



Mediprise Final Project Presentation

Presented by the HouseCare Group

Jennifer Deroy
James Gomez
Jennifer Sandels
Quinise Sherman



Problem Statement

The healthcare industry is for the most part, still dependent on paper based medical records that are decentralized, poorly accessible, and redundant.

A myriad of tools are already available to manage medical records electronically, but lack of national standards, lack of trust in the ability to secure data, and poor interoperability has hampered the industry from adopting Electronic Medical Records (EMRs) and has prevented the medical industry from delivering the best quality services to patients.

The current system has resulted in the loss of important patient medical information, the inability of doctors to collaborate, medical errors, and an often negative experience for patients and health care providers alike.

Disconnects in health care communication systems can result in consequences ranging from inconveniences to fatalities and cost upward of \$17 billion annually.

Linda T. Kohn, Janet M. Corrigan, and Molla S. Donaldson, Editors; Committee on Quality of Health Care in America, Institute of Medicine, "To Err Is Human: Building a Safer Health System", http://www.nap.edu/catalog.php?record_id=972



Mission Statement

The HouseCare Mission Statement is to develop an architecture and business plan for a fully integrated and standardized electronic healthcare management system (Mediprise) to be used by patients, healthcare providers, and pharmacies. Initial functionality should be delivered in the early 2010 timeframe and extend through 2018.





Approach

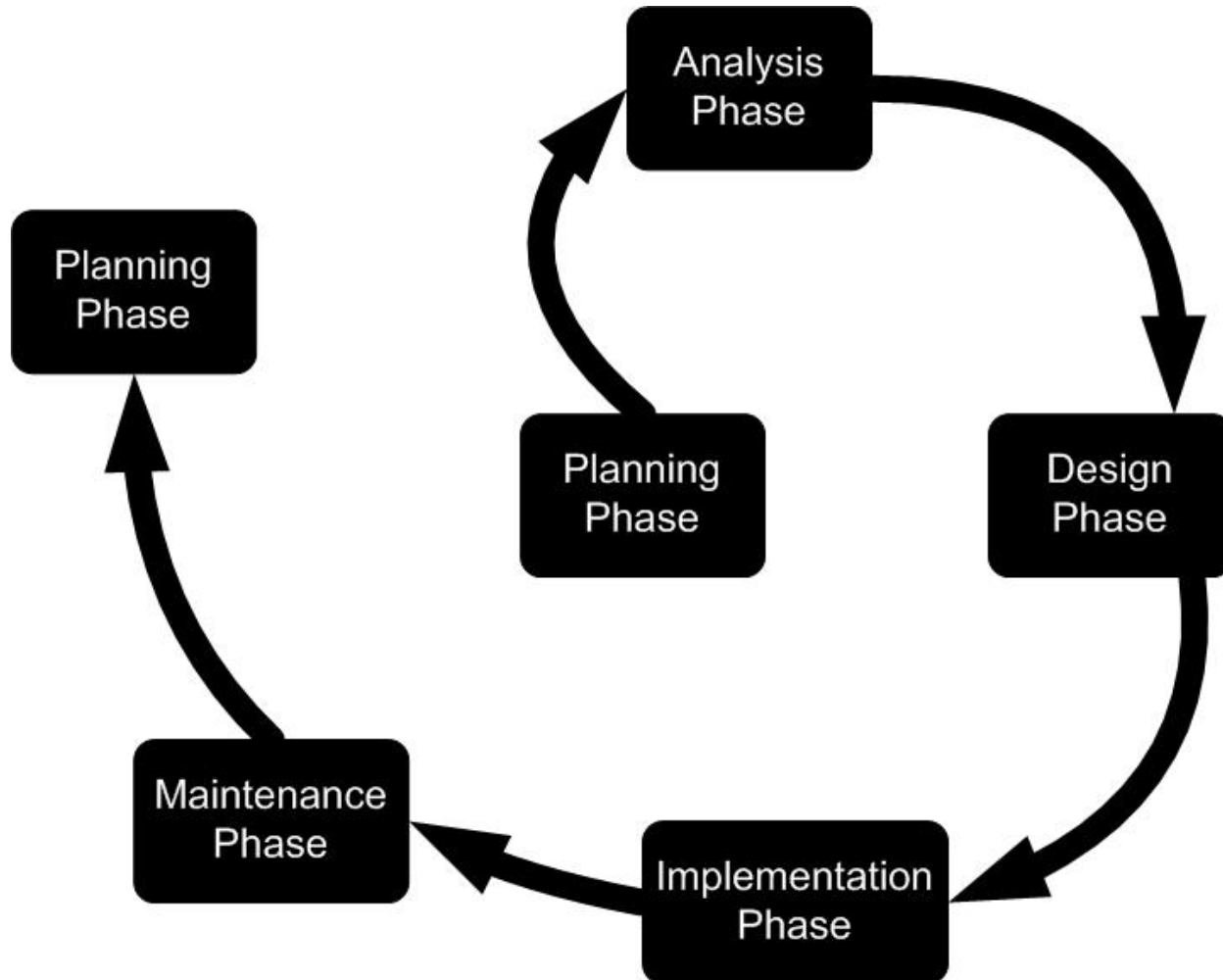
- Performed trade off analysis to determine best approach for handling multiple EMR standards (HL7, ANSI X12, ASTM CCR) that are currently being used.
 - Create a new Standard?
 - Pros
 - Simple
 - Guaranteed interoperability
 - Cons
 - No advantage to customer
 - Incur additional cost and disruption to customers
 - Require replacement of existing EMR software
 - Create a conversion service for multiple standards
 - Pros
 - Little to no impact to customers
 - Not competing with existing EMR software
 - Low Cost to develop
 - Will not require replacement of EMR software
 - Cons
 - High risk – Achieving interoperability will be challenging

The HouseCare Mediprise Architecture will:

- Provide Patients with access to medical records
- Provide Hospitals and Hospital facilities, with Electronic Medical Record systems, access to our integrated architecture to gain access to up-to-date Medical Records, Collaboration tools, and Cross-Facility Communication
- Provide non-EMR hospitals with recommendations as to what systems to adopt in order to seamlessly interface with our system
- Provide Pharmacies with access to prescription information for the purpose of filling patient prescriptions as requested by the patient.



Spiral Project Development Plan



Technical Case and Business Case

- Developed both a technical case and a business case that mirrored each other.

