different region of the country. This reduces the risk of total data loss.
- Not creating a backup copy is not a good idea, even if your data center is physically hardened against attacks. Cyber attacks could still occur rendering your network unusable.

Trends in IT: EMR

STAGE	HIMSS Analytics EMRAM EMR Adoption Model Cumulative Capabilities
7	Complete EMR; External HIE; Data Analytics, Governance, Disaster Recovery, Privacy and Security
6	Technology Enabled Medication, Blood Products, and Human Milk Administration; Risk Reporting; Full CDS
5	Physician documentation using structured templates; Intrusion/Device Protection
4	CPOE with CDS; Nursing and Allied Health Documentation; Basic Business Continuity
3	Nursing and Allied Health Documentation; eMAR; Role-Based Security
2	CDR; Internal Interoperability; Basic Security
1	Ancillaries - Laboratory, Pharmacy, and Radiology/Cardiology information systems; PACS; Digital non-DICOM image management
0	All three ancillaries not installed

Trends in IT: Making The EMR Work

- **Clinical Decision Support—"rules" by which decisions are made and the ability to track compliance with those rules**
  - **Meaningful use required clinical support interventions on quality measures for any reporting period**
  - **Drug to Drug or Drug to Allergy interactions**
- **Knowledge Management**
- **Predictive Analytics/AI**

Elements of the Base EMR for Documentation

- Progress Note
- H&P
- Consult Notes
- Problem/Diagnosis List
- Discharge Summary

Tech Enabled To Assist Clinicians

- **Barcode Administration**
- **Patient Empowerment (IPADS, Alexa)**
- **Voice Technology (3M, Nuance)**
- **Hard Stops**

Underappreciated Elements of EMR

- Governance
- Disaster Recovery/Business Continuity
- Information Exchange
- Analytics And Reporting

Don't Forget the Other Systems!

- **Revenue Cycle and Business Applications**
- **ERP & Accounting**
- **Decision Support & Reporting**
- **Internal Development, WEB and IntraNet**
- **And. . . So many new innovation technologies!**

Q12

What type of system assists physicians in diagnosis and treatment planning?

a) Financial information systems
b) Clinical decision support systems
c) Office automation systems
d) Physician's Assistant information systems

Q12 Answers

- B
- Financial information systems support operational activities such as general accounting, patient accounting, payroll, contract management, and investment management.
- Office automation systems help to coordinate and manage people and workflow, link organizational units and projects, and coordinate work in the organization across levels and functions.
- Clinical decision support systems assist physicians in diagnosis and treatment planning.
- There's no such thing as Physician's assistant information systems.

Q13

Which technology trend is the combination of computer technologies and communications technologies to support healthcare provided to patients at remote locations?

a) Picture Archiving and Communications Systems (PACS)

b) Electronic Health Records (EHR)

c) Telemedicine

d) Second Life Virtual Worlds

Q13 Answers

- C
- PACS is a device that provides online storage and retrieval of medical images for transmission to user workstations. EHRs consist of an individual's medical records from all locations and sources. They're stored in digital format facilitating the storage and retrieval of records with the aid of computers. These technologies could be used as components of a telemedicine solution.
- Telemedicine is the combination of computer technologies and communications technologies to support healthcare provided to patients at remote locations.
- Second Life (SL) is an on-line virtual world developed by Linden Lab in 2003. A free client program called the Second Life Viewer enables its users, called Residents, to interact with each other through avatars allowing them to explore, meet other residents, socialize, participate in individual and group activities, and create and trade virtual property and services with one another, or travel throughout the world, which residents refer to as the grid. Although SL wasn't created for use within healthcare, it is being used by the military to analyze, prototype, develop and evaluate virtual worlds and their applicability and utility for support of military personnel.

Q14

Proprietary medical information is protected within an organization on what type of server?

a) Internet

b) Intranet

c) Extranet

d) Securenet

Q14 Answers

- **B**

• The Internet is the global communications network that allows almost all computers worldwide to connect and exchange information. So if you want to make information available publicly, post it on the Internet.

• The Intranet is a private computer network that uses Internet protocols and Internet-derived technologies, including web browsers, web servers, and web languages, to facilitate collaborative data sharing within an enterprise.

