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Transforming the Information Infrastructure: Build, Manage, Optimize.

FALL 2011

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Bridging IT Islands with Virtualization

Jeffrey Alan Orndoff
Director of Information Technology
University of Kansas Physicians

THE UNIVERSITY OF KANSAS PHYSICIANS

KU MEDICAL CENTER
The University of Kansas

THE UNIVERSITY OF KANSAS HOSPITAL

Agenda

- Who We Are
  - University of Kansas Physicians
  - University of Kansas Hospital
  - University of Kansas Medical Center
- Growth in Healthcare
- IT Challenges
  - Accounts Receivable, Scheduling and Billing Application
  - Electronic Medical Record (EMR) Application
  - IT in Healthcare
- Our IT Solution
  - Review current and future state
- Impact
  - Doctors, Residents, Students, Nurses and Employees
- Questions and Answers

User Case Study: Bridging IT Islands With Virtualization

Speaker: Jeffrey A. Orndoff, Director of Information Technology
The University of Kansas Physicians (UKP)

Description: Maintaining efficient IT operations for UKP

- Objective
  - Designing, developing, implementing and maintaining efficient data storage operations for 20 medical specialties
- Problem
  - Increase number of physical servers
  - Third storage upgrade in just a few years
  - Clinical and business application performance was lagging
  - Data growth (doubling every 12 months)
    - Clinical data
    - Research data
    - Academic data
    - Business data
- Solution
  - Virtualized storage

UKP IT Challenges
Cost-Effective Data Storage

- Clinical data growth (doubles every 12 months)
- New medical technology
  - Medical devices increasing
  - Medical applications increasing
- Reduce total cost of ownership
  - IT staff, hardware, software and maintenance cost
- Efficient management of Backup, Recovery and Archiving
- Reduce IT Infrastructures among all clinical departments
- Complying with healthcare industry standards
- Government healthcare regulations
- Managing fragmented data requirements
- Growing number of business and clinical computers

Kansas City Metropolitan Area

University of Kansas Physicians Clinical Departments

- Anesthesiology
- Emergency Medicine
- Family Medicine
- General Surgery
- Internal Medicine
- Neurology
- Neurosurgery
- Obstetrics and Gynecology
- Ophthalmology
- Orthopedic Surgery
- ENT- Otolaryngology and Head and Neck Surgery
- Pathology
- Pediatrics
- Plastic Surgery
- Psychiatry and Behavioral Sciences
- Radiation Oncology
- Radiology
- Rehabilitation Medicine
- Urological Surgery

University Of Kansas Physicians

- Multispecialty Physician Group - 18 foundations
  - Largest physician practice in Kansas
  - Representing more than 200 specialties
- Shared administrative services:
  - Information Technology
    - Technical Systems Maintenance
    - Help Desk Services
    - Purchasing Hardware/Software
    - Database Administration/Reporting Services
    - Internal and External Website Development
  - Clinical Operations
    - Design, Develop, Implementing and Maintaining EMR
    - Patient Satisfaction Management
    - Clinical Operations Efficiency/Provider Productivity
    - MOB Development/Planning-Ongoing Facilities Management
    - Centralized Materials Management
    - Risk Management
    - Clinical Core Competency Testing

University Of Kansas Physicians

- Managed Care Services
  - Contract negotiation with third-party payers
  - Ensure fair market value compensation for PSAs
  - Development and implementation of Kansas Medicaid State Plan

- Billing and Practice Services
  - Provide daily operating support for
    - Registration
    - Scheduling
    - Billing and accounts receivable
  - Provide on-going training for new employees
  - GE (IDX) enterprise system maintenance
  - CBO and AR management (McKesson)
  - Support to clinics to design or redesign
    - Clinic schedules
    - TES charge entry edits
    - Claim edits and formatting
    - Claims production

Universty Of Kansas Physicians

- Compliance
  - Institutional Compliance
  - Charge master management
  - Development of department's policies to ensure consistency with regulations and accreditation
  - HIPAA compliance and Privacy Policy development
  - Internal audit:
    - » Annual audits of all UKP providers
    - » New provider audits
    - » Identification of missed revenue
  - Training for new employee
  - Coding resource for departments

- Financial Management and Accounting Services
  - Financial and Accounts Payable reporting
  - Accounts Receivable Management
  - Payroll, budget, annual audit, tax returns and pension
  - Bank reconciliations
  - Financial policies and procedures

University Of Kansas Hospital

- By the Numbers
  - Employees - 4,763
  - Outpatient visits - 361,652/year
  - Staffed beds - 606
  - Inpatient discharges - 26,180/year
  - Physicians - 505
  - Emergency Department visits - 46,209/year
  - Residents - 341

- Academic Medical Center
  - Cancer care, Heart care, Spine care, Neuroscience, Trauma, Critical Care, Burn Center and Transplant

BEST HOSPITALS
U.S.News & WORLD REPORT
NATIONAL
RANKED IN 6 SPECIALTIES
2011-12

University of Kansas School of Medicine

- Vision
  - Academic Medical Center
  - Education
  - Research
  - Clinical programs
  - Community service
  - The place where everyone wants to come:
    - to learn
    - to teach
    - to conduct research
    - to receive health care

Basic Science Departments
School of Medicine

- **Anatomy** and Cell Biology
- **Biochemistry** and Molecular Biology
- **Biostatistics**
- **Health Policy** and Management
- **History and Philosophy of Medicine**
- **Microbiology**, Molecular Genetics and Immunology
- Molecular and Integrative **Physiology**
- **Pathology** and Laboratory Medicine
- **Pharmacology**, Toxicology and Therapeutics
- **Preventive Medicine and Public Health**