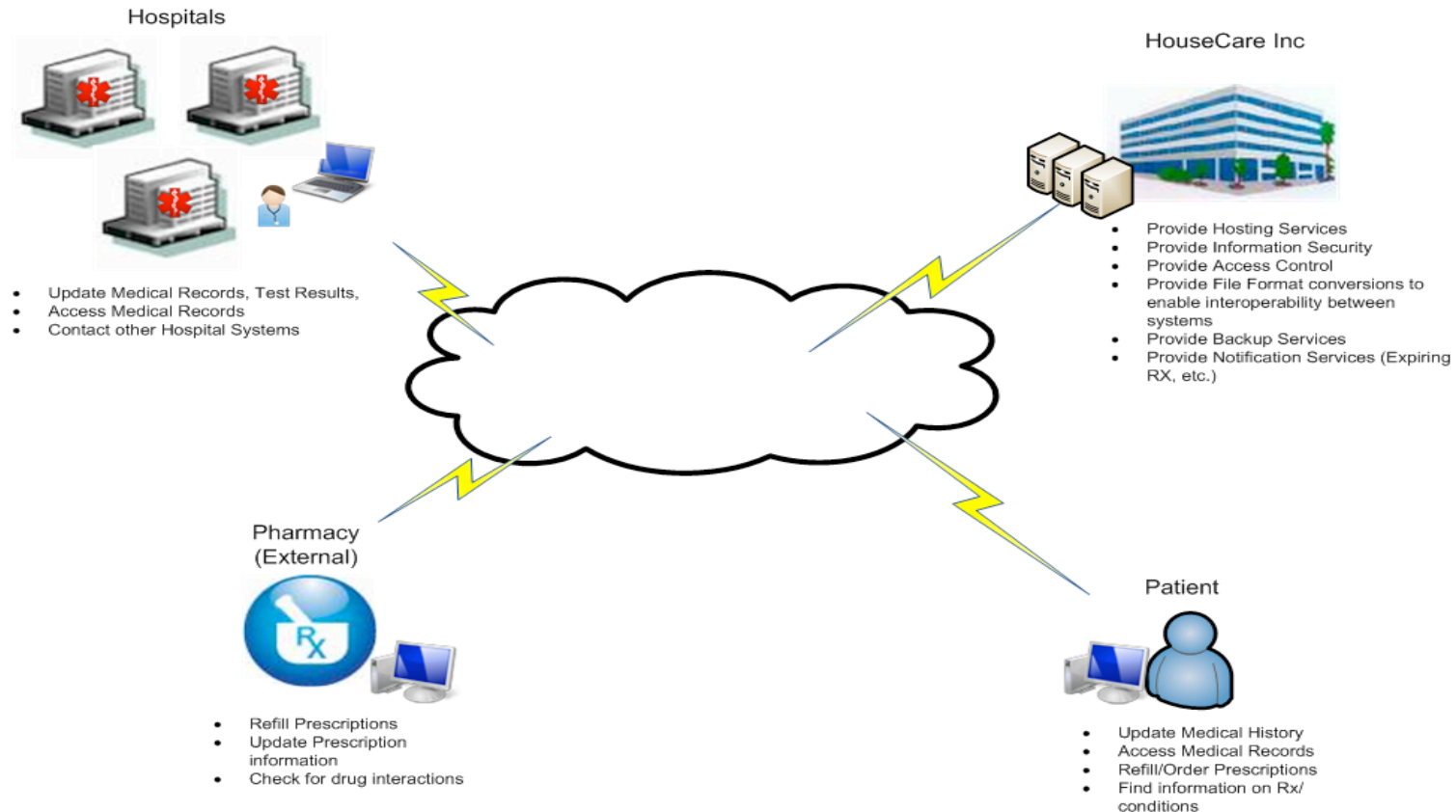




Technical Case

- Operational Concept
- Scope and Context
- Stakeholder Value Mapping
- Architecture Evaluation
- DoDAF Diagrams
- Executable Architecture