• An Extranet is a restricted network of computers that allows controlled access to a firm's internal information to authorized outsiders (customers, suppliers, joint venture partners, etc.) by connecting them (usually via Internet) to the firm's intranet.

• Securenet is actually the name of a private company.

Integrated Delivery Systems and Managed Care

Understanding that provider networks developed through mergers & acquisitions and joint ventures require electronic communications among network members; managed care contracting places a priority on financial forecasting and modeling by healthcare organizations

- **Contract Management and Payment Analysis Systems**
- **Revenue Forecasting**
- **Daily Flash (see visuals next slide)**
- **EDI (Electronic Data Interface)**
- **Contract Management**
- **Insurance Rules**
- **Bill Scrubbers**
- **Reimbursement Analysis**
- **Government Reporting and Others**

Healthcare Informatics—Various Definitions

- **Access to key information to make care or business decisions that result in the best outcome for the patients and the business**
- **The capture of data and understanding of patterns in the data**
- **To use currently available and create new data sources to drive all aspects of running an organization**
- **Maximizing the quality of care and minimizing the cost**

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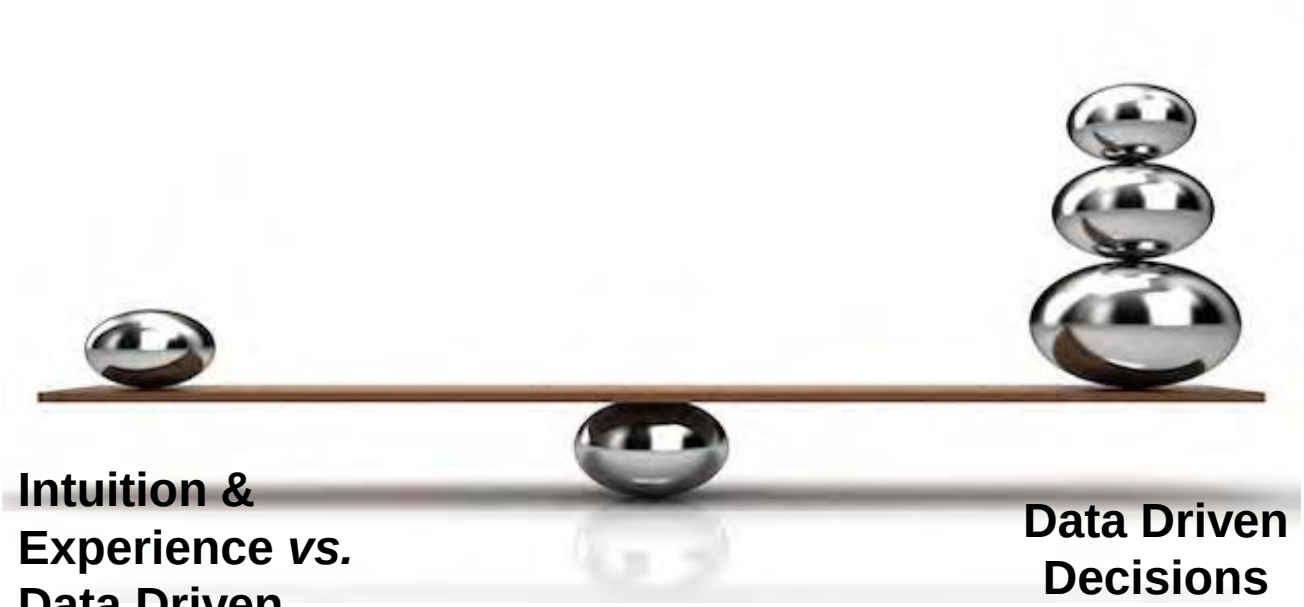
Enable balanced and informed decisions