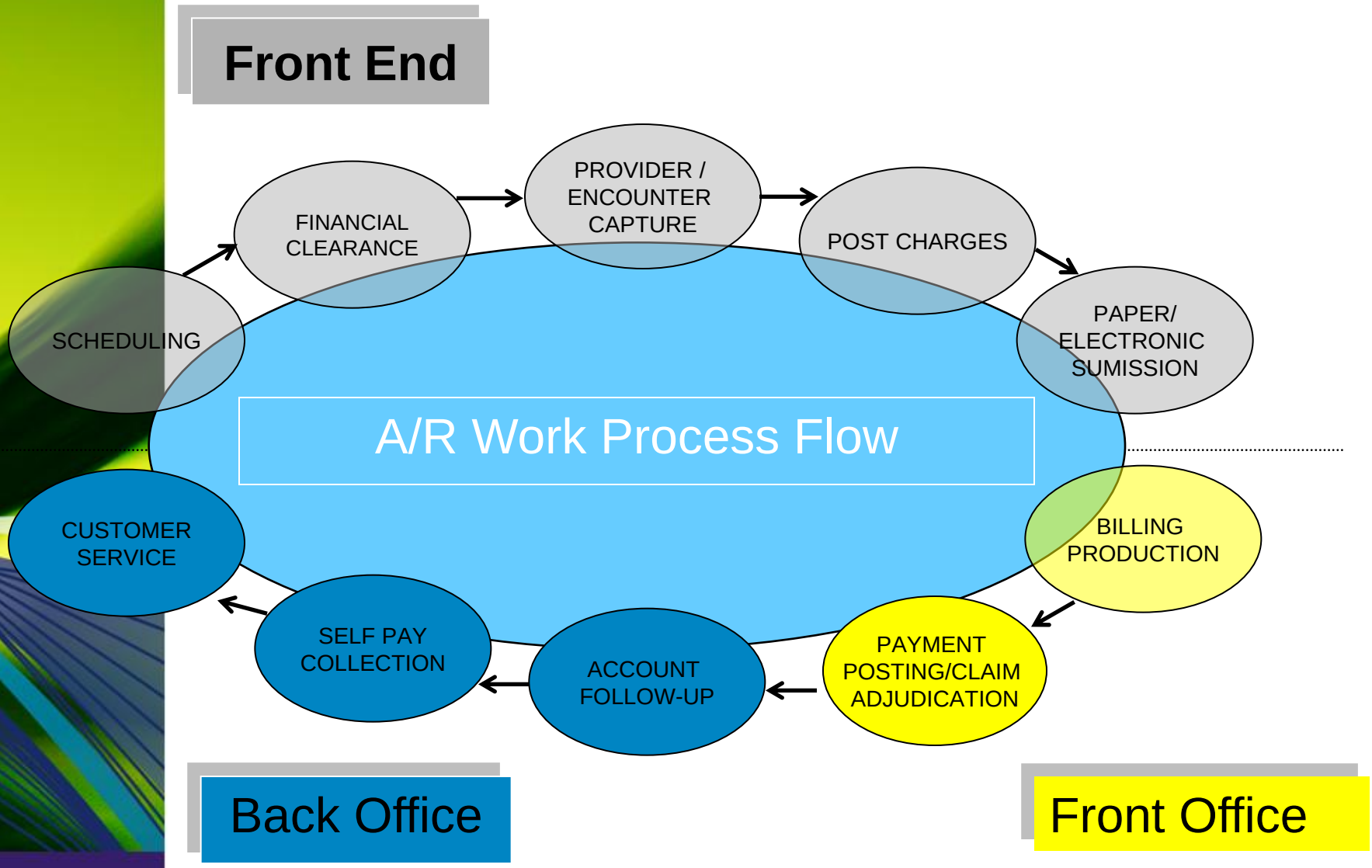
Centers
School of Medicine

- **Cardiovascular Research** Institute
- Center for **Biostatistics** and Advanced Informatics
- Center for **Child Health** and Development
- Center for **Children's Healthy Lifestyles** and Nutrition
- Center for **Healthcare Informatics**
- Center for **Reproductive Sciences**
- Center for **Tele-Medicine** and Tele-Health
- Center for **Oncology**
- Center on **Aging**

How we use technology

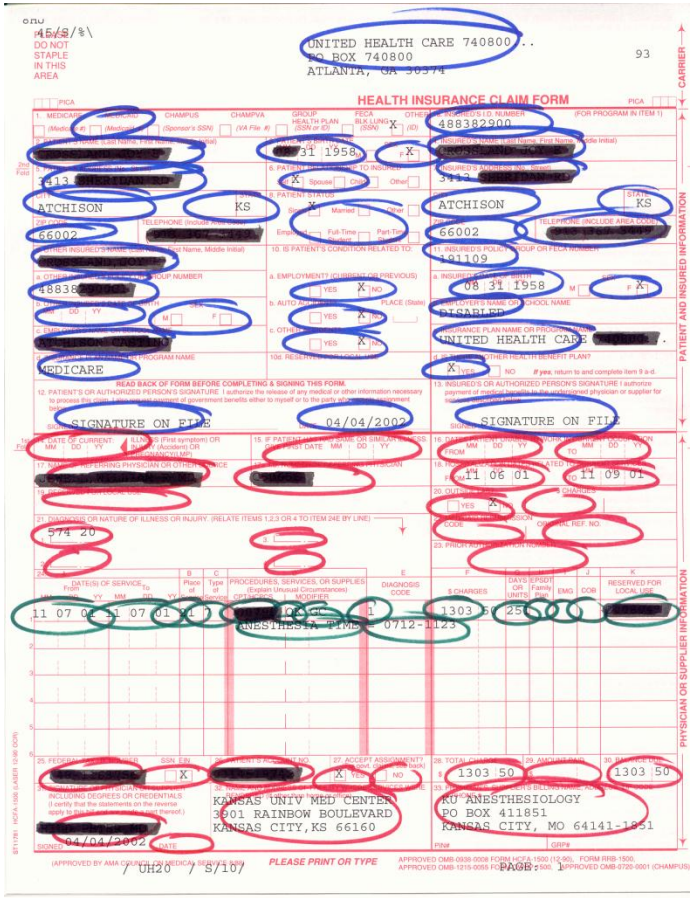
- Thousands of users access IT system for:
  - Clinical
    - Epic-Care - Electronic Medical Record
      - Epic-Care is a full-featured system
      - Computer Physician Order Entry (CPOE)
      - e-prescribing, health maintenance, population management, research, visit documentation and follow-up workflows
      - Epic's My-Chart
  - Research
    - i2b2 - research data warehouse
      - clinical research data
  - Teaching
    - Resident and Medical Student - management applications
      - Records clinical experience
      - Valuation tool
  - Administrative
    - GE Business Centricity - scheduling and accounts receivable
      - Revenue cycle management system

Patient Access and Revenue Cycle



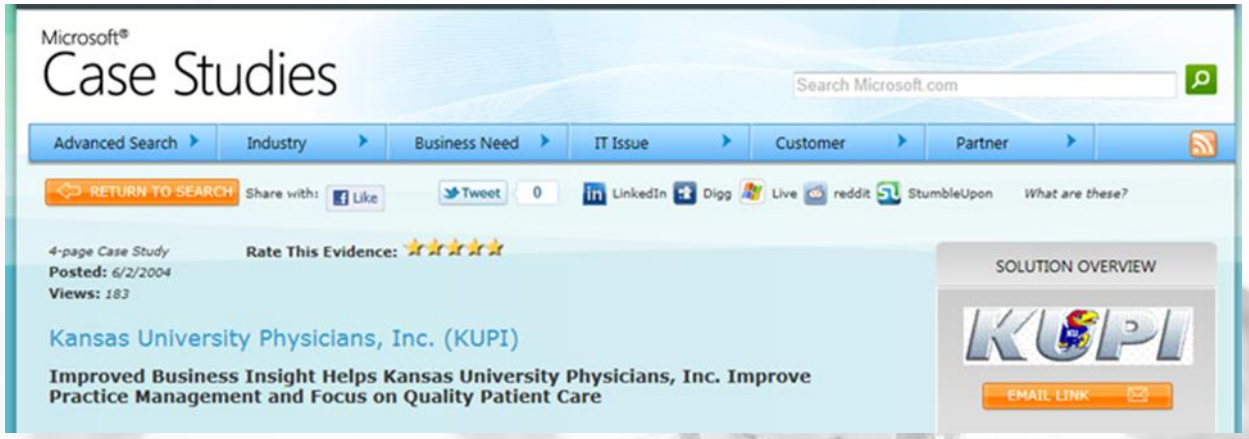
HCFA Form 1500 Information

- Patient Demographic and Insurance Information
  - 36 data items
- Procedures Information
  - 14 data items
- Clinical Information
  - 47 data items



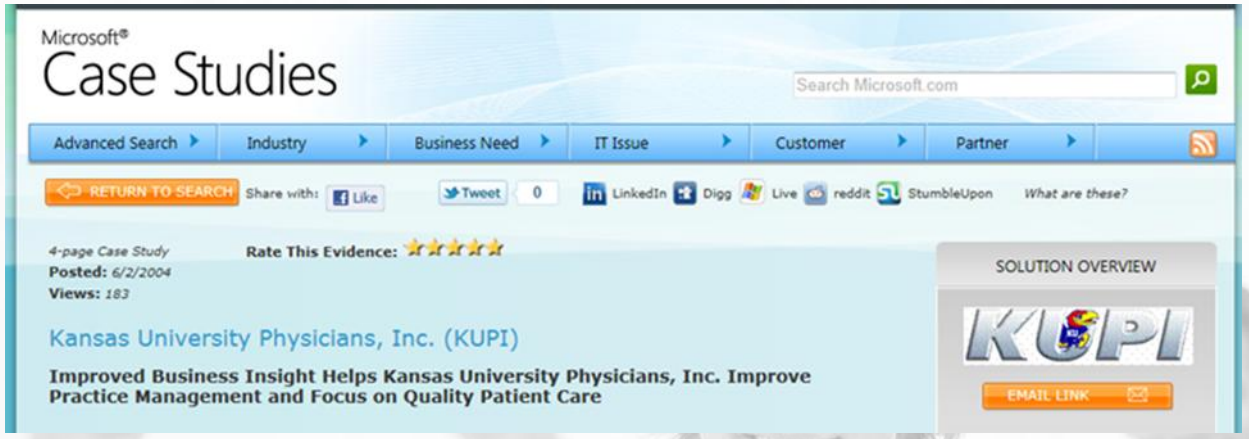
- Organization Profile
  - Kansas University Physicians, Inc. (KUPI) is the largest multi-specialty group practice in Kansas. Working with state-of-the-art treatment, knowledge, and expertise, KUPI ensures quality care for patients throughout the region.