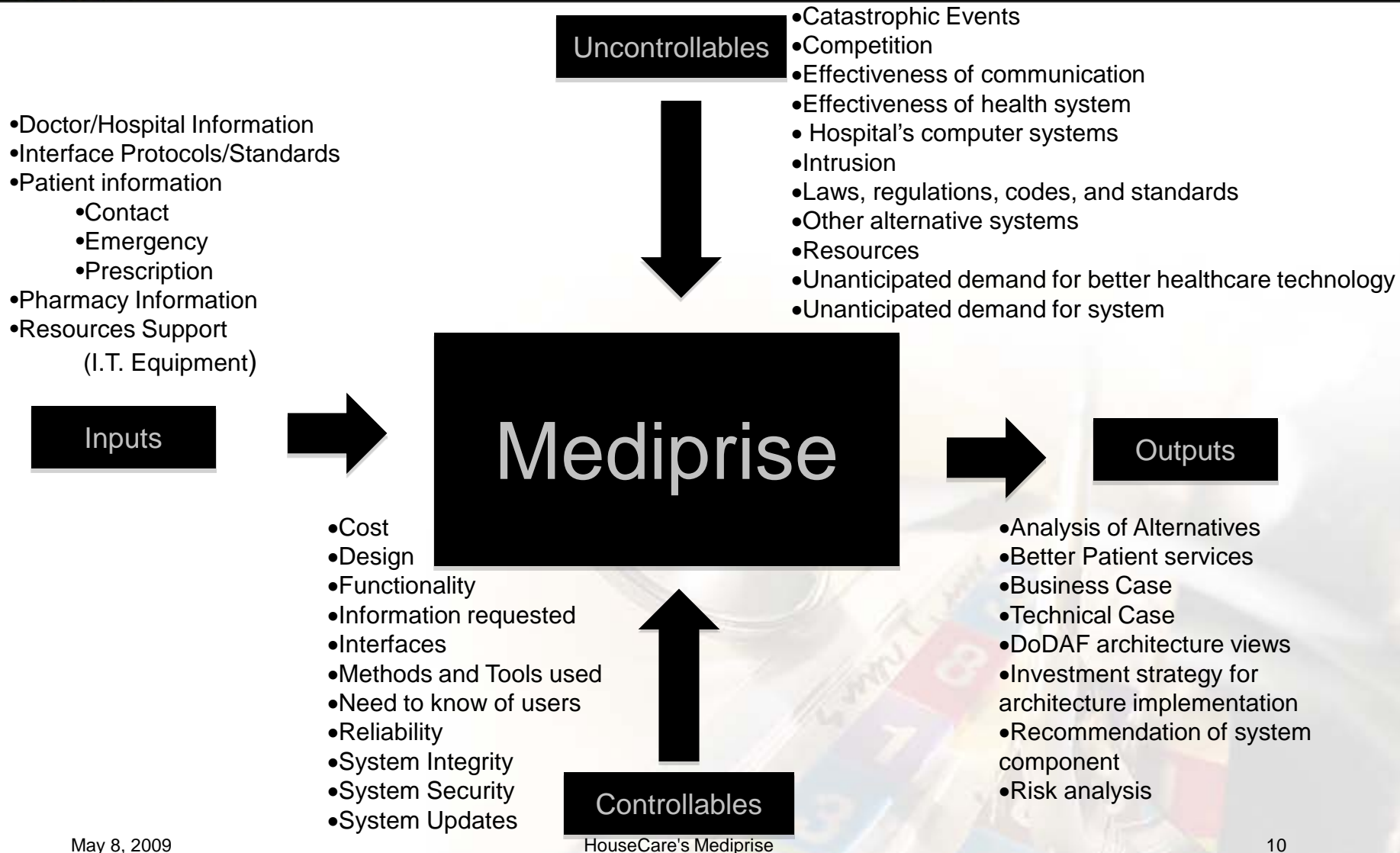
Operational Concept



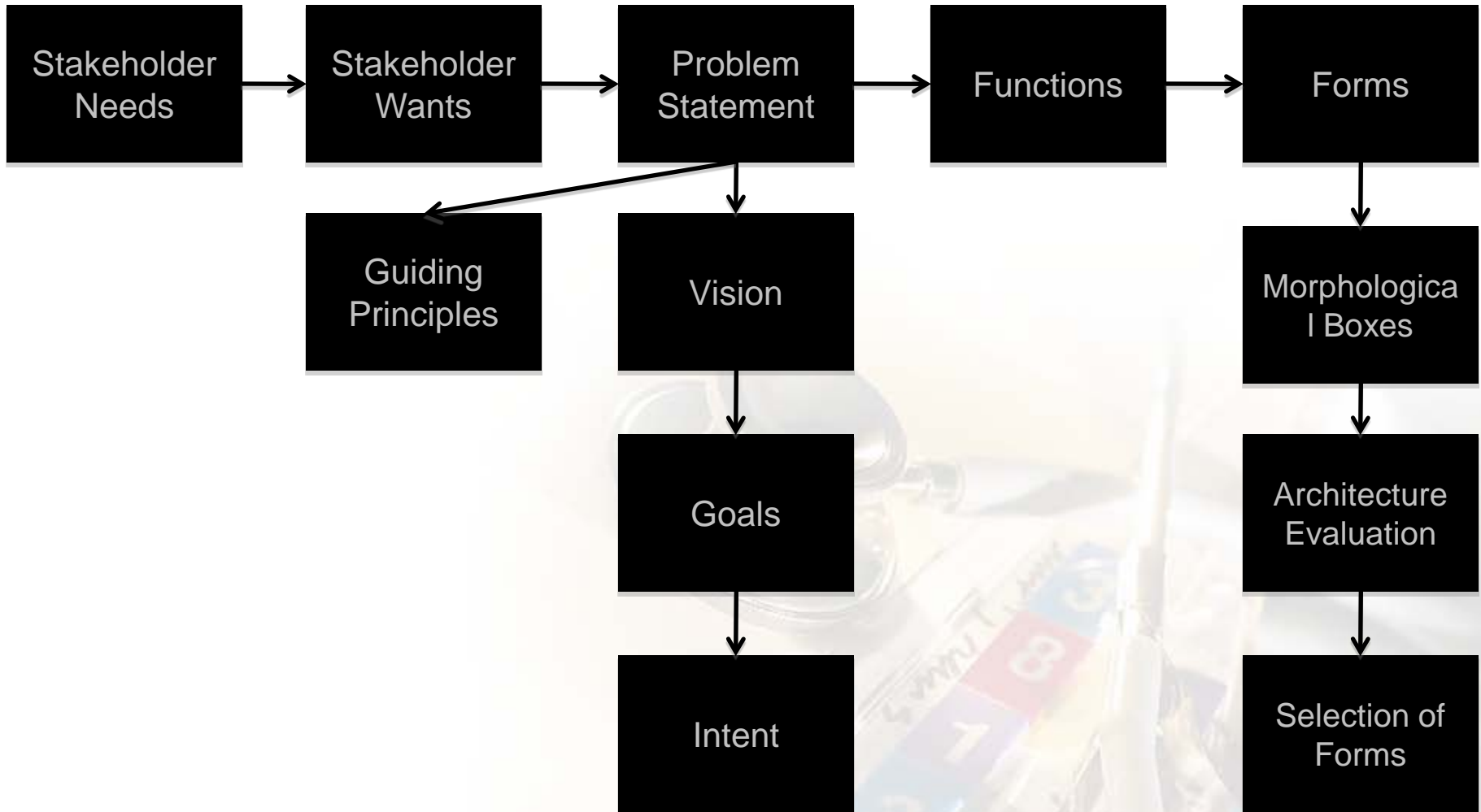
- Provide Secure Electronic Access to Up-to-Date Medical History
- Provide Electronic Prescription Services
- Provide Healthcare Management Tools, Alerts and Reminder Services