Intuition & Experience *vs.* Data Driven Decisions

Data Driven Decisions

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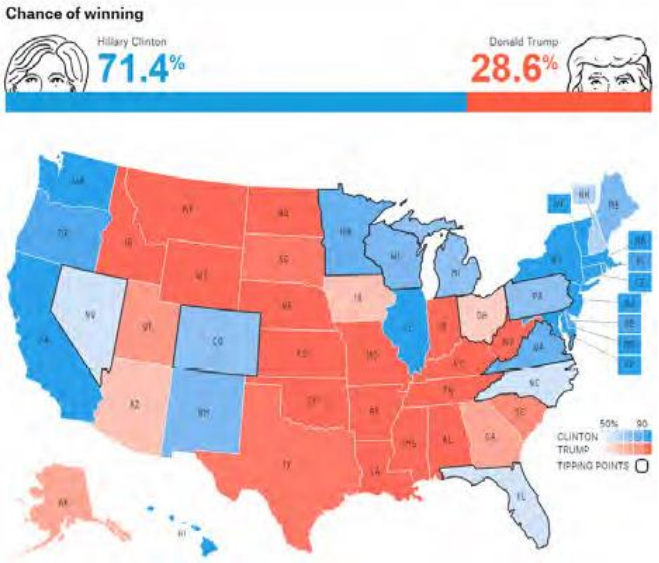
But. . .It isn't Nirvana

It's risky to apply even rigorous statistical methods to the inherently unpredictable behavior of free-will humans

- Can't deliver conclusions that are loftier than
the available data supports
- Analytics can reduce a maddeningly complex situation into something that is more understandable even when it's dead wrong