- Business Situation
  - Improvements to its practice management. Needed better visibility into processes and information:
    - Increase accounts receivable - Date of Services to Posting
    - Increase accounts receivable – Missing Charges
    - Reduce missed appointments - No Show Rate, Cancel Rate, Bump Rate
    - Increase physician utilization- Scheduling Information



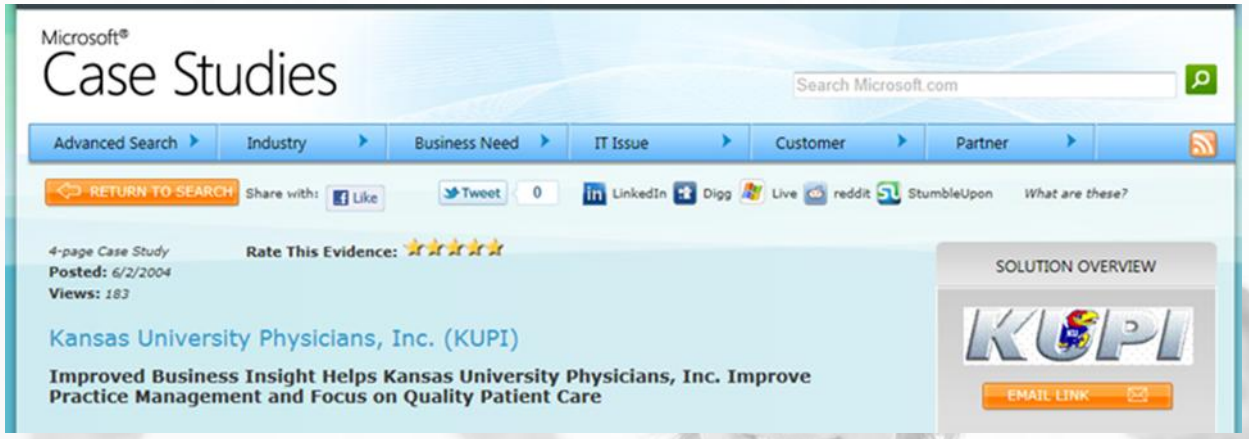
- Solution
  - Using the Business Scorecard

Department of Internal Medicine-Endocrinology Division	June 2011					
	Month-to-Date Actual	Month-to-Date Target	Month-to-Date Var.	Performance at or better than Target	Warning--Lagging Performance	Immediate Action Required
Monthly Data Points						
Charge Entry Process						
Charge Lag	8.50	8.00	0.50	=< 8 Days	8-10 Days	> 10 Days
Missing Charge Tickets > 30 days*	61	-	61	0 - 15 accounts	16 - 30 account:	>30 accounts
Account Management						
UKP Rejections, Send For Imaged and Non Imaged > 30 Days	5	-	5	0	1 - 15	> 15
Credit Balance w/zero charges > 60 days	-	-	-	0-10	11-20	> 20
Days in Accounts Receivable	36	47	(11)	=< 47	48 to 54 Days	> 54 Days
Scheduling						
Appointment Scheduled - Bumped w/ < 60 Days Notice	9%	<=5%	na	<=5%	6% to 7%	>=8%
No Show Rate*	16%	<=12%	na	<=12%	13% to 16%	>16%
Past Pending	-	-	-	0	1 - 3	> 3
* Includes COA Osteo, Genetics, Osteo and Diabetic						



- Solution
  - Using the Business Scorecard

Scheduling Provider	Clinic Allocated Hours	Clinic Arrived Hours	Clinic Allocated FTE	Clinic Booked FTE	Clinic Efficiency	Clinic Arrived Appts	Clinic Arrived Appts per Hour
KHAN,TALAL W - 4510026	19.0	8.8	0.11	0.06	46.05%	33	1.7
ANESTH KUMW 45 Totals:	19.0	8.8			46.05%	33	1.7
ANESTH KU BRAUN PROC - 45009	82.0	89.8	0.49	0.59	109.45%	185	2.3
ANESTH KU KHAN PROC - 45006	76.0	82.0	0.45	0.54	107.89%	152	2.0
BRAUN,EDWARD - 4510029	64.8	51.0	0.39	0.38	78.7%	149	2.3
KHAN,TALAL W - 4510026	59.5	55.8	0.35	0.37	93.7%	175	2.9
KU SPINE CENTER 65 Totals:	282.3	278.5			98.65%	661	2.3

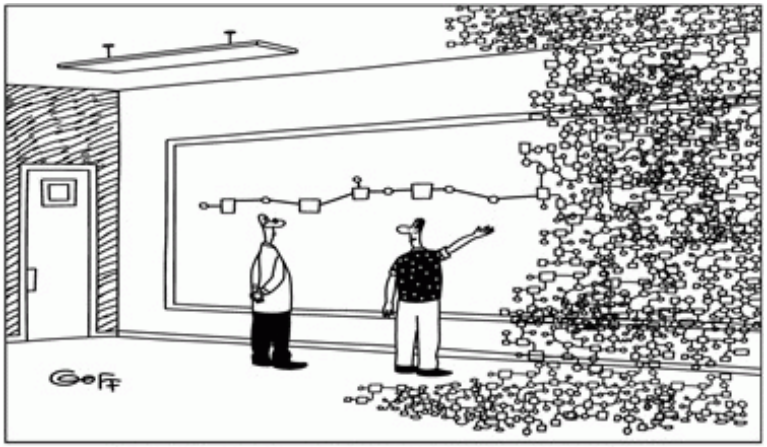


- Solution
  - Using the Business Scorecard

Scheduling Provider	No Show Percentage	Bump Percentage	Cancel Percentage	New Patient Percentage	Established Percentage	Other Percentage	Procedure Percentage
KHAN,TALAL W - 4510026	17.5%	0.0%	60.71%	7.5%	92.5%	0.0%	0.0%
ANESTH KUMW 45 Totals:	17.5%	0.0%	60.71%	7.5%	92.5%	0.0%	0.0%
ANESTH KU BRAUN PROC - 45009	9.76%	0.0%	24.49%	19.02%	8.29%	0.0%	72.68%
ANESTH KU KHAN PROC - 45006	8.98%	0.0%	24.0%	8.38%	0.0%	0.0%	91.62%
BRAUN,EDWARD - 4510029	20.32%	0.67%	28.71%	37.97%	62.03%	0.0%	0.0%
KHAN,TALAL W - 4510026	11.62%	12.5%	39.66%	26.26%	73.74%	0.0%	0.0%
KU SPINE CENTER 65 Totals:	12.68%	3.78%	29.98%	23.25%	36.86%	0.0%	39.89%

- Benefits
  - Increased visibility needed to make improvements to practice management
    - "The solution helps us gain visibility into the information we need to make improvements," says Jeff Orndoff. "For example, by providing more user friendly reports on accounts receivable, KUPI managers can more easily make decisions to optimize resource allocation to improve management of the practice."
  - Improved accounts receivable
    - The solution is helping KUPI administrators gain heightened visibility into the factors that contribute to late or uncollected accounts receivable. Ultimately, this information is helping to address existing receivables and to better allocate resources to optimize the business. KUPI has been able to improve its collection of existing missing charges and expects to prevent a significant number of missing charges from occurring in the future.
  - Higher physician utilization
    - Orndoff adds, "Effectively utilizing support staff resources is an important part of medical practice management. Reports on missing charges, missed appointments, charge lag, and insurance denials at the physician level help us increase physician efficiency, generate revenue and improve patient service."