Scope and Context



Stakeholder Value Mapping





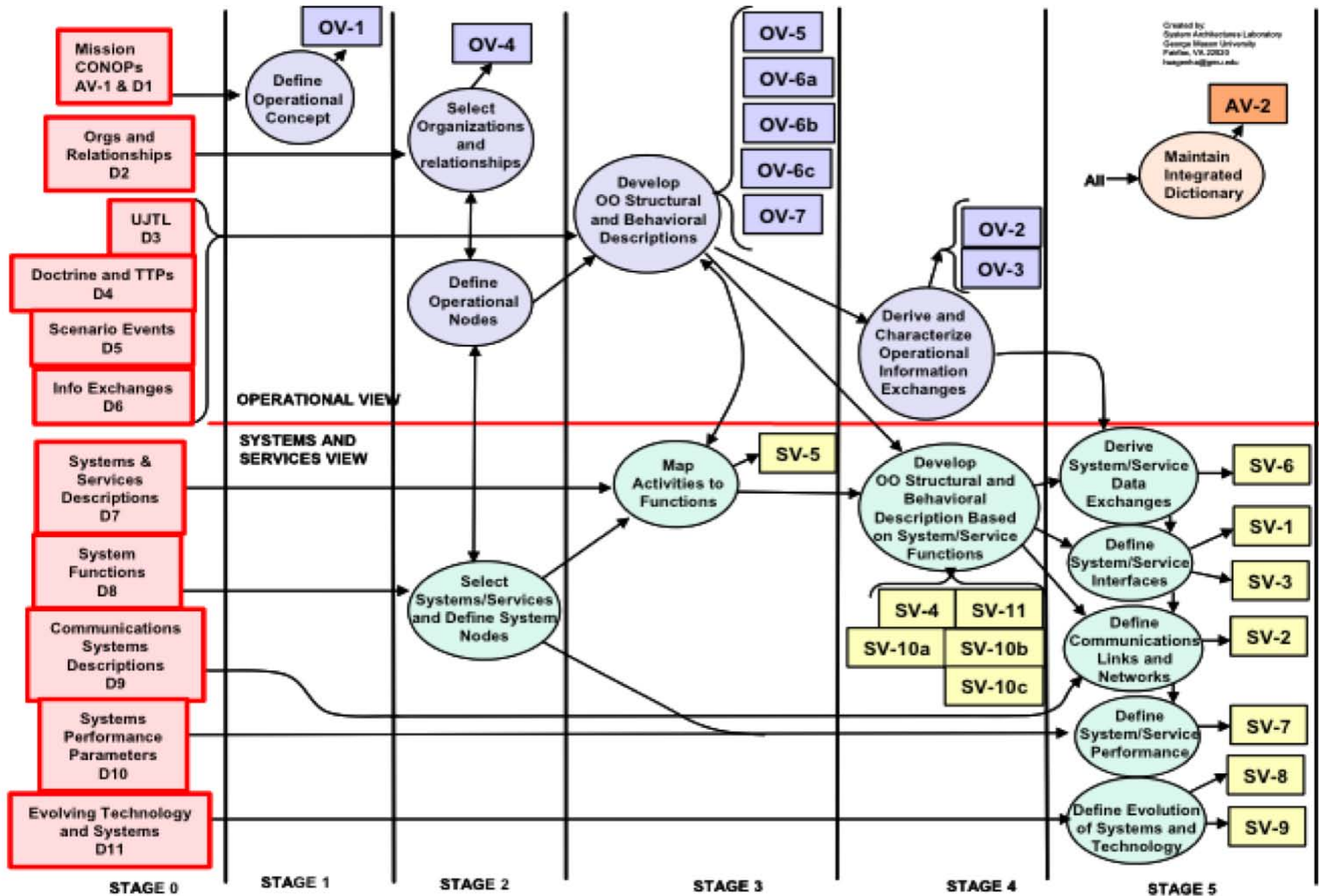
Architecture Evaluation

Stakeholder Goals	Ranking	Export Mechanism					Transfer from EMR to Mediprise Mechanism					Mediprise Query Mechanism				Transfer to EMR System Mechanism						
		PDF Report File	HL7 Formatted File	ATSM International Continuity of Care Formatted File	ANSI X12 Formatted File	Printed Report	Virtual Private Network over TCP/IP	Dedicated WAN	Proprietary Message Schema via Internet	Standard HL7/ASTM/ANSI X12 over TCP/IP	SOAP	CORBA	Manually Entered Query	User Initiated Query	Preformatted Queries	Dynamically Created Queries	Virtual Private Network over TCP/IP	Dedicated WAN	Proprietary Message Schema via Internet	Standard HL7/ASTM/ANSI X12 over TCP/IP	SOAP	CORBA
Confidentiality	4.4	0	0	0	0	0	5	4	1	1	1	1	0	0	0	0	5	4	1	1	1	1
Ease of Use	3.1	4	3	3	3	4	4	4	2	4	4	3	2	3	4	5	4	4	2	4	4	3
Speed	3.9	4	4	4	4	4	4	2	4	4	3	4	3	3	4	5	4	2	4	4	3	
Efficiency	3.9	3	4	4	4	3	4	3	4	4	3	4	2	3	4	5	4	3	4	4	3	
Access	3.8	5	4	3	3	4	4	1	3	5	5	3	2	3	4	5	4	1	3	5	5	3
Accuracy	3.8	0	0	0	0	0	4	4	4	5	4	4	2	2	4	5	4	4	4	5	4	4
Use of Standards	3.1	2	5	5	5	1	4	2	1	5	5	4	2	2	4	4	4	2	1	5	5	4
Cost	4	5	5	5	5	5	4	1	5	5	5	4	4	4	3	3	4	1	5	5	5	4
Feasibility	4	5	5	5	5	5	5	3	4	5	5	4	2	2	4	4	5	3	4	5	5	4
Ranking		105	111	107	107	98	144	91	108	142	130	116	71	82	114	133	144	91	108	142	130	116

Will need converters to convert to internal data format, so we should be able to export in all formats without incurring much additional cost

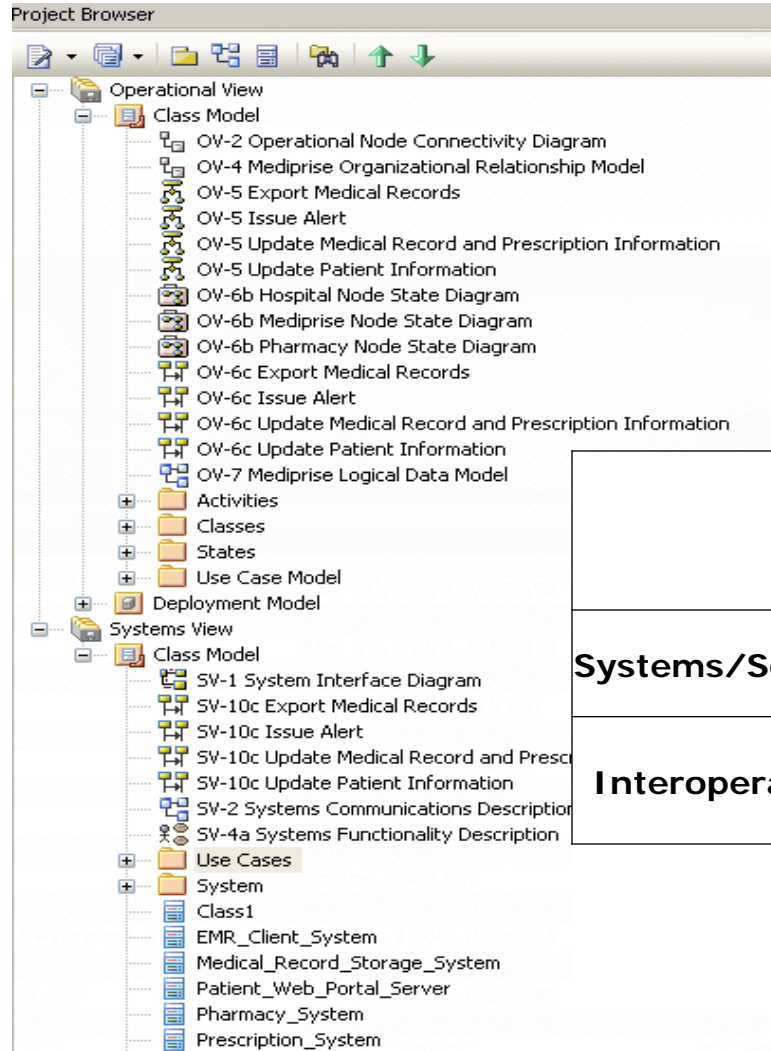


Five Stage Modeling Process





DoDAF Diagrams



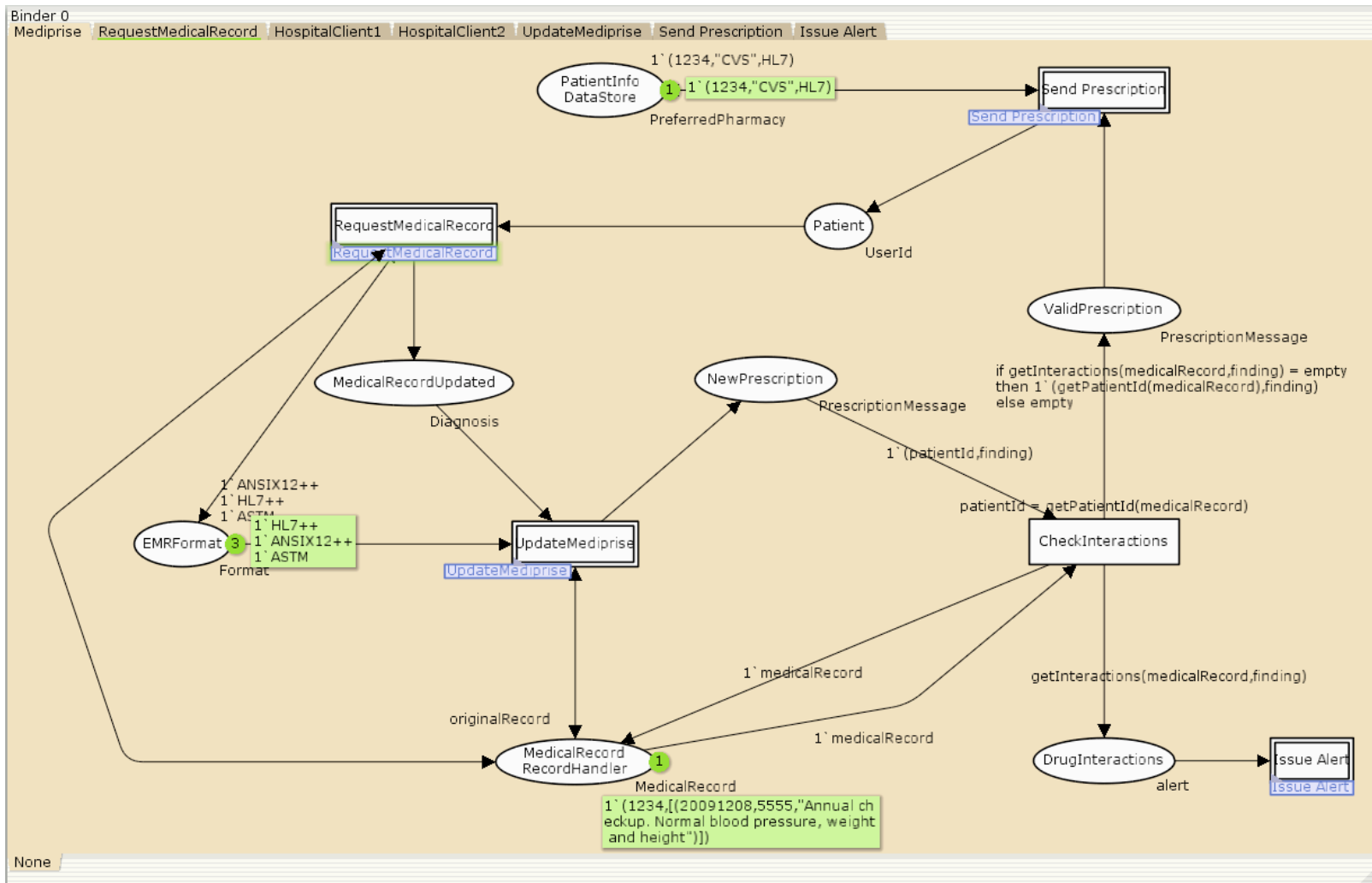
- Utilized Sparx Enterprise Architect to develop UML DoDAF views.
- Developed DoDAF diagrams for an interoperability architecture.

	Operational View (OV)							Systems and Services View (SV)											Tech View (TV)	
Systems/Services	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10	11	1	2
Interoperability	•	•	•	⊙	•	•	⊙	•	⊙		•	•	⊙	•				⊙	•	⊙

- = Data Highly Applicable
- ⊙ = Data is often or partially applicable



Executable Architecture



A stethoscope is positioned in the upper left corner of the slide. The background features a blurred image of a desk with a calendar and a pen. The text 'Business Case' is displayed in a large, white, sans-serif font in the upper right area.

Business Case

- Current Market
- Market Introduction Approach
- 10 Year Road Map
- Cost Analysis
- Risk Analysis

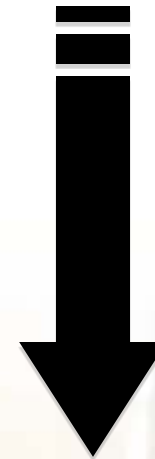


Current Market Adoption Rates

EMR Adoption Model SM			
Stage	Cumulative Capabilities	2007 Final	2008 Final
Stage 7	Medical record fully electronic; HCO able to contribute CCD as byproduct of EMR; Data warehousing in use	0.0%	0.3%
Stage 6	Physician documentation (structured templates), full CDSS (variance & compliance), full R-PACS	0.3%	0.5%
Stage 5	Closed loop medication administration	1.9%	2.5%
Stage 4	CPOE, CDSS (clinical protocols)	2.2%	2.5%
Stage 3	Clinical documentation (flow sheets), CDSS (error checking), PACS available outside Radiology	25.1%	35.7%
Stage 2	Clinical Data Repository, Controlled Medical Vocabulary, Clinical Decision Support, may have Document Imaging	37.2%	31.4%
Stage 1	Ancillaries – Lab, Rad, Pharmacy – All Installed	14.0%	11.5%
Stage 0	All Three Ancillaries Not Installed	19.3%	15.6%
Total Hospitals		n = 5073	n = 5166

Data from HIMSS Analytics Database N = 5073/5166 ©2009 HIMSS Analytics

Fully Electronic

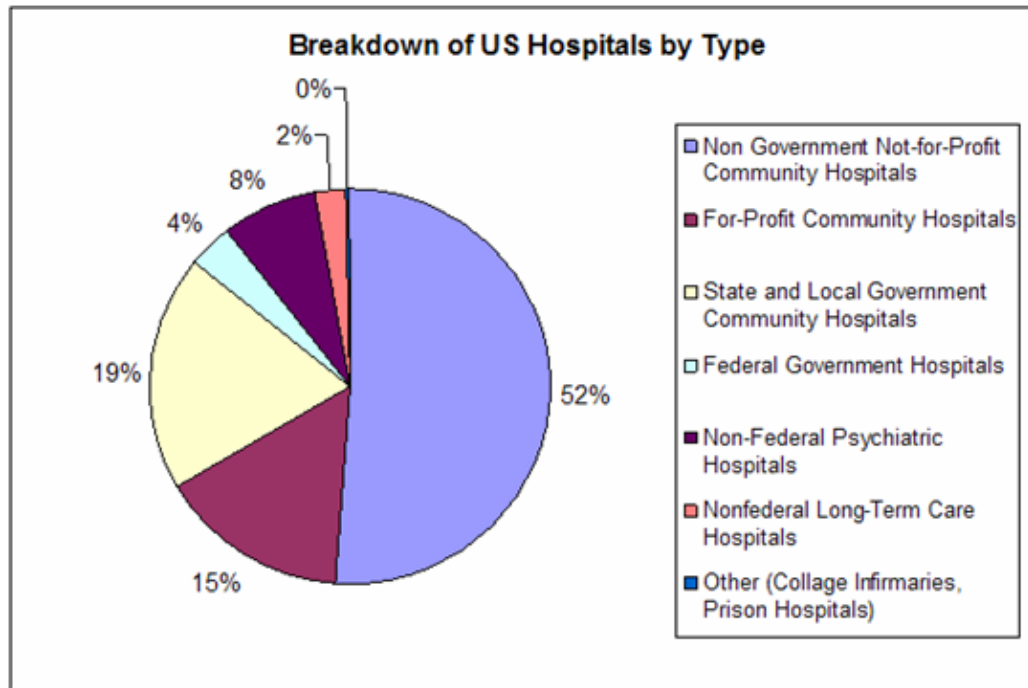


Paper Based

- **Lack of Standards:** No national standard exists dictating the format or taxonomy associated with Electronic Medical Records, making interoperability difficult.
- **Cost:** Implementing EMRs can be costly. One study found that initial costs of EMR systems for a Solo/Small Group Practice are over \$40,000 with an annual upkeep of \$8000.¹ These costs are almost entirely the hospital or physicians responsibility.
- **Privacy:** Securing Sensitive medical data is a large concern, and sufficient steps must be taken to secure data and prevent unauthorized access in order to make a true interoperable EMR network possible

Robert Miller et al. "The Value of Electronic Health Records in Solo or Small Group Practices," Health Affairs Vol. 24: 5 (2005): 1127-1136. Abstract available at: content.healthaffairs.org/cgi/content/full/24/5/1127 Retrieved March 8, 2009.

Breakdown of U.S Hospitals by Type



- Non Profit account for over half of all U.S. Hospitals
- Currently 12 of the top 19 hospitals are confirmed to be using an EMR systems¹
- Eligible for Tax Exempt Status
- Large Research Budgets
- Vested interest in 'Secondary Use' Medical Records

<http://health.usnews.com/articles/health/best-hospitals/2008/07/10/best-hospitals-honor-roll.html>



Market Introduction Approach

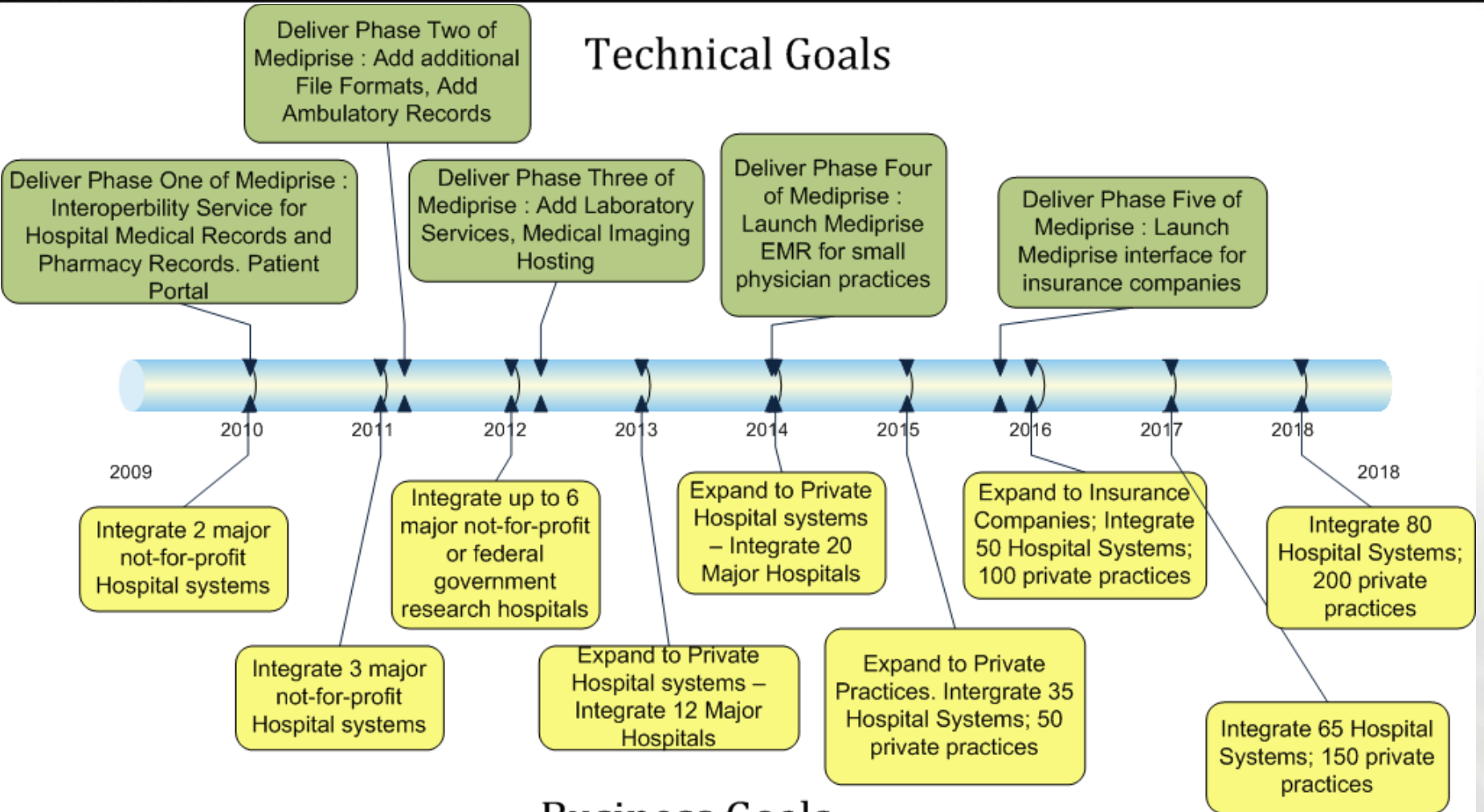
Mediprise is a constantly changing networked service. As such it made sense that a subscription price model be used, based on the number of physicians in a hospital

- Hospitals
 - One time set-up fee
 - Monthly Subscription
- Patients
 - Free web-based Portal
 - Subscribe for e-mails/alerts that may contain ads (optional)



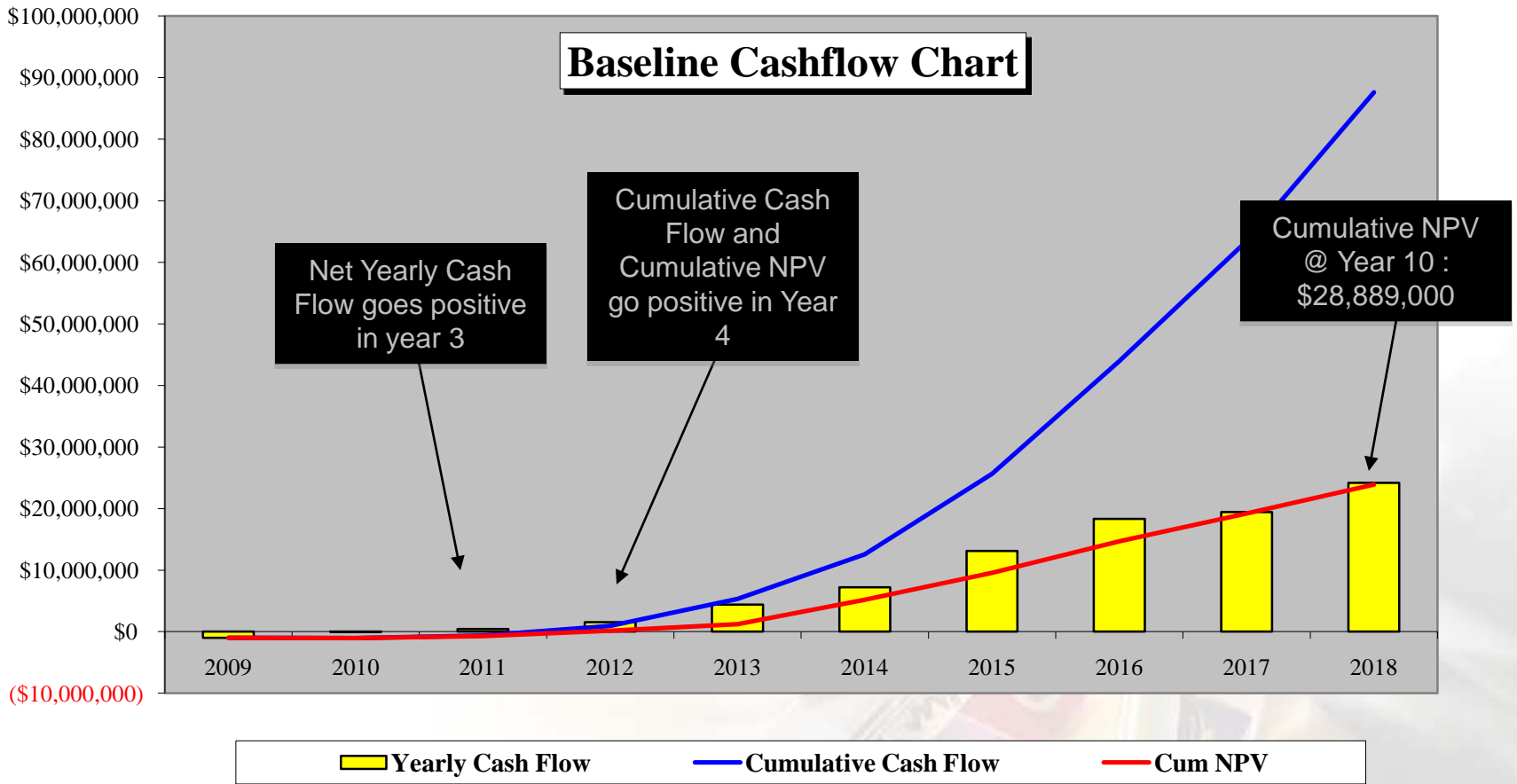
10 Year Road Map

Technical Goals





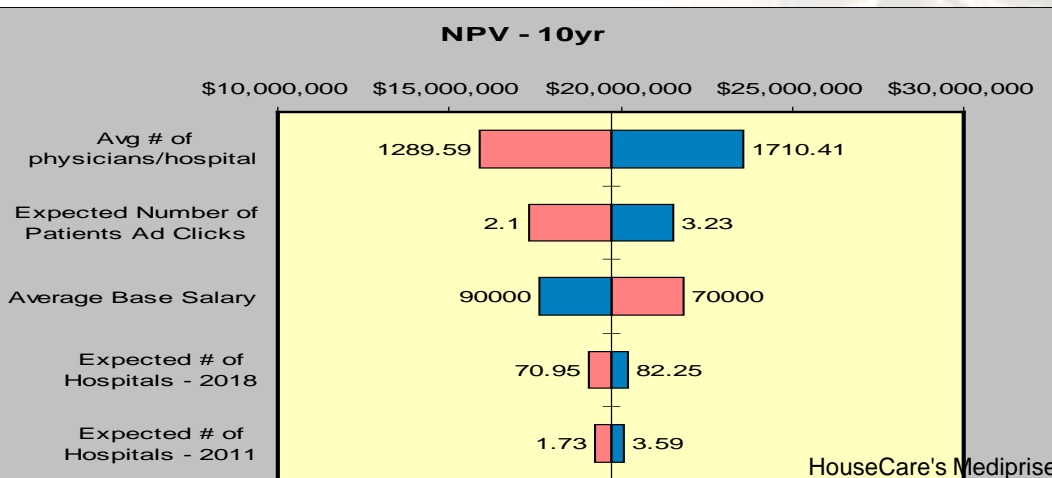
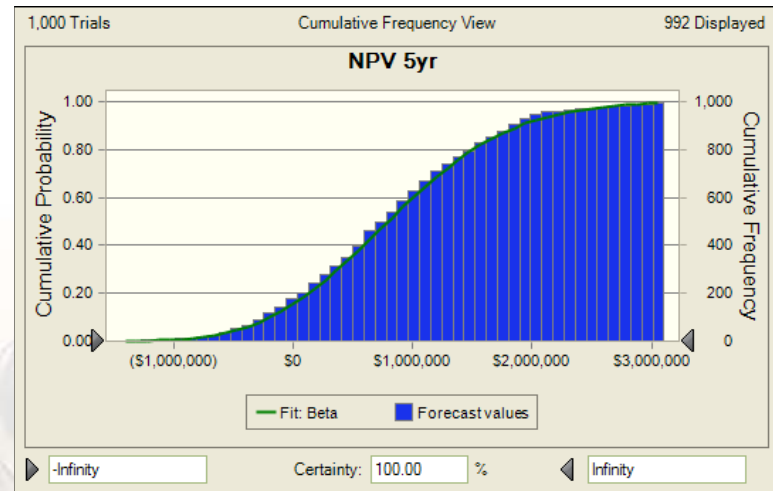
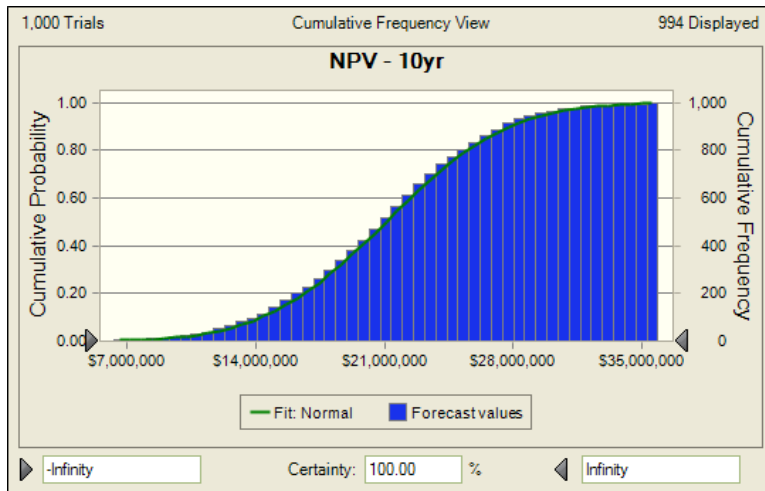
10 Year Cashflow





Net Present Value Analysis

- Over a 10 year period, there is a 0% chance of a negative NPV
- However, over a 5 year period, there is ~17% chance of a negative NPV



Variables:

- Number of Hospitals using Mediprise
- Number of Small Doctor's Offices using Mediprise
- Expected Number of Patient Ad Clicks
- Estimated Work Force Size



Risk Analysis

Risk ID	Risk Category (Cost, Schedule, Performance)	Risk Event	Consequence	Probability of Occurrence (A - E)	Consequence of Occurrence (A - E)	Overall Risk Level (H-M-L)	Risk Mitigation Plan
R1	Performance	Mediprise Software is not compatible with Mediprise Entity Legacy Software	System will not be operational with other EMR systems. Patient records will be in influx.	C	D	M	Test all known EMR software systems against our interface to ensure system software compatibility.
R2	Cost/Schedule	New Standards will be adopted or existing Standards are changed	System will not meet new standards, and will not be government compliant.	D	B	L	Update system to meet new standards. Keep up with major Standard releases and changes. Encourage participation in Health IT organizations such as HIMSS, CCHIT, HHS, etc.
R3	Cost	System security is inadequate, loopholes are exploited.	Patient data is compromised, and system access and availability may be denied.	B	E	H	Ensure sufficient firewalls are implemented, and data transfers are well encrypted. Re-visit security plan annually and update accordingly.
R4	Performance	Lack of Training/education of Housecare Employees	May unintentionally expose viable data, that could lead to a more major problem.	E	B	L	Train all employees, on the system. Develop training materials, and operating procedures. Also, have an emergency contact list for individuals to call regarding system issues.
R5	Performance	Loss of power	System down for an undetermined amount of time, updates aren't received at Mediprise Entities.	E	A	L	Install a backup power system.
R6	Schedule	Poor integration	System incompatibility (user interfaces, functionality, system architecture).	D	D	M	Test all systems against our standards to ensure system software compatibility.
R7	Performance	Technology reliability (availability)	Loss of support for system.	E	E	M	Conduct several tests to determine system reliability (establish MTBF, MTTR calculation). Establish alternatives to support system availability.
R8	Cost	Proprietary hardware/software, and database applications needed for Mediprise are unavailable or late	Can cause schedule delay for implementation.	E	C	L	Identify all alternative vendors.
R9	Cost/Performance	Hackers gain access to the Mediprise Network	Data is illegally accessed and distributed.	A	E	H	Require all user accounts to have strong passwords. Make sure Mediprise data is protected with adequate encryption and file sharing permissions. Make sure Housecare employees have access on a need to know basis.
R10	Performance	Insufficient or poor Service and Support provided to Mediprise users	Displeased customers.	C	E	H	Ensure adequate training for Customer Service Reps for Patient and Healthcare Provider Users. Require Customer Reps to go through annual training to ensure quality and consistency of service.
R11	Performance	Distributed Development Organization	Lack of information sharing.	E	A	L	Ensure system interoperability and integration.
R12	Performance	Fire or Theft at Housecare office locations.	Mediprise Network unavailable, updates not received at Mediprise entities.	E	B	L	Ensure Housecare Office spaces adhere to regional fire and safety codes, installing sprinklers, smoke alarms, fire extinguishers, etc. Conduct quarterly fire drills for evacuation and test safety equipment. Secure physical office spaces using door locks or cypher locks for highly sensitive locations. Consider also that most damage from a fire occurs from water sprinkler systems and the fire department. You may choose to cover your computer monitors with fireproof tarps when the fire alarm goes off.
R13	Performance	Employee misuse of computer	Can introduce viruses, or security flaws. May expose patient data.	E	B	L	Train all employees, on the system. Develop information Assurance training materials, and operating procedures to show what happens when systems are misused. Conduct annual required training. Also, have contact list for Security Personnel available.
R14	Performance	Mediprise is infected with a Computer Virus	May expose system vulnerabilities, personal information, and disrupt communication to Mediprise Entities.	A	E	H	Perform regular system updates(antivirus, patches,etc). Backup information nightly so records can be restored in case of data corruption.
R15	Performance	Acts of God (hurricanes, tornadoes, earthquakes)	Mediprise Servers are physically destroyed, service is disrupted.	D	C	L	Physically separate offsite backups will be maintained in the case of catastrophic events.
R16	Performance	Partial EMR systems	Lack of functionality.	C	B	L	Reduction in all capabilities.
R17	Performance	Data Conversions	Lack of information sharing.	D	B	L	Implement generic data conversion tool so that all systems can use.
R18	Cost	Corporate Espionage	Loss of technical information and business information	D	B	M	Have employees sign non-disclosure statements and develop intellectual property.
R19	Cost	Beat to Market by Competition	Loss of business and value.	A	A	H	Keep initial functionality simple and deliver incrementally.

System security is inadequate, loopholes are exploited.

Hackers gain access to the Mediprise Network

Insufficient or poor Service and Support provided to Mediprise users

Mediprise is infected with a Computer Virus

Mediprise is beaten to market by competitor

Probability	Consequence				
	Minimal to No Impact	Acceptable with some reduction in margin	Acceptable with significant reduction in margin	Acceptable. No margin remaining	Unacceptable
	A	B	C	D	E
80-100	A	M	H	H	H
60-80	B	M	H	H	H
40-60	C	M	M	M	H
20-40	D	L	L	M	M
0-20	E	L	L	L	M



Conclusions

- The Mediprise solution is:
 - Low Cost
 - A minor impact to Hospital's current process
 - Utilizing current and future standards
 - A providing mechanism to research hospitals to share secondary use (anonymous medical records) for research purposes
 - Feasible business business strategy over a 10 year period
 - Provides better patient services