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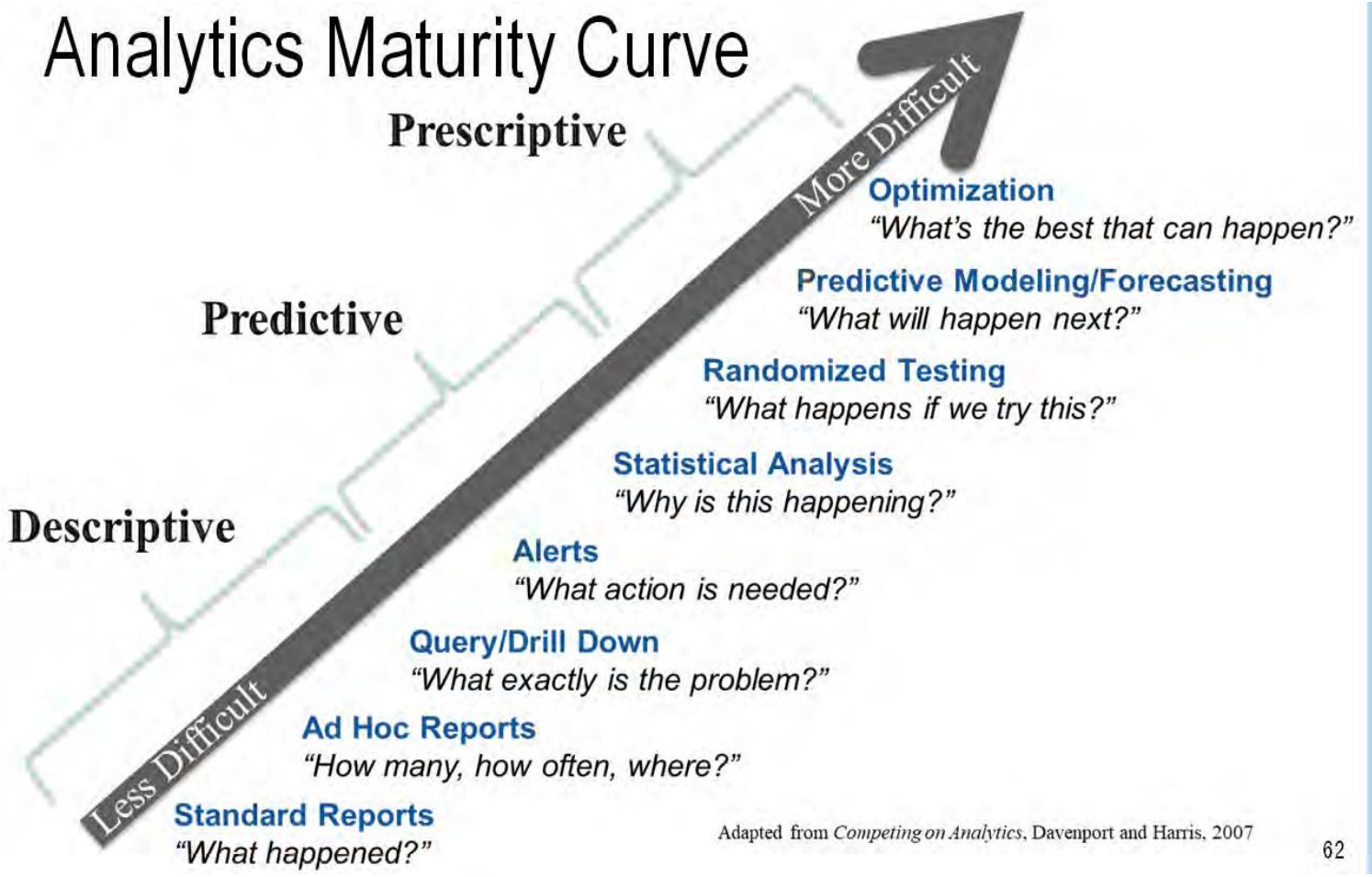
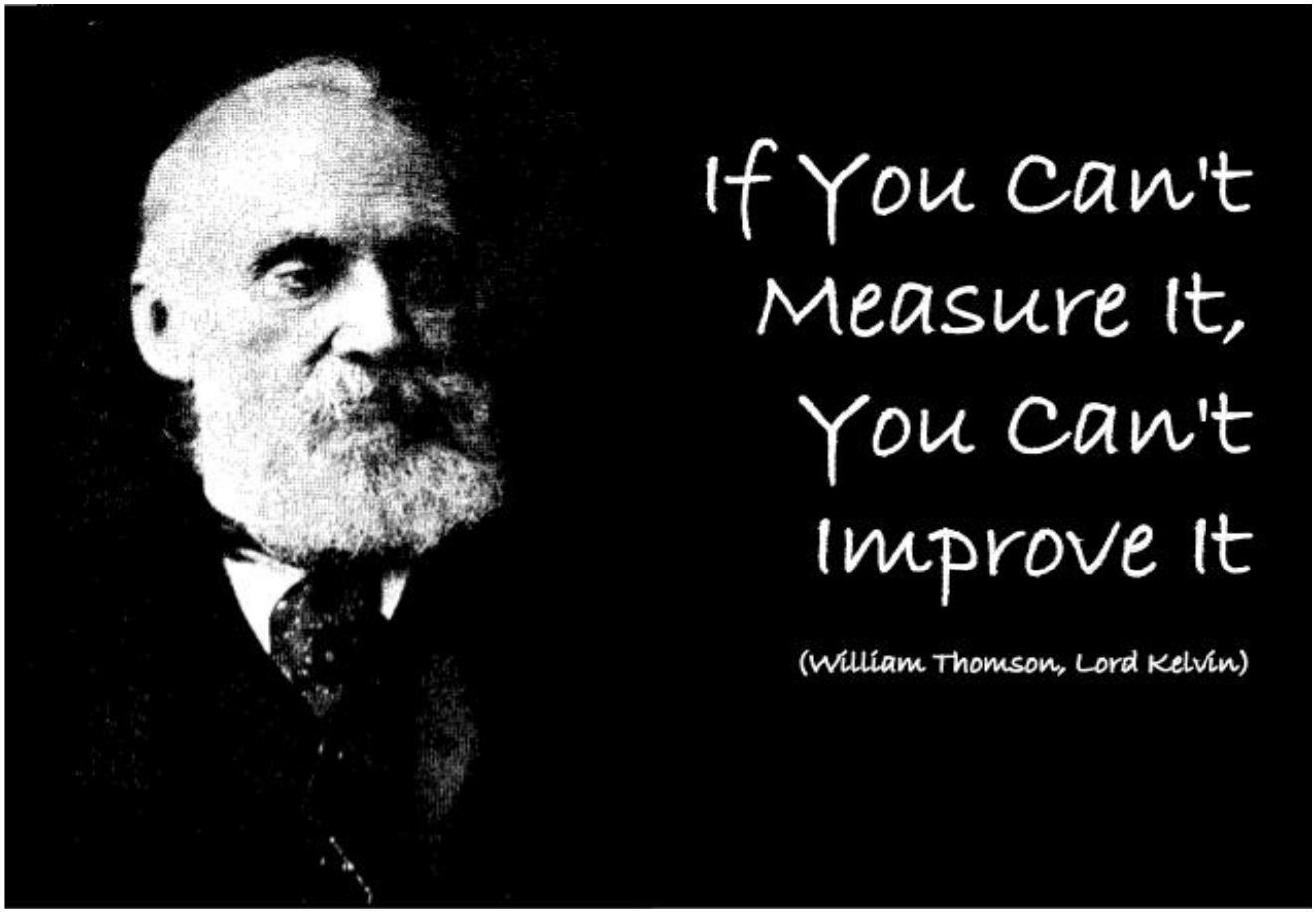

Analytics Maturity Curve
Prescriptive
Predictive
Descriptive
More Difficult
Less Difficult
Optimization
"What's the best that can happen?"
Predictive Modeling/Forecasting
"What will happen next?"
Randomized Testing
"What happens if we try this?"
Statistical Analysis
"Why is this happening?"
Alerts
"What action is needed?"
Query/Drill Down
"What exactly is the problem?"
Ad Hoc Reports
"How many, how often, where?"
Standard Reports
"What happened?"
Adapted from Competing on Analytics, Davenport and Harris, 2007
62


If You Can't Measure It, You Can't Improve It
(William Thomson, Lord Kelvin)

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Balanced Performance Scorecard

Hospital Total Rankings — Report Month: February 2005

Rank Order ➡	1	2	3	4	5	6	7	8	MHHS Avg.**
Performance Objective	FB	KM	TW	HH	SE	SW	MC	NW	
Clinical Quality Indicators	102.2	93.8	106.9	93.1	86.8	77.9	93.7	78	91.6
ALOS: Budget (YTD)	94.5	100.8	103.3	96.7	95.1	97.3	96.3	97.2	97.6
ALOS: Prior (YTD)	94	100.5	104.6	97.5	99.6	97.2	97.5	100.2	98.9
Avg Chg Per Case: Budget (YTD)	90.3	97.9	98.3	95.7	93.2	98.2	93.7	92.4	95
Avg Chg Per Case: Prior (YTD)	88.6	98.1	93	91.4	94.3	92.9	93.3	92.3	93
Avoidable Days	191.29	200*	128.46	120.53	60.47	61.12	89.79	121.42	121.6
CRM: Inpatient	92.9	99	100.5	98.3	96.8	96.7	98.3	98.8	97.7
CRM: Outpatient	101.1	99.8	100.6	100.3	96.1	97.1	95.4	99.6	98.8
Managed Care % (YTD)	98.1	96.5	102	102.1	98.3	98.5	98.6	92.2	98.3
Supplies: per Adj. Pat. Day (YTD)	98.9	108.6	100.3	93.6	96.7	94.9	95.5	92.2	97.6
Supplies: NPR (YTD)	104.9	112.1	103	97.8	104.7	94.7	94.3	94.7	100.8
Operating Perf: Budget (YTD)	200*	132.3	97.7	117.2	81.7	55.4	32.5	0	89.6
Operating Perf: Prior (YTD)	200*	114.8	94.9	109.7	69.8	63	48.4	0	87.6
Volumes: Budget (YTD)	105.6	92.1	100.3	106.1	90.5	96.4	97.6	126.2	101.9
Volumes: Prior (YTD)	100.9	94.5	102.2	102.5	94.5	98	104.2	89.5	98.3
Employee Satisfaction	106.3	103.5	103.3	99.7	97.2	100.5	101	99.2	101.3
Turnover Rates (Annualize)	121.1	110.3	98.2	110.3	75.6	103.2	87.5	103.2	101.2
Total Percentage %	117.1	109.1	102.2	101.9	90.1	89.6	89.3	86.9	98.2
Totals	1990.69	1854.6	1737.56	1732.53	1531.37	1523.02	1517.59	1477.12	1670.8

Category Key X
- Clinical Quality
- Customer Satisfaction
- Operational Excellence
- Work Place Environment

<< Back to Scorecard Dashboard

Navigation Instructions
-Click any Objective Name to view category scorecard
-Click any score to view a calculation example

Traffic Light Key X
- 100% Above Target
- 95 - 99.9% of Target
- 95% Below Target

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Daily Flash Report

Balanced Performance Scorecard >>

View Previous 3 Months: February | January | December

Traffic Light Dashboard | Data Map | Flash Notifier | About Daily Flash

(All Facilities): Summary — Report Date: 3/21/05

View Facility: All

Status	Key Indicator	Previous Day 3/20/05	Report Day 3/21/05	Report Month March MTD	Projected	Budget	% Var.	PY Same Month
--	Patient Days	1913	2082	43,290	64,066	64,286	-0.3%	59,814
■	ALOS	9.5	6.4	5.8	5.8	5.8	0.0%	5.7
■	Admits	204	432	7,384	11,060	10,999	0.6%	10,479
■	Discharges	202	323	7,456	11,135	10,999	1.2%	10,479
■	OP Diagnostic & Therapeutic Reg.	59	1625	23,561	35,944	31,468	14.2%	31,997
■	ER Visits (Log)	914	938	18,696	27,538	28,960	-4.9%	27,991
■	IP Revenue ($000's)†	5,365	10,300	200,733	300,444	298,822	0.5%	281,750
■	OP Revenue ($000's)†	999	4,866	79,317	120,147	105,888	13.5%	105,576
■	Gross Revenue ($000's)†	6,364	15,166	280,049	420,591	404,709	3.9%	387,326
■	ER Dept. Revenue ($000's)*	84	741	15,256	22,936	18,720	22.5%	19,947
--	Debit Balance ($000's)	768,566	770,205	--	--	--	--	--
--	Credit Balance ($000's)	-18,838	-18,071	--	--	--	--	--
--	Total Unbilled Balance ($000's)	152,117	152,696	--	--	--	--	--
■	Payer Mix (Managed Care %)	31.9%	39.2%	38.1%	38.2%	39.2%	-2.5%	--
--	ER Dept. Payer Mix (Managed Care %) **	24.9%	32.8%	32.7%	32.8%	--	--	--
--	Case Managment Outcomes	--	--	--	--	--	--	--
--	Daily Executive Reports (ResQ)	--	--	--	--	--	--	--
	Patient Satisfaction	**Week End. 3/5/05**	**Week End. 3/12/05**	**FYTD Avg**		**Goal**	**Variance**	
●	Inpatient Satisfaction - Overall	84.7	81.2	83.3	--	83.7	-0.4	--
●	Outpatient Satisfaction - Overall	87.9	88.7	88.5	--	89.6	-1.1	--

+ View Traffic Light Legend: Key Indicators

+ View Traffic Light Legend: Patient Satisfaction

†Revenue Retabulated Weekly
*ER Dept. Rev is a subset of OP
**Includes Acute Facilities Only

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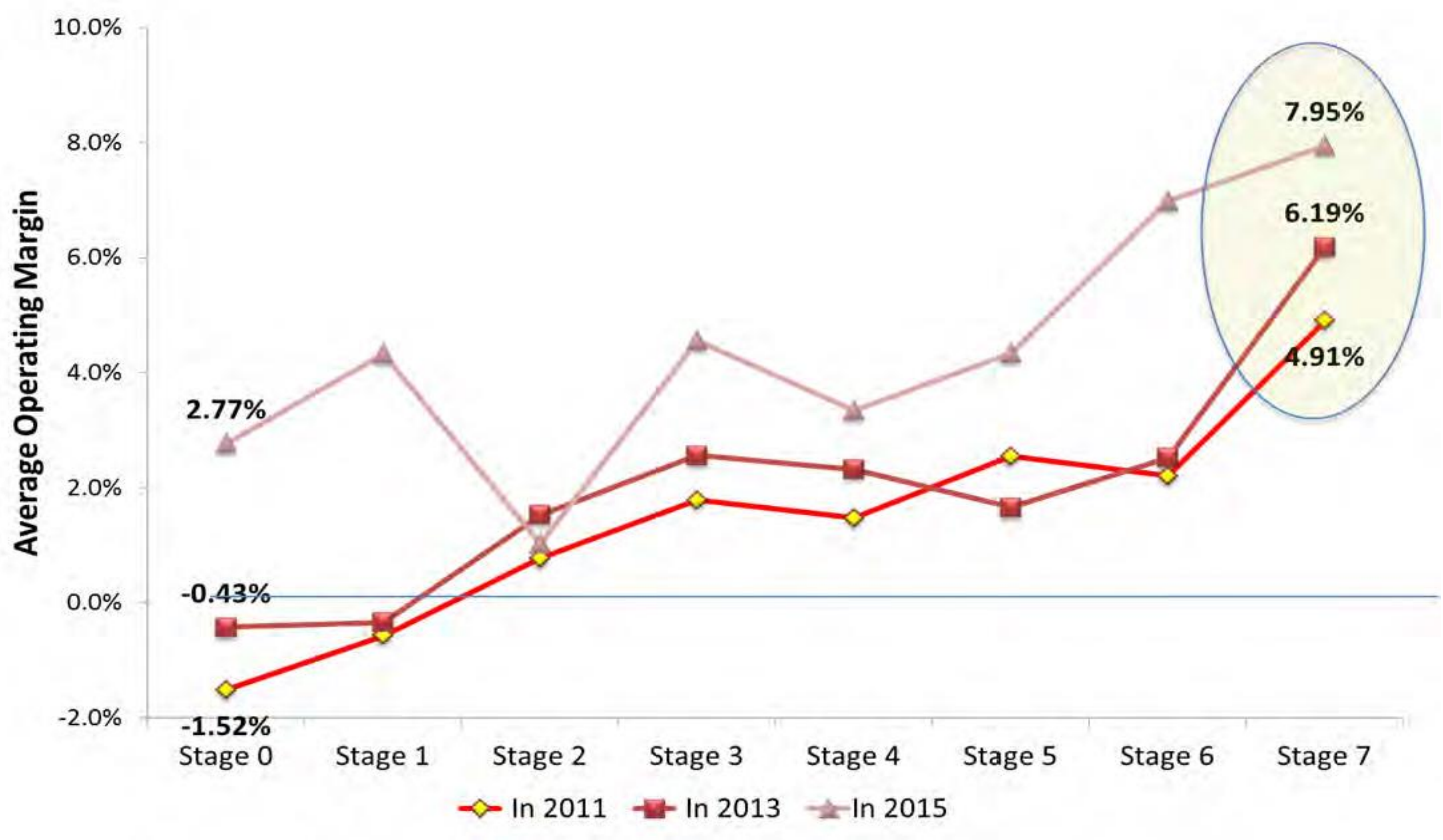

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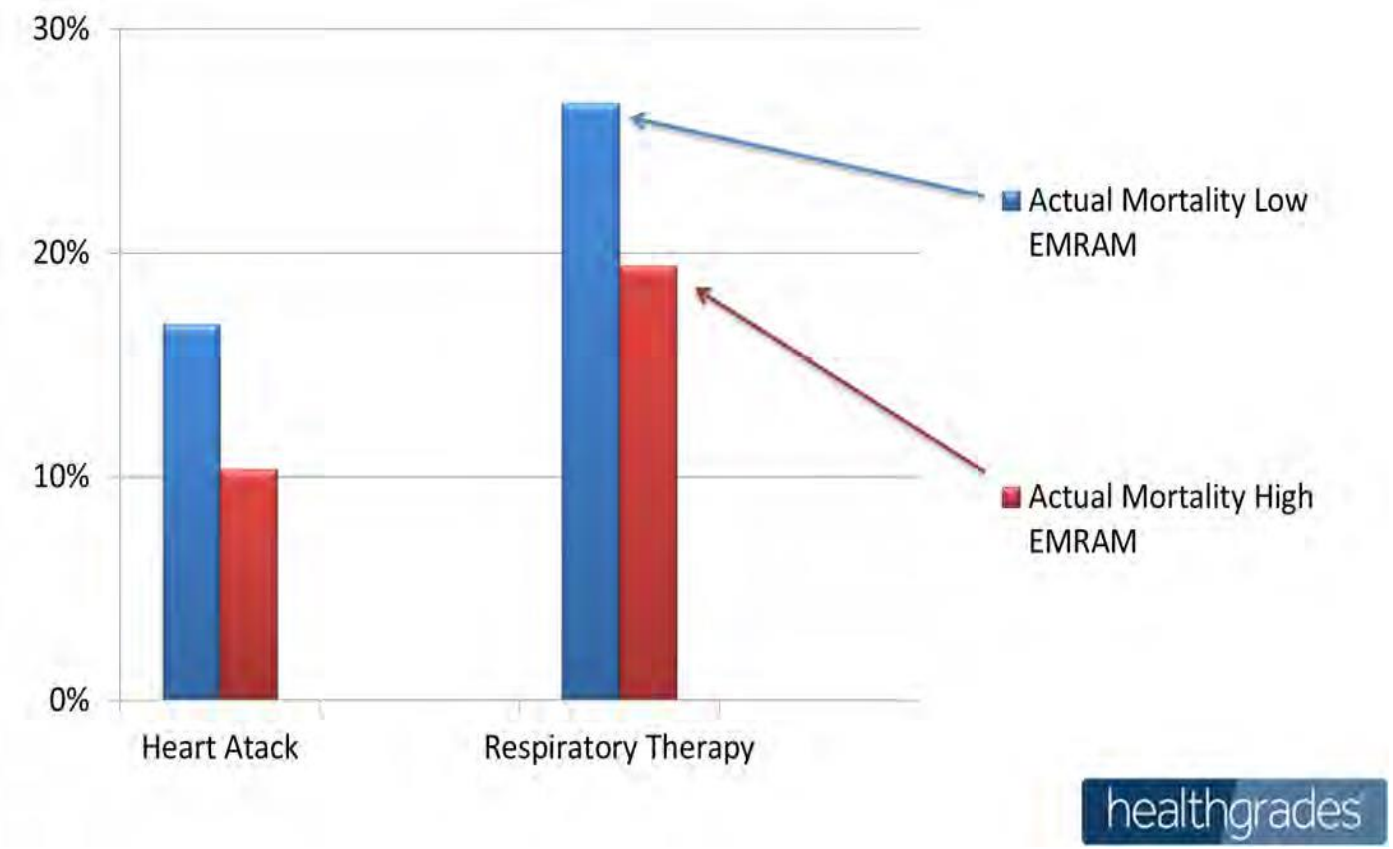
30%
20%
10%
0%
Heart Atack
Respiratory Therapy
Actual Mortality Low EMRAM
Actual Mortality High EMRAM
healthgrades

Q15

Knowledge management is defined as …

a) The practice of explicitly and deliberately building, renewing, and applying relevant intellectual assets to maximize organizational effectiveness

b) The transfer of structured information between two computer systems

c) A movement to explicitly use the current, best-available scientific evidence for managerial decision making

d) The planning, organizing, directing, and controlling of resources to accomplish goals and objectives related to a distinct initiative

Q15 Answers

- **A**

• Knowledge management is defined as the practice of explicitly and deliberately building, renewing, and applying relevant intellectual assets to maximize organizational effectiveness.
• Electronic data interchange (EDI) is defined as the transfer of structured information between two computer systems.
• Evidence-based management (EBM) is defined as a movement to explicitly use the current, best-available scientific evidence for managerial decision making.
• Project management is defined as the planning, organizing, directing, and controlling of resources to accomplish goals and objectives related to a distinct initiative.

Q16

Which of the following is a reason that system support of outcomes data collection and analysis can be very complex?

a) The required data typically resides in multiple information systems and in manual systems.

b) The functional departments are not integrated with financial information systems.

c) There is inconsistent medical terminology across different clinical systems.

d) Variation exists between open system architecture, interface engines, and multimedia data entry options.

Q16 Answers

- **A**

• An organization's analytics strategy must consider all types and sources of data and should be able to assimilate these data into its decision support algorithms.
• Focusing on the integration of functions departments with only financial systems is not considered a holistic approach.
• Inconsistent medical terminologies across the enterprise is focused solely on clinical data.
• The last option is too narrowly focused on the technologies themselves. It's not about the technology, it is about how you use the technology.

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KEY REVIEW AREAS

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