Electronic Medical Record



"This is where the idea for the new EHR starts getting a little complicated."

"This is where the idea for the new EMR start to get a little complicated."

primary care functionality
specialty care functionality
sub-specialty care functionality
unique sub-specialty care functionality
academic functionality
research functionality

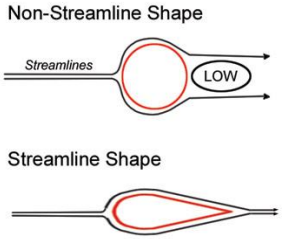
Electronic Medical Record

- What is the Electronic Medical Record (EMR)
  - **Electronic record of patient health information**
  - Patient health information generated by one or more **encounters** in any care delivery setting
  - Included in this information:
    - **patient demographics**
    - **progress notes**
    - **problems**
    - **medications**
    - **vital signs**
    - **past medical history**
    - **immunizations**
    - **laboratory data and radiology reports**

Electronic Medical Record

- Automates the clinical workflow….
  - to reduce the need for human work in the production of services

- Streamlines the clinical workflow….
  - to be less resistant



- EMR has the ability to generate a **complete record of a clinical patient encounter….**
  - evidence based clinical services
  - quality management
  - outcomes reporting

NextGen EMR: John Dokes - [06/26/2007 12:00 PM : "Master Im"]

File Edit Default View Tools Utilities Window Help

Exit | Save | Clear | Delete | Main Office | Barclay, Joseph MD | Patient | History | Inbox | PAQ | Apps. | Close

HOME
Demographics
Record Vital Signs
Nurse Documentation
Chart Summary
View Results
Allergies
Immunizations
Past Medical History
Family History
Social History
Health Maintenance
HPI / Problem List
Review of Systems
Physical Exam
Procedures
Assessment
Disease Management
Plan / Lab / OS / Diag
Document Library
E&M Coding
Coumadin
Adult Office Visit
Echocardiogram
Nutrition Assessment
Stress Master
Stress Nuclear
Preview | Offline

Patient: John Dokes **Age:** 47 **DOB:** 03/14/1960
Current Provider: Joseph Barclay MD **Gender:** Male **Current Encounter:** 06/26/2007

New patient
Established patient
Specialty: IM
Visit Type: Office Visit
Historian: self
Referring MD | PCP Info
Alerts Patient Service info

Reason(s) for visit | Brief Visit
cough F/U
headache F/U

Chronic Problem List | Add new problem

Chronic Problem	Code

Add to today's assessments ?

Vitals | Vital Signs Outside Normal Range | Add New Vital Signs | Expand Vital Signs

Date / Time	Temp F	Temp C	BP	Pulse	Rhythm	Respiration	Ht In	Ht Cm	Wt Lb	Wt Kg	Conte
06/26/2007 12:00 PM	96.4		130/90	80	regular	16	71.0		216.00		dress

Medications ☐ No Medications | Comment

Medication	Dose	Sig Codes	Start Date	Stop Date
SIMVASTATIN	10MG	1T PO OD	/ /	/ /

Allergies ☑ No Known Allergies | Comment

Ingredient/Allergen	Brand Name

Health Monitor: Set Health Maintenance Protocols | Set Disease Management Protocols | Tobacco User: yes quit

	Due:		Due:		Due:		Due:
Physical Exam	/ /	Tetanus	/ /	Eye Exam	/ /	ALT/AST	/ /
Lipid Panel	06/26/2007	PSA Test	/ /	Foot Exam	/ /	CPK	/ /
Colonoscopy	/ /			HgbA1C	/ /	Urinalysis	06/26/2007
Sigmoidoscopy	/ /			BMP Fasting	/ /	Urine Micro	/ /
FOBT x3	/ /			EKG	06/26/2007	TSH	/ /
Influenza Vac	/ /			Stress Test	/ /	PFT	/ /
Pneumo Vac	/ /			Echocardiogram	06/26/2007	Chest X-ray	/ /

New | Lock
06/26/2007 12:00 PM
Master Im
Master Im Vitals
Medication
Adult Office Visit
Disease Mngt
Custom ...

Ready 06/26/2007

Base: 300 U.S. healthcare providers

- **Top reasons** healthcare providers adopt EMR systems:
  - Better patient care
  - Save time, improve efficiency
  - Reduce errors or the risk of errors
  - Improve staff productivity

- **Improvements doctors would like** to see in EMR systems:
  - Increased speed
  - Easier to use, less complex
  - Lower cost
  - Removal of unnecessary functions
  - Greater interoperability with other systems
  - Better remote access

Source: Computing Technology Industry Association survey on healthcare IT, July 2010

Base: 300 U.S. healthcare providers

- **Most commonly used** EMR software features:
  - Charting
  - Scheduling
  - E-prescriptions
  - Computerized physician order entry
  - Medications management

- **Top reasons for not adopting** EMR systems:
  - Upfront costs
  - Ongoing operational costs
  - Impact on existing workflow or processes
  - Training and user-adoption issues

Source: Computing Technology Industry Association survey on healthcare IT, July 2010

EMR Healthcare IT Report Card

- **Sharing data** among healthcare industry: C-
- The technology is **usable enough** for doctors and nurses: C
- Making healthcare computer systems **affordable**: C
- Ensuring the **privacy and security** of electronic health records: B
- Using IT to **lower the cost** of care: B-
- Using IT to **improve the quality** of patient care: B+

Source: Computing Technology Industry Association survey on healthcare IT, July 2010

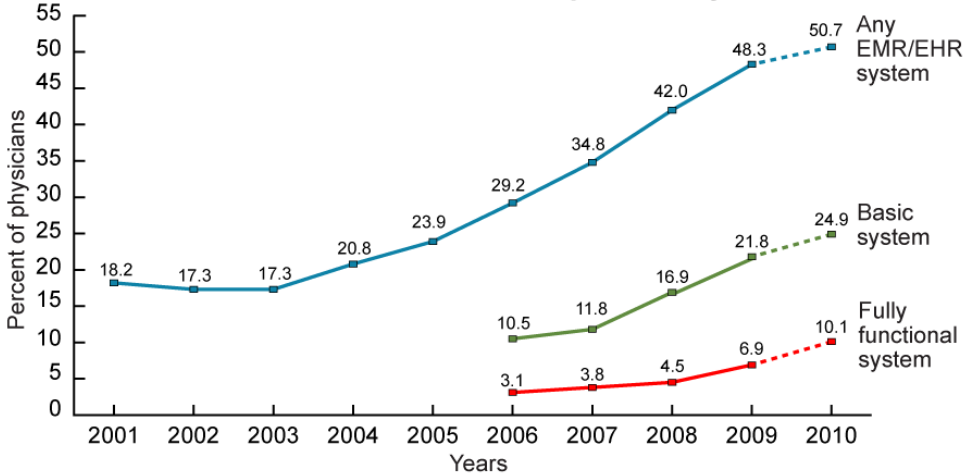
The Medicare and Medicaid EMR Incentive Program Demonstrate Meaningful Use

- Use **computerized order entry** for medication orders
- Implement **drug-drug, drug-allergy checks**
- Generate and **transmit prescriptions electronically**
- **Record demographics**
- Maintain an **up-to-date problem list** of current and **active diagnoses**
- Maintain **active medication list**
- Maintain active medication **allergy list**
- **Record and chart changes in vital signs**
- **Record smoking status** for patients 13 years old or older
- Implement one **clinical decision support rule**
- **Report ambulatory quality measures** to CMS or the States
- Provide patients with an electronic copy of their health information upon request
- Provide **clinical summaries to patients** for each office visit
- Capability to **exchange key clinical information electronically** among providers and patient authorized entities
- **Protect electronic health information** (privacy & security)

Percentage of office-based physicians with electronic medical records

- Half of 7,000 doctors surveyed this year reported at least partial use of electronic medical records (EMR)
- The trends over the past 9 years reflect a major increase in the use of EMR
- Fully Functional EMR Systems (10%) Increase by 46.4% (2009-2010)
- Basic Functional EMR Systems (25%) Increase by 14.2% (2009-2010
- Limited Functional EMR Systems (50%)

Figure 1. Percentage of office-based physicians with electronic medical records/electronic health records (EMRs/EHRs): United States, 2001–2009 and preliminary 2010

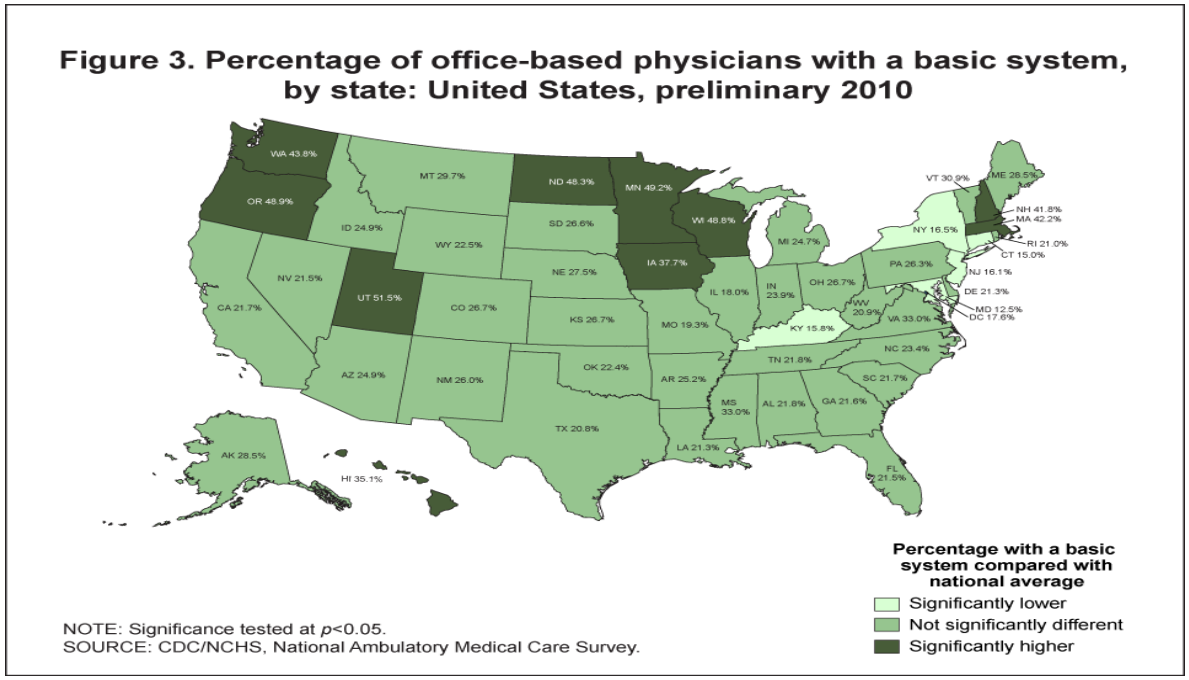


NOTES: Any EMR/EHR is a medical or health record system that is either all or partially electronic (excluding systems solely for billing). The 2010 data are preliminary estimates (as shown by dashed lines), based only on the mail survey. Estimates through 2009 include additional physicians sampled from community health centers; prior 2008 combined estimates were revised to include those physicians (4). Estimates of basic and fully functional systems prior to 2006 could not be computed because some items were not collected in the survey. Fully functional systems are a subset of basic systems. Some of the increase in fully functional systems between 2009 and 2010 may be related to a change in survey instruments and definitions of fully functional systems between 2009 and 2010 (see Table for more details). Includes nonfederal, office-based physicians. Excludes radiologists, anesthesiologists, and pathologists.
SOURCE: CDC/NCHS, National Ambulatory Medical Care Survey.

States Reporting Use of Electronic Medical Record

- The survey found a "significantly higher" percentage of doctors in certain states reporting use of EMR. Minnesota, Washington, Oregon, Wisconsin, Utah and North Dakota topped the list.

- Florida, Louisiana and Kentucky showed significantly lower numbers of physicians reporting EMR use.



Healthcare Costs Are Growing Faster Than The Economy

Hospital Care, Professional Services, and Prescription drugs

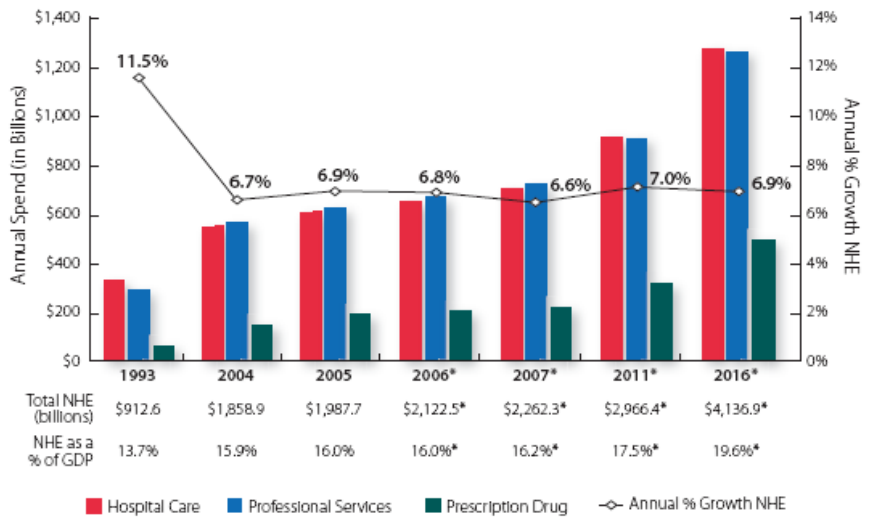
Annual growth rate at 7%

20% of gross national product in 2016

2.9 trillion - healthcare spending in 2011

4.0 trillion - healthcare spending in 2016

CMS estimates that national health expenditures will exceed $4 trillion by 2016 and account for nearly 20% of gross domestic product.



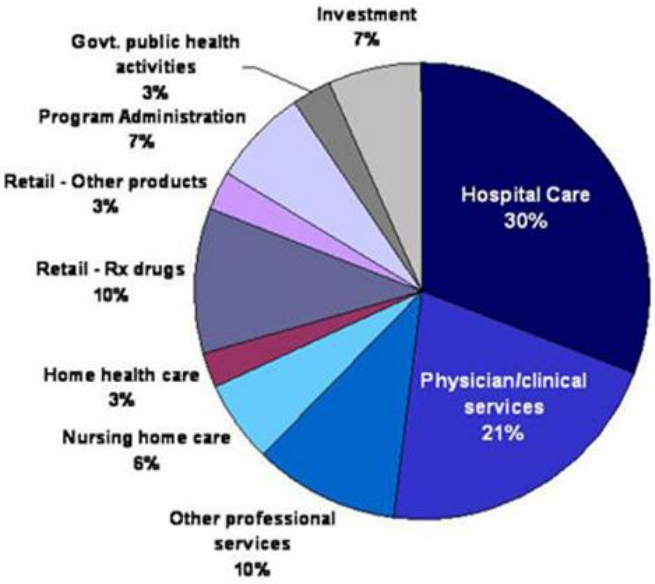
*Projected

Source: "Health Spending Projections Through 2016: Modest Changes Obscure Part D's Impact," *Health Affairs*, February 2007. Data source: National Health Statistics Group, Office of the Actuary, Centers for Medicare and Medicaid Services; and U.S. Department of Commerce, Bureau of Economic Analysis and Bureau of the Census. Selected NHE components shown.

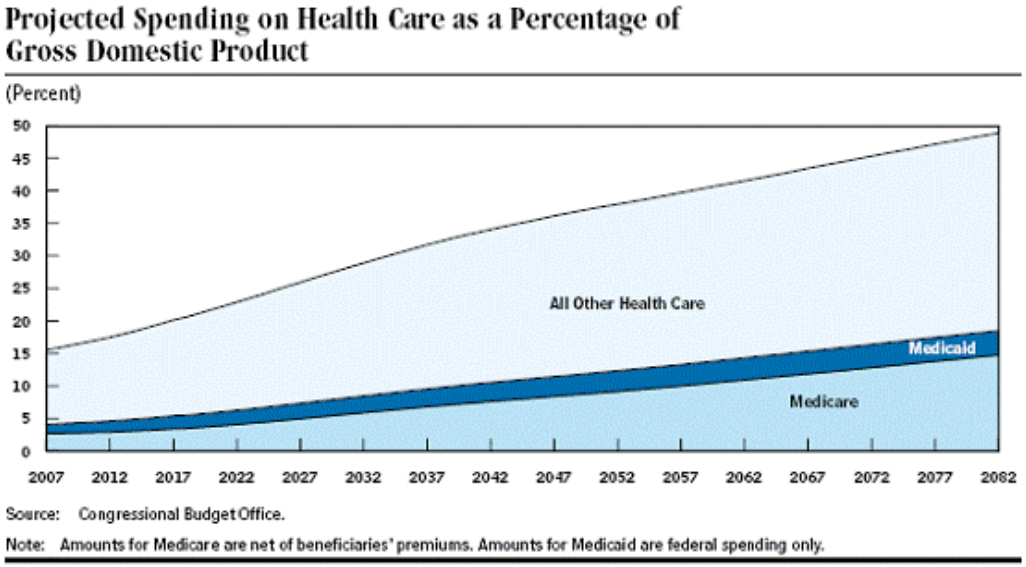
Factors Underlying Historical Growth in Health Care Spending

- Aging Population
- Changes in Third-Party Payment
- Rising Personal Income
- Prices in the Health Care Sector
- Defensive Medicine
- Supplier-Induced Demand
- Administrative Costs
- Advances in Medical Technology
  - Clinical services
  - Equipment
  - Drugs
  - Providers

Healthcare Cost
Services/Products/Activities



The Percent of Gross Domestic Product in 2082



Healthcare Jobs

- Supply for Healthcare Services "**supply-side economics**"
  - Industry
    - **Ambulatory** 43% of jobs
    - **Hospitals** 35% of jobs
    - **Nursing care facilities** 22% of jobs
  - Healthcare provides 14.2 million jobs
    - **Professionals**: physicians, nurses, technicians and others 72% of jobs
    - **Office Support**: billing, receptionist, secretaries and others 24% of jobs
    - **Management**: business, financial and others 4% of jobs
  - 10 of the 20 fastest growing occupations are healthcare related

UKP IT Challenges
Cost-Effective Data Storage

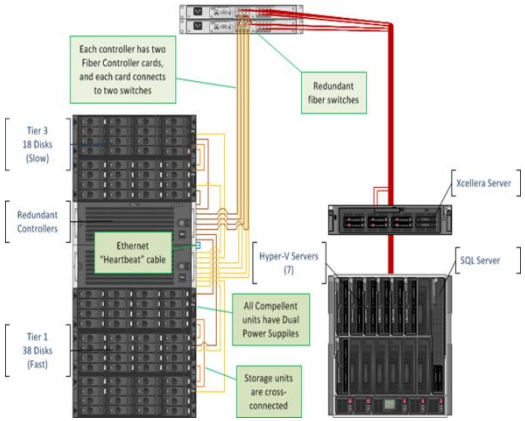
- Clinical data growth (doubles every 12 months)
- New medical technology
  - Medical devices increasing
  - Medical applications increasing
- Reduce total cost of ownership
  - IT staff, hardware, software and maintenance cost
- Efficient management of Backup, Recovery and Archiving
- Reduce IT Infrastructures among all clinical departments
- Complying with healthcare industry standards
- Government healthcare regulations
- Managing fragmented data requirements
- Growing number of business and clinical computers

Our IT Solutions and Benefits

- Solution
  - Dell™ Compellent™ Storage Center™ SAN
  - Dell Fluid Data technology
    - Thin Provisioning
    - Automated Tiered Storage
    - Copilot Consult migration services
- Benefits
  - Reduced storage capacity by 65 percent
  - Decreasing disk drive costs by 50 percent
  - Migrated 80 percent of data to cost-effective drives
  - Flexible and scalable storage foundation
  - Improving application performance
  - Prepared for continued data growth without massive expenditures or the addition of IT staff

Dell Compellent

- Redundancy is key feature
  - Dual controllers
  - Redundant fiber controller cards
  - Dual tier dynamic storage
    - Fast Tier 1
      - 450GB, 15K RPM, Fiber-SCSI
    - Slow Tier 3
      - 1TB, 7200 RPM, Fiber-ATA
  - Redundant fiber switches



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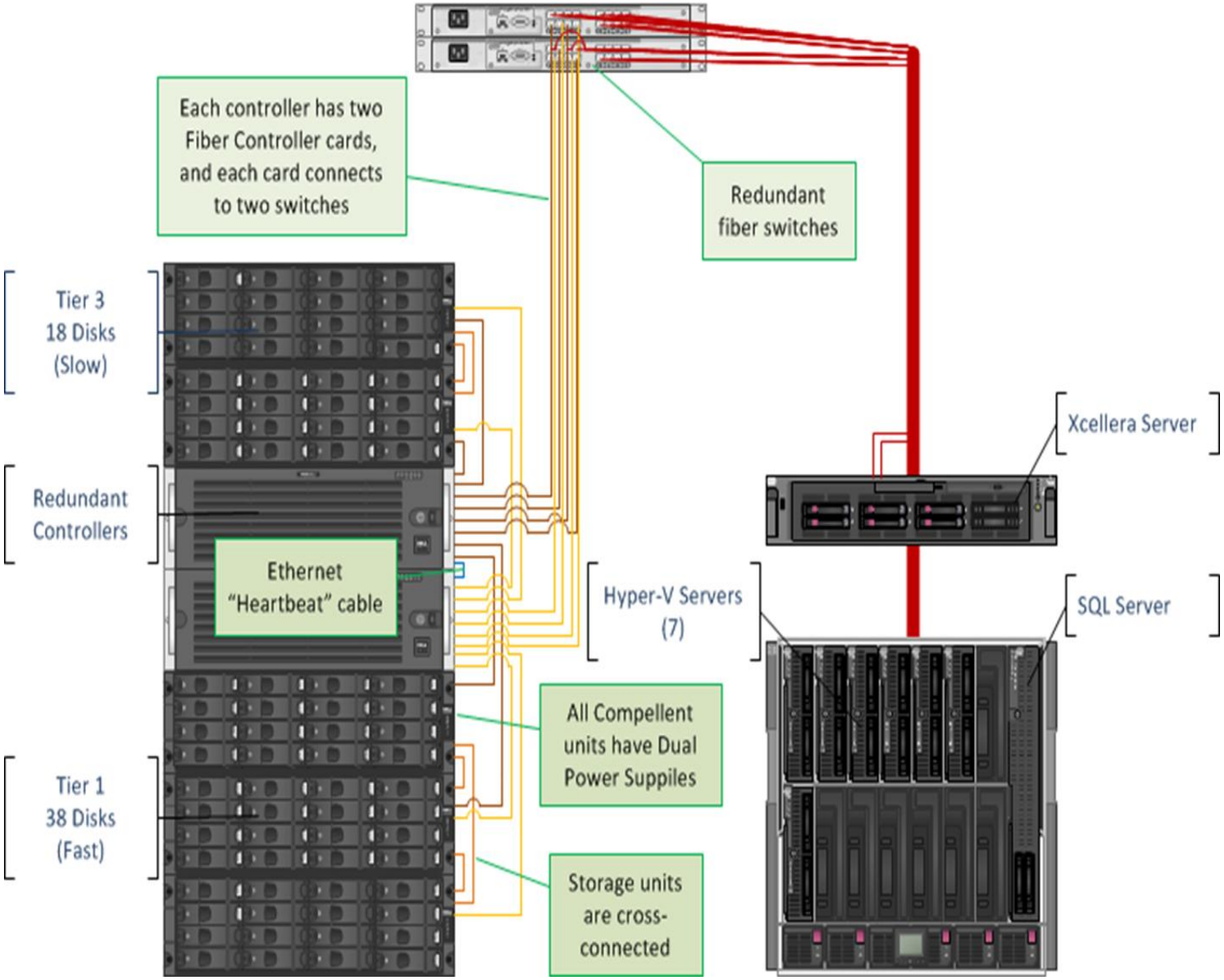
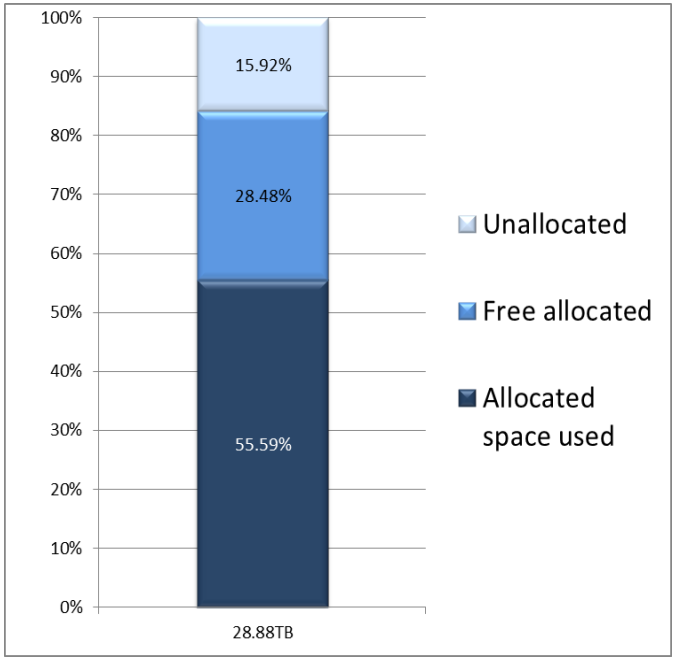


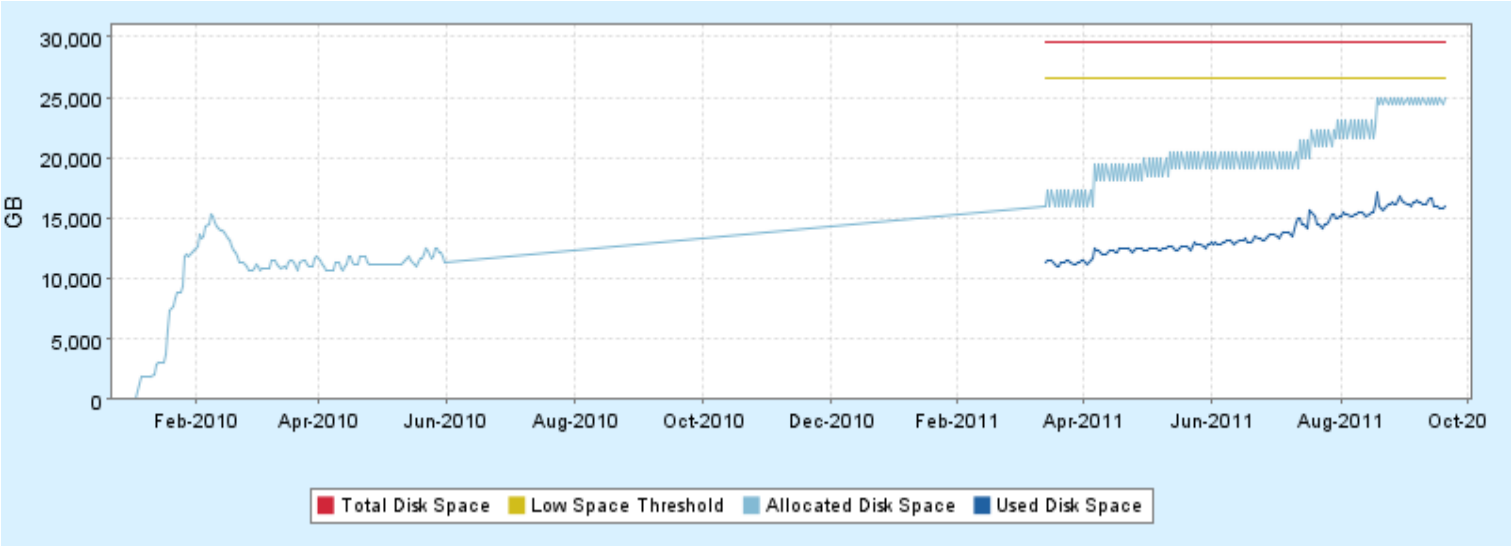
Storage Statistics

- Total disk space: 28 TB
- Available space: 24 TB (84.07%)
- Allocated space: 16 TB (55.59%)
- Free space: 8 TB (28.48%)
- Unallocated space: 4 TB (15.92%)
- Total free space: 12 TB (44.41%)



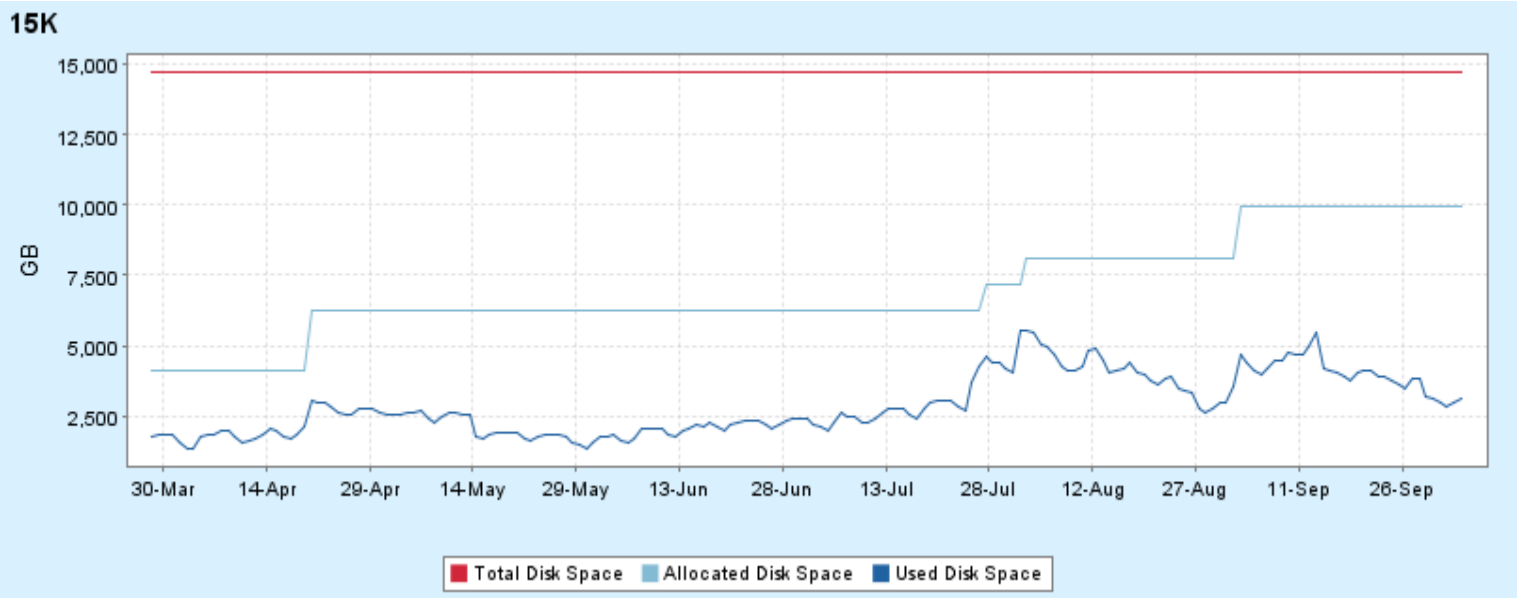
Consumption Trends Overall: January 2010 – October 2011

- Initial spike upon migration to Compellent
- 28 TB Total capacity
- 27 TB Low space warning
- 24 TB Allocated
- 16 TB Used



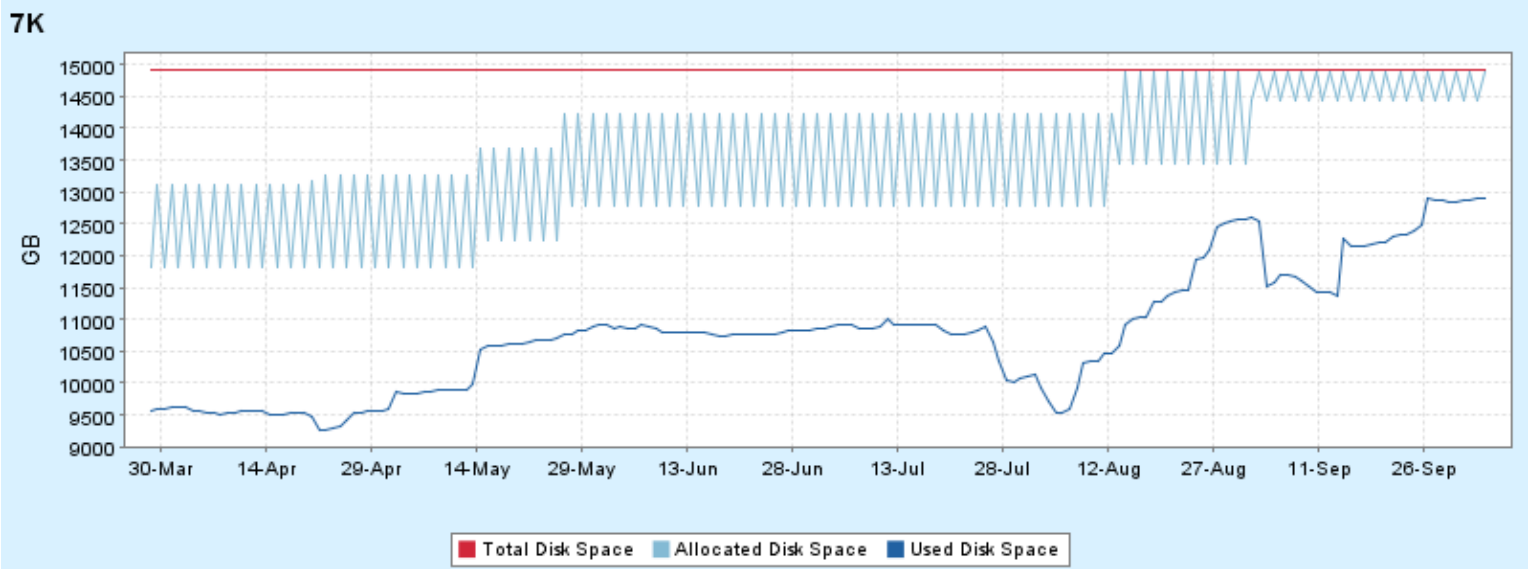
Consumption Trends
Tier 1 – Past 6 Months

- 38 disks
  - 450GB, 15K RPM, Fiber-SCSI (419GB formatted)
  - 3 used as RAID Hot-Spare disks
- 35 active disks provides
- 15 TB Usable space
- 10 TB Allocated space / 4 TB Used



Consumption Trends
Tier 3 – Past 6 Months

- 18 disks
  - 1 TB, 7200 RPM, Fiber-ATA (931GB formatted)
  - 2 used as RAID Hot-Spare disks
- 16 active disks provides
- 15 TB Usable space
- 14 TB Allocated space / 12 TB Used



Data Progression

- Dell-Compellent automatically moves data between tiers
- Frequently access data moves to faster disks
  - 450GB, 15K RPM, Fiber-SCSI (419GB formatted)
- Stale data moves to slower disks
  - 1 TB, 7200 RPM, Fiber-ATA (931GB formatted

Tier 1 Storage

Space available in tier: 14.33 TB | Allocated to Redundant 2 MB storage: 9.73 TB | Total space allocated: 9.73 TB

RAID Level	Track	Chart	Disk Allocated	Disk Used	Moving Up	Moving Down
RAID 10	Fast		1.24 TB	1.01 TB	0 MB	318.59 GB
RAID 5-9	Fast		1.62 TB	1.62 TB	0 MB	0 MB
RAID 10	Standard		3.6 TB	218.6 GB	12.87 GB	0 MB
RAID 5-9	Standard		3.27 TB	781.14 GB	0 MB	4.73 GB

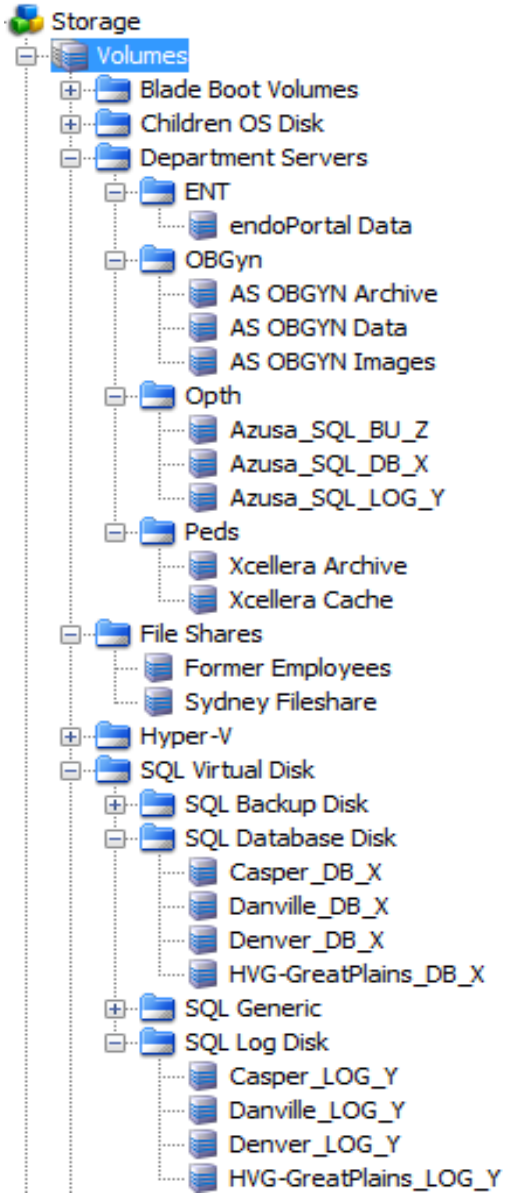
Tier 3 Storage

Space available in tier: 14.55 TB | Allocated to Redundant 2 MB storage: 14.55 TB | Total space allocated: 14.55 TB

RAID Level	Track	Chart	Disk Allocated	Disk Used	Moving Up	Moving Down
RAID 10	Fast		1007.75 GB	4.79 GB	0 MB	0 MB
RAID 5-9	Fast		1.92 TB	1.26 TB	0 MB	232.65 GB
RAID 10	Standard		457.69 GB	0 MB	0 MB	0 MB
RAID 5-9	Standard		11.19 TB	11.19 TB	0 MB	0 MB

Applications

- AS Software - OB/GYN (Ultrasound PACS)
- Xcellera - Cardiology (Ultrasound PACS)
- SQL Datawarehouse
  - IDX/Centricity
  - Reporting Services
  - Great Plains
  - Research
  - Other clinical applications: Methasoft, Ingenix, UHC
- Bