

# The Business Value of Information Technology

University of South Florida  
Health Information Systems

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# James L. Oakes

- Thirty+ years in healthcare information systems and management engineering
- Extensive experience as an operating manager, vendor executive, and consultant
- Specializes in helping healthcare providers plan and optimize use of information resources, systems, and technology to improve clinical, operational, and financial outcomes
- Worked with return on investment methodologies and analysis for over 25 years and pioneered the use of healthcare-specific economic analysis of healthcare information technology, including financial, clinical, and decision support
- Developed and deployed healthcare value-based planning methodology for healthcare now adopted at a 600 bed regional medical center, a nationally known pediatric referral center, etc.
- Served as interim Chief Information Officer in 3 healthcare institutions in financial or operational turnarounds and provided CIO level leadership assistance and development in 12+ others
- Assisted in the development of a business case and pilot methodology for a community-wide health information exchange initiative (HIE) and recently completed planning and implementation options for a statewide HIE
- Co-authored the book, ***Return on Investment for Healthcare: Maximizing the Value of Healthcare Information Technology*** (HIMSS 2003 book of the year) advocating the development of a disciplined business case for technology investments
- Appeared on the Hospital Satellite Network and spoken at numerous professional conferences, including CPRI, HFMA, SIIM, and HIMSS on such issues as effective governance, value realization, and strategy alignment
- Holds a Bachelor of Industrial Engineering and a Master of Industrial Management, both from the Georgia Institute of Technology

# Health Care Technology in the 21<sup>st</sup> Century

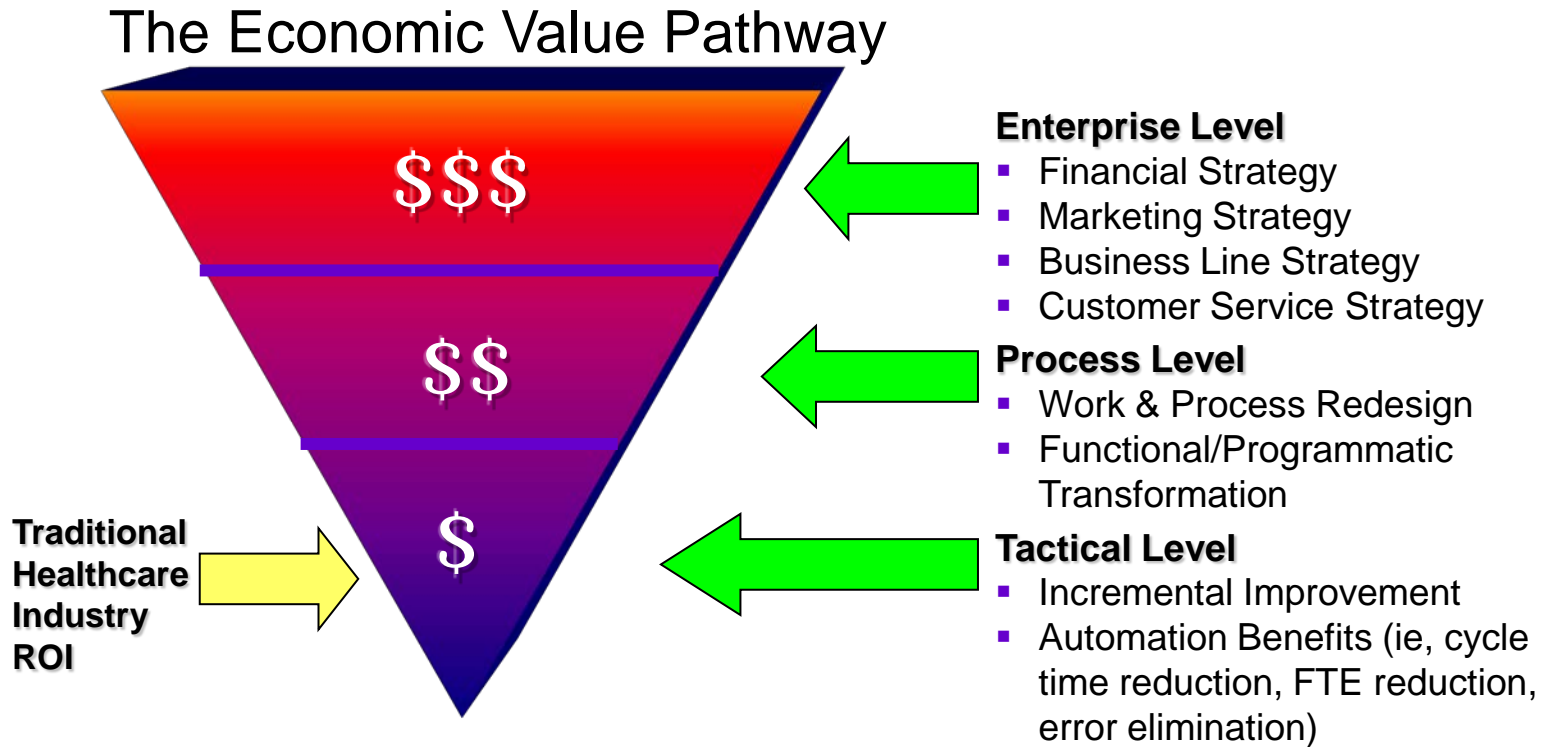
- Still predominately paper based
- Systems not interoperable
- Slow, expensive implementations
- Continuing economic pressures
- Provisions of ARRA (Stimulus Act of 2009) incent use of IT
- Many provisions of Health Reform depend on its use
  - Best practices
  - Information exchange
  - Reduction in errors
  - Standardization of care
- Increasing rate of adoption unlikely to be affected by political climate in Washington
- Recognized need to objectively evaluate proposed purchases to assess value



# HIT - It is not just technology!

- It is a massive reengineering effort that converts paper processes to digital workflow
- It is about Return on Investment (ROI) or achieving the benefits from the use of technology in healthcare to gain the full value in:
  - Quality
  - Efficiency
  - Revenue
- Numerous studies have been published attesting of the value of health information technology
- Numerous other studies have been published finding it has little value
- Both are correct!

# Return on Investment is Essential



Historical measurements have focused on tactical items, but should also focus on strategic goals. A broader focus: Can technology contribute to the bottom line?

## For Example...

- A metropolitan community hospital
- Full service medical/surgical
- Busy emergency services
- Competitive environment
- Battle for market share

# Develop a vision for the future....

- Phase in applications in a logical manner
- If moving towards a “core vendor” strategy, phase in as contracts expire
- Look for “quick wins” along the way
- Recognize that users must see continuing benefits to support a long term plan
- Be prepared to adapt plan as circumstances dictate
- Communicate, communicate, communicate!

# Legend

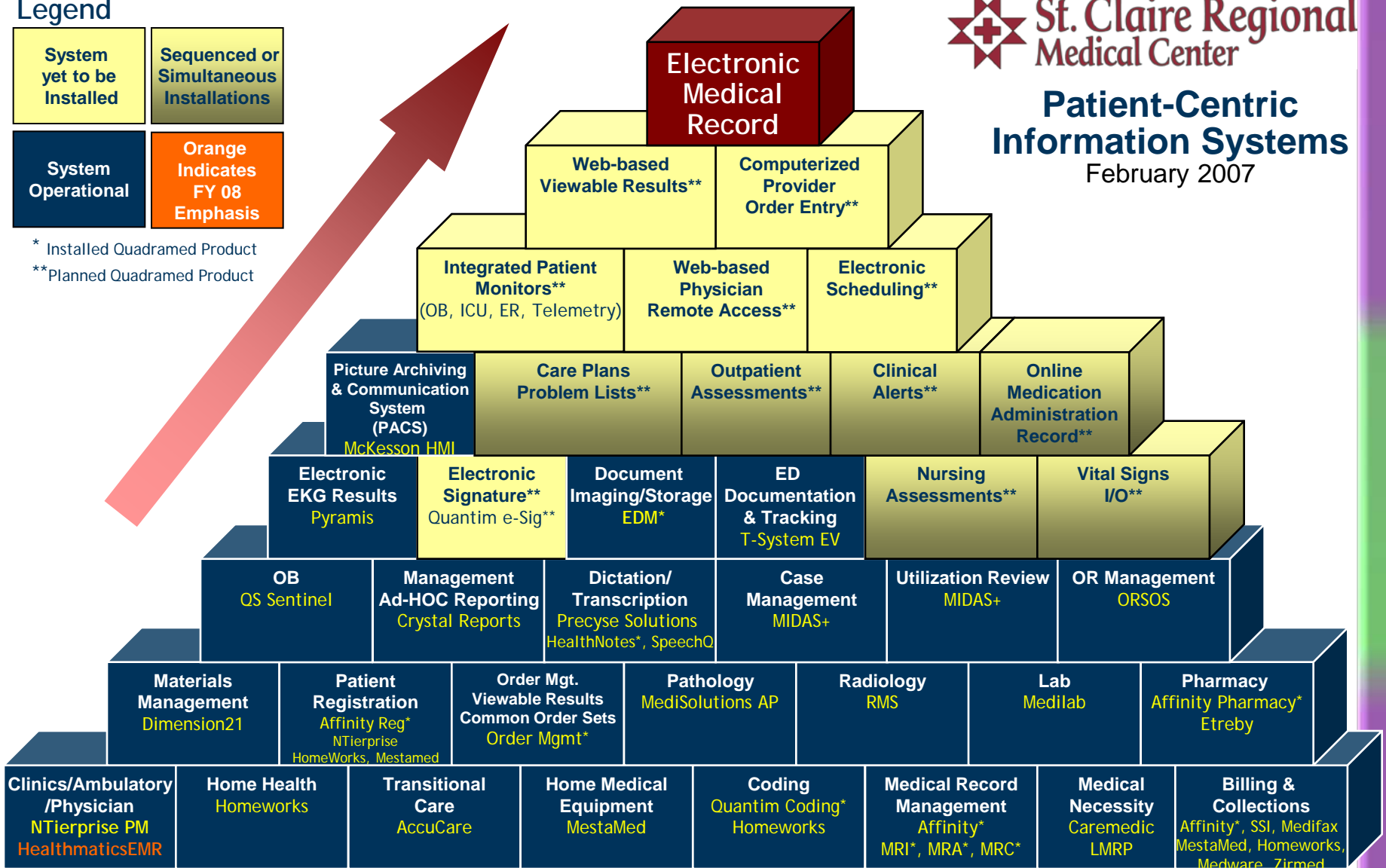
System yet to be Installed	Sequenced or Simultaneous Installations
System Operational	Orange Indicates FY 08 Emphasis

\* Installed Quadramed Product

\*\*Planned Quadramed Product

## Patient-Centric Information Systems

February 2007



The **FOUNDATION REQUIRED** to make these components into a **Fully Functional Electronic Medical Record** includes the following:

1. Business Continuity Plans that provide for Redundant Storage and Communications to ensure constant availability of the systems
2. An adequate number of appropriate user devices connected to a Robust Infrastructure that provides data that is shared (interfaced or integrated) across the continuum of care
3. Common Identification of the Patient across the continuum of care
4. Adequate Technical Support to ensure continuous operation.



# What *Value* does the system bring?



## Costs

- Direct, one-time
- Direct, ongoing
- Indirect

## Benefits

- Level I
- Level II
- Level III

# Benefits

- For the CFO

- Capital Avoidance
- Efficiency Improvements
- Reduced A/R
- Denials Reduction
- Paper Storage elimination
- Etc.

“Its got room for the kids”

- For the CMO

- Improved Registration Process
- Decreased Turnaround Time
- Streamlined Coding
- Increased Customer Satisfaction
- Physician Satisfaction
- Etc.

“Its got a Hemi”

# Benefit-Cost Ratio vs. Payback Period vs. NPV vs. IRR

- Measures are complementary
- Intended to guide, rather than substitute for, decision making
- None of these measures attempt to account for intangibles
- Particularly useful in comparing alternative investment opportunities
- Never assume that just because numbers are in a spreadsheet, they are necessarily accurate

# Investment Analysis Example

- Proposed acquisition of a Document Imaging System
- System hardware and software will cost \$250,000
- Use of the system will lead to greater efficiencies in the HIM department
- Should we approve the purchase?

# Costs:

Direct, one time (negotiated with vendor):

Hardware/Peripherals	\$100,000
Software	\$150,000
Training	\$35,000
First Year Maintenance	\$15,000

Direct, Ongoing (negotiated with vendor):

Annual Maintenance (3% inflation)	\$30,000
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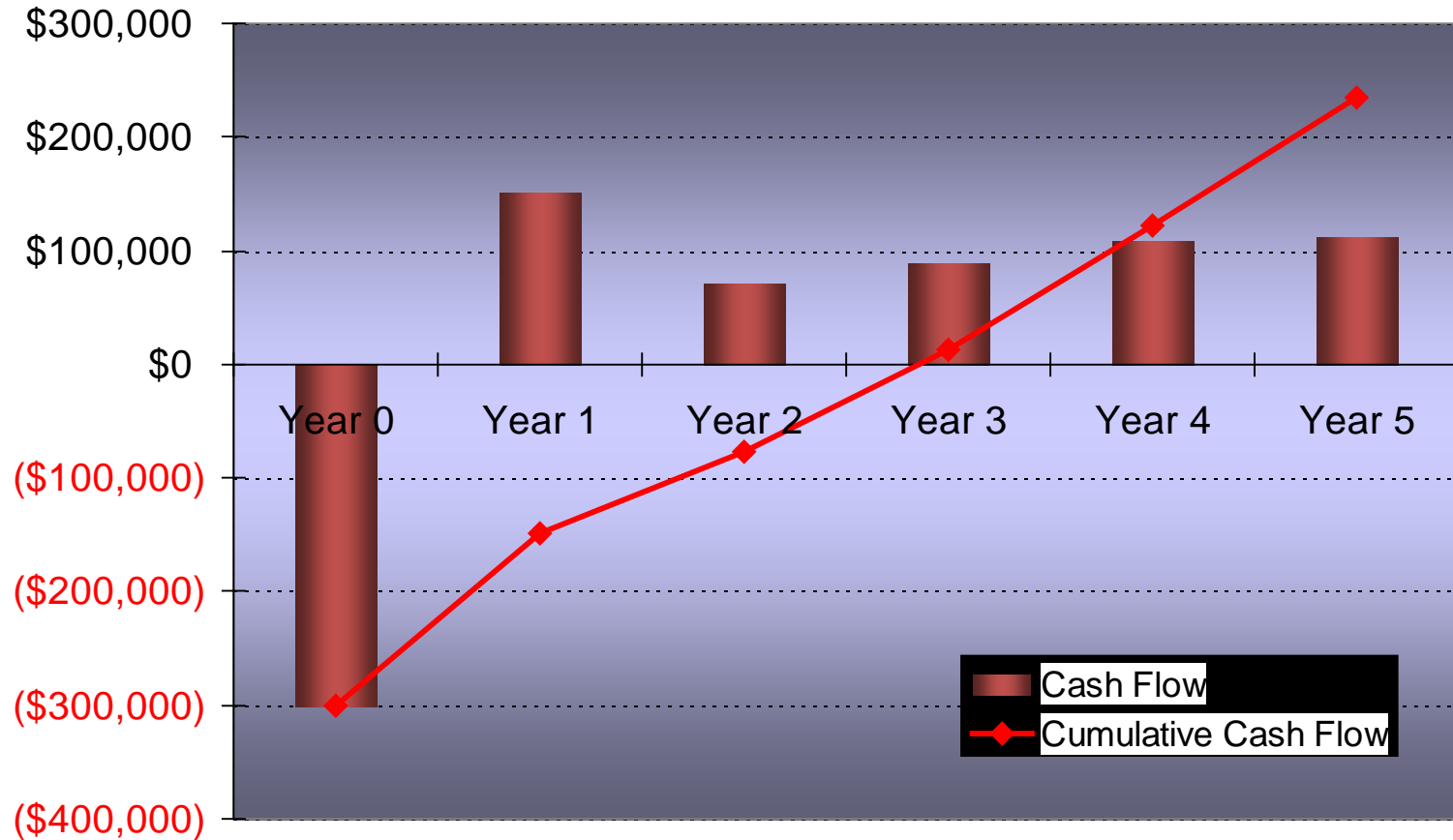
Indirect:

None identified	
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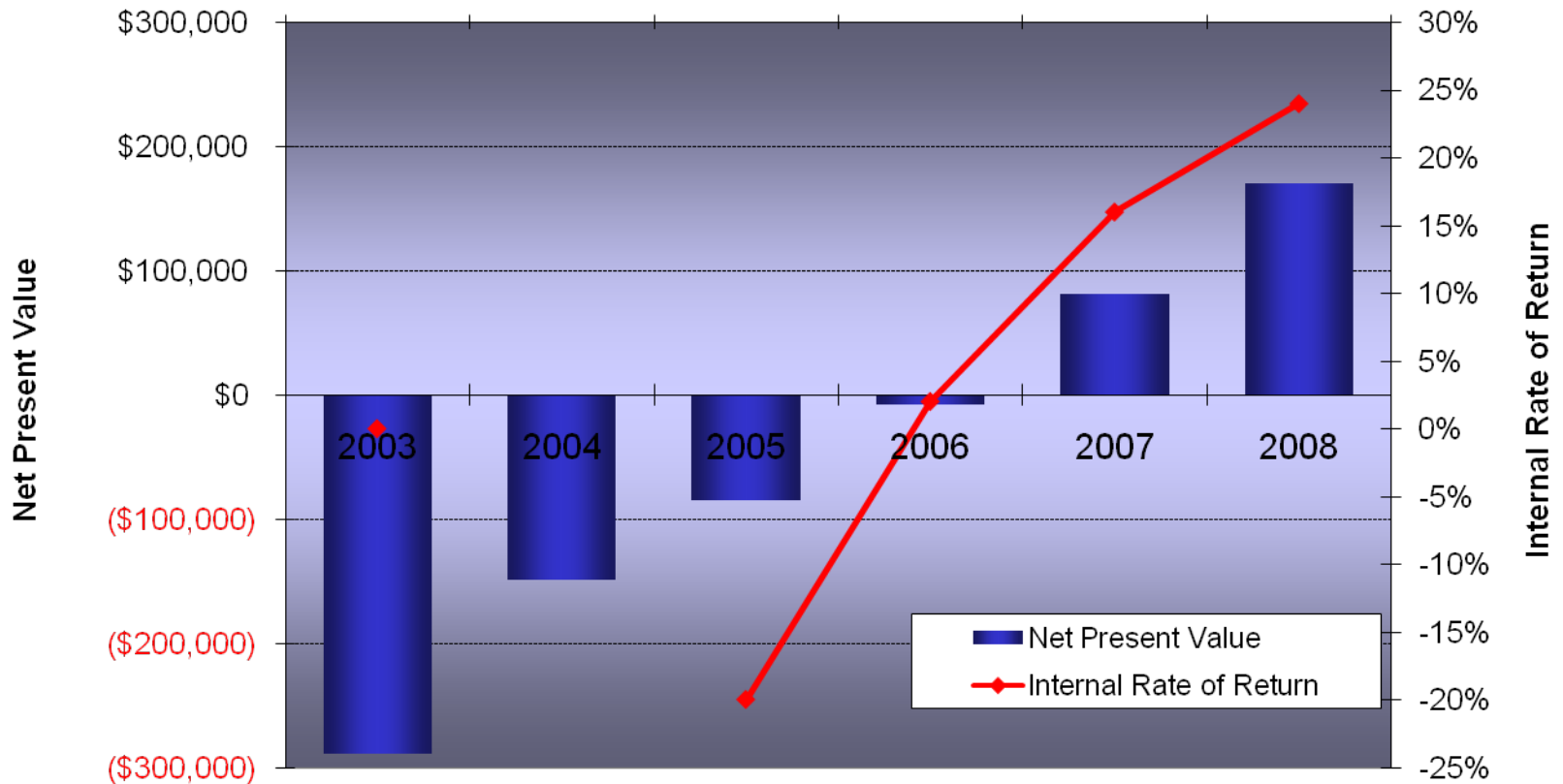
# Projected Benefits: Level 1

Year	0	1	2	3	4	5
Microfilm Equipment	\$ -	\$ 100,000				
Microfilm Supplies	-	15,000	15,450	15,914	16,391	16,883
Copier Costs	-	5,000	5,150	5,305	5,464	5,628
ED Printing Costs	-	500	515	530	546	563
HIM ED Postage	-	7,500	7,725	7,957	8,195	8,441
Marginal Facility Costs	-	17,500	36,050	54,075	72,100	74,263
Autoindexing		36,000	37,080	38,192	39,338	40,518
<b>Total Benefits</b>	<b>\$ -</b>	<b>\$ 181,500</b>	<b>\$ 101,970</b>	<b>\$ 121,973</b>	<b>\$ 142,035</b>	<b>\$ 146,296</b>

# Cash Flow - Level I benefits only



# Net Present Value and Internal Rate of Return – Level I Benefits only





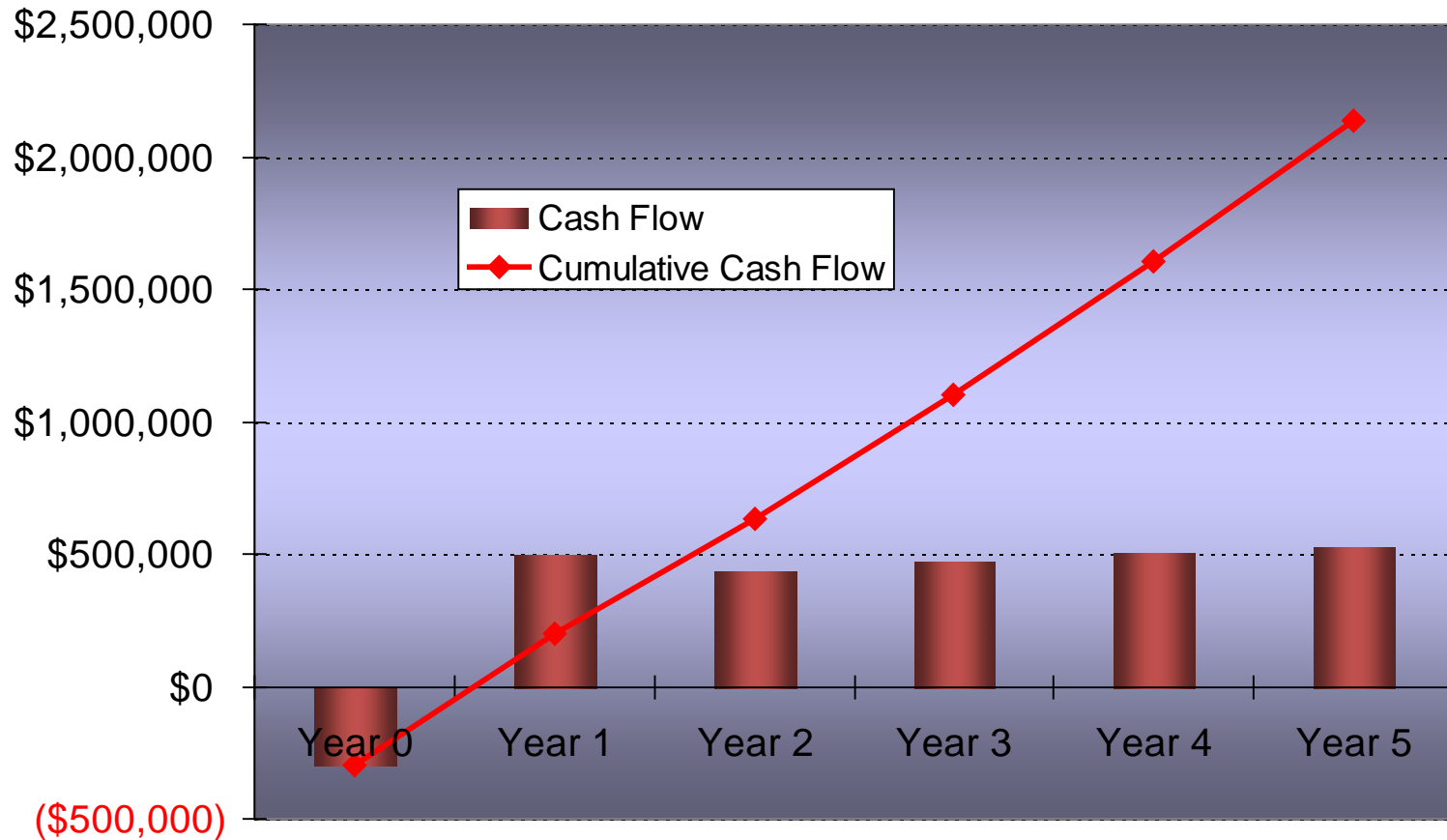
# Level II Benefits

- Process Redesign Across Departments and Functions
  - IT Enabled Registration and Scheduling:
    - Inpatient Registration Process
    - Outpatient Registration Process
    - ED Registration Process
    - Satellite facilities Registration Process
  - Document Retrieval Process

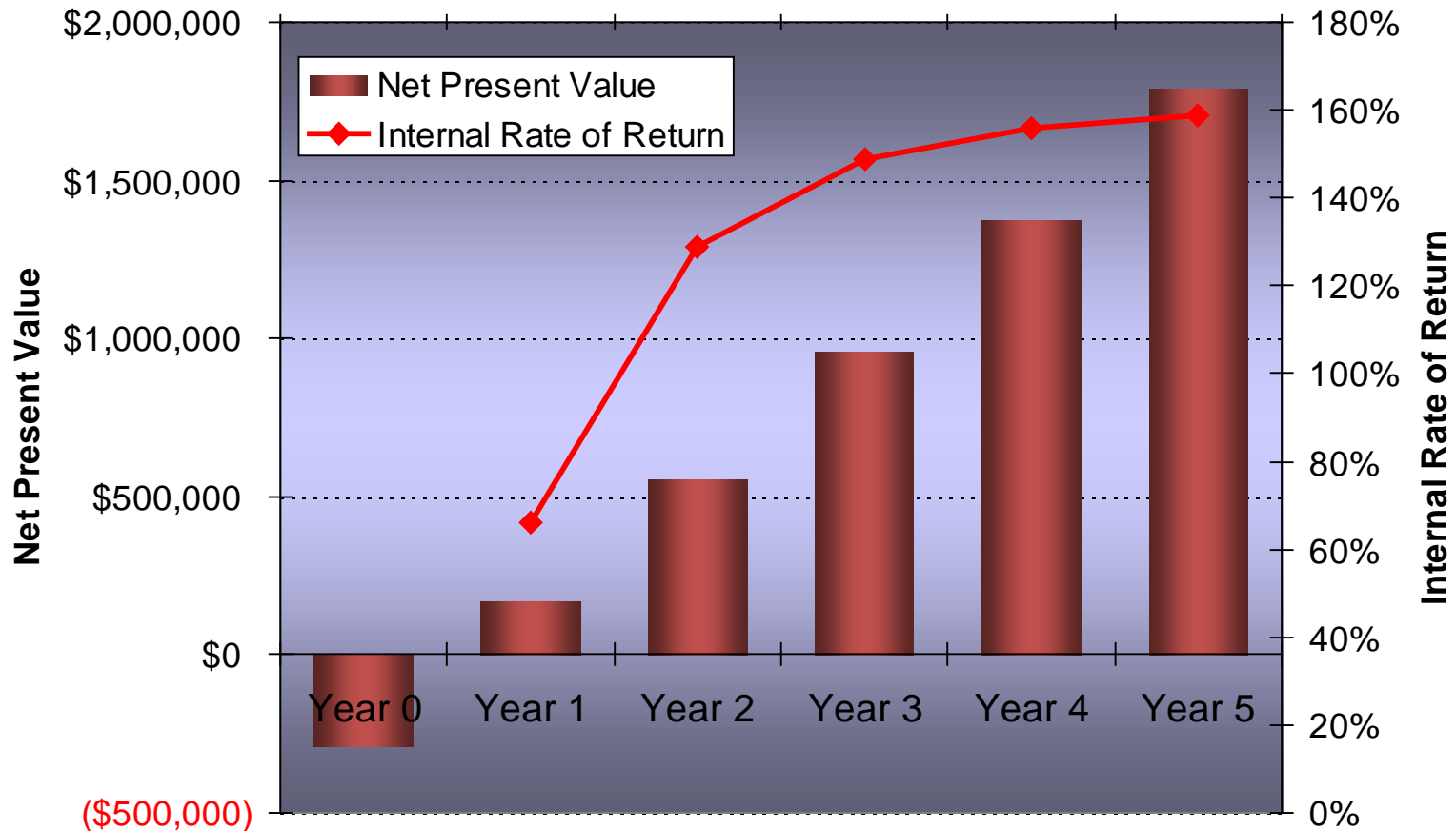
# Level III Benefits

- Revenue Cycle
  - Reduction in unbilled \$
  - Reduction of days in AR
  - Reduction of denials
- Customer Satisfaction
  - Faster, more user friendly patient registration
  - Faster access to billing and payment information
  - Increased market share

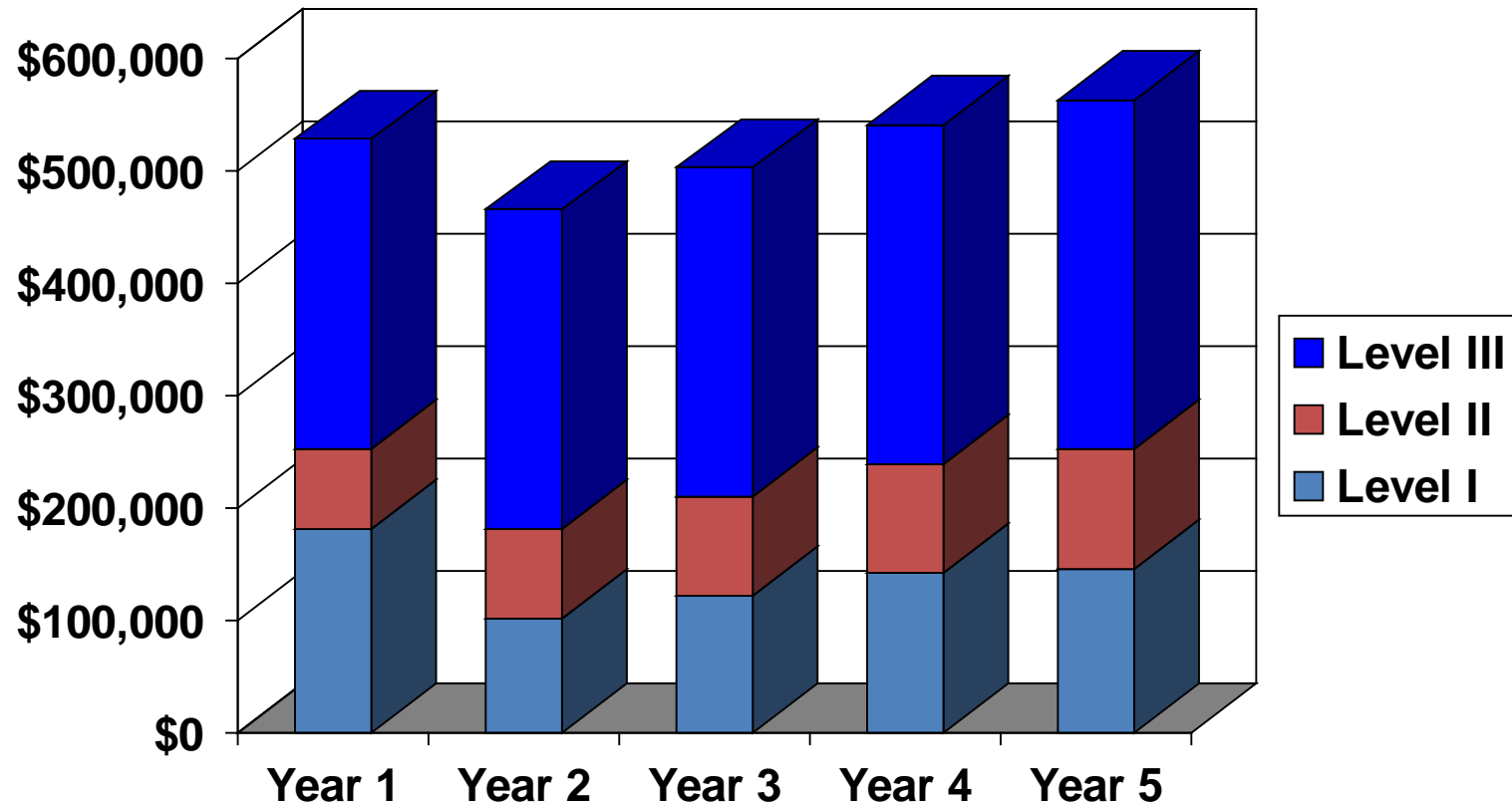
# Cash Flow - With Level I, II, III Benefits



# Net Present Value and Internal Rate of Return – Level I, II and III Benefits



# Comparison of Benefits: Level I, II and III



# EHR Return on Investment Analysis Example

- Methodology
  - Interview based approach
  - Combines industry experience with client specific environment
  - Utilizes information gained from multiple sources
    - Vendor Claims
    - Prior studies
    - Literature review (including Davies Award submittals)
    - Consultant experience
- Benefits Identified in Four Categories
  - Revenue
  - Hard dollar savings
  - Soft dollar savings
  - New opportunities

# ROI Analysis – Benefits

Benefit Category	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14	Total
<b>Revenue</b>									
Reduced ER Walkouts		\$ 93,562	\$ 190,866	\$ 194,683	\$ 198,577	\$ 202,548	\$ 206,599	\$ 210,731	\$ 1,297,567
Reduced Denials		\$ 125,000	\$ 255,000	\$ 260,100	\$ 265,302	\$ 270,608	\$ 276,020	\$ 281,541	\$ 1,733,571
Reduced DNFB		\$ 126,891	\$ 258,857	\$ 264,034	\$ 269,314	\$ 274,701	\$ 280,195	\$ 285,799	\$ 1,759,789
Copay Collection		\$ 250,000	\$ 500,000	\$ 510,000	\$ 520,200	\$ 530,604	\$ 541,216	\$ 552,040	\$ 3,404,060
<b>Total Revenue</b>	<b>\$ -</b>	<b>\$ 595,452</b>	<b>\$ 1,204,723</b>	<b>\$ 1,228,817</b>	<b>\$ 1,253,393</b>	<b>\$ 1,278,461</b>	<b>\$ 1,304,030</b>	<b>\$ 1,330,111</b>	<b>\$ 8,194,988</b>
<b>Hard Cost Reduction</b>									
Forms reduction		\$ 12,857	\$ 26,228	\$ 26,753	\$ 27,288	\$ 27,834	\$ 28,391	\$ 28,958	\$ 178,310
SCC Maintenance		\$ 40,000	\$ 81,600	\$ 83,232	\$ 84,897	\$ 86,595	\$ 88,326	\$ 90,093	\$ 554,743
Logicare Maintenance		\$ 16,000	\$ 32,000	\$ 32,640	\$ 33,293	\$ 33,959	\$ 34,638	\$ 35,331	\$ 217,860
Keane Maintenance		\$ 77,500	\$ 155,000	\$ 158,100	\$ 161,262	\$ 164,487	\$ 167,777	\$ 171,133	\$ 1,055,259
Avoided Capital Expense - Dictaphone	\$ 275,000							\$ -	\$ 275,000
<b>Total Hard Cost Reduction</b>	<b>\$ 645,000</b>	<b>\$ 335,675</b>	<b>\$ 995,436</b>	<b>\$ 1,181,065</b>	<b>\$ 1,385,226</b>	<b>\$ 1,412,931</b>	<b>\$ 1,441,189</b>	<b>\$ 1,470,013</b>	<b>\$ 8,866,534</b>
<b>Soft Cost Reduction</b>									
Reduced RN Charting time		\$ 514,239	\$ 1,049,048	\$ 1,070,029	\$ 1,091,430	\$ 1,113,258	\$ 1,135,524	\$ 1,158,234	\$ 7,131,763
Reduced RN turnover			\$ 39,780	\$ 40,576	\$ 41,387	\$ 42,215	\$ 43,059	\$ 43,920	\$ 250,937
Reduced infection rate									\$ -
Reduce ADEs									\$ -
Reduced malpractice insurance									\$ -
Pharmacist time (tracking down MD)		\$ 59,363	\$ 121,101	\$ 123,523	\$ 125,993	\$ 128,513	\$ 131,084	\$ 133,705	\$ 823,283
<b>Total Soft Cost Reduction</b>	<b>\$ -</b>	<b>\$ 573,603</b>	<b>\$ 1,209,929</b>	<b>\$ 1,234,128</b>	<b>\$ 1,258,810</b>	<b>\$ 1,283,987</b>	<b>\$ 1,309,666</b>	<b>\$ 1,335,860</b>	<b>\$ 8,205,983</b>
<b>New Opportunities</b>									
Increased Lab Outreach		\$ 137,500	\$ 280,500	\$ 286,110	\$ 291,832	\$ 297,669	\$ 303,622	\$ 309,695	\$ 1,906,928
<b>Total New Opportunities</b>		<b>\$ 137,500</b>	<b>\$ 280,500</b>	<b>\$ 286,110</b>	<b>\$ 291,832</b>	<b>\$ 297,669</b>	<b>\$ 303,622</b>	<b>\$ 309,695</b>	<b>\$ 1,906,928</b>
<b>Total Potential</b>	<b>\$ 645,000</b>	<b>\$ 1,642,229</b>	<b>\$ 3,690,588</b>	<b>\$ 3,930,120</b>	<b>\$ 4,189,262</b>	<b>\$ 4,273,047</b>	<b>\$ 4,358,508</b>	<b>\$ 4,445,678</b>	<b>\$ 27,174,433</b>
<b>Additional Factors</b>									
MD Satisfaction									
Patient Satisfaction									
Staff Satisfaction									
Patient Safety									
Competitive Advantage									
Inflation Rate 2%									

# ROI Analysis – Cost/Benefit Projections

	FY 06	FY 07	FY 08	FY 09	FY 10	FY 11	FY 12	FY 13	FY 14
<b>One Time Costs</b>									
Application Software		\$ 2,166,360	\$ 1,444,240						
3rd Party/Operating SW		\$ 428,454							
Hardware		\$ 922,697	\$ 395,441						
Implementation		\$ 2,867,514	\$ 1,911,676						
Out of Pockets		\$ 430,127	\$ 286,751						
Conversions/Interfaces		\$ 295,373							
Infrastructure Costs		\$ 635,000							
Foundation Costs	\$ 155,500	\$ 773,500							
<b>Total One Time</b>	<b>\$ 155,500</b>	<b>\$ 8,519,024</b>	<b>\$ 4,038,109</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>
<b>Ongoing Costs</b>									
Software Maintenance			\$ 1,500,210	\$ 1,530,214	\$ 1,560,818	\$ 1,592,035	\$ 1,623,876	\$ 1,656,353	\$ 1,689,480
Hardware Maintenance			\$ 146,460	\$ 149,389	\$ 152,377	\$ 155,425	\$ 158,533	\$ 161,704	\$ 164,938
<b>Total Ongoing</b>			<b>\$ 1,646,670</b>	<b>\$ 1,679,603</b>	<b>\$ 1,713,195</b>	<b>\$ 1,747,459</b>	<b>\$ 1,782,409</b>	<b>\$ 1,818,057</b>	<b>\$ 1,854,418</b>
<b>Grand Total Cost</b>	<b>\$ 155,500</b>	<b>\$ 8,519,024</b>	<b>\$ 5,684,779</b>	<b>\$ 1,679,603</b>	<b>\$ 1,713,195</b>	<b>\$ 1,747,459</b>	<b>\$ 1,782,409</b>	<b>\$ 1,818,057</b>	<b>\$ 1,854,418</b>
Cumulative Cost		\$ 8,674,524	\$ 14,359,303	\$ 16,038,906	\$ 17,752,102	\$ 19,499,561	\$ 21,281,970	\$ 23,100,027	\$ 24,954,444
<b>Benefits</b>		\$ 645,000	\$ 1,642,229	\$ 3,690,588	\$ 3,930,120	\$ 4,189,262	\$ 4,273,047	\$ 4,358,508	\$ 4,445,678
Cash Flow	\$ (155,500)	\$ (7,874,024)	\$ (4,042,549)	\$ 2,010,984	\$ 2,216,924	\$ 2,441,803	\$ 2,490,639	\$ 2,540,451	\$ 2,591,260
Cumulative Cash Flow	\$ (155,500)	\$ (8,029,524)	\$ (12,072,074)	\$ (10,061,089)	\$ (7,844,165)	\$ (5,402,362)	\$ (2,911,724)	\$ (371,272)	\$ 2,219,988
Net Present Value		\$17,180.07							

Discount Rate 4%  
 Inflation Rate 2%

**Notes**

Highest cost vendor assumed  
 Assume discounts from RFP pricing as follows:  
 Software 25%  
 Hardware 10%  
 Implementation 20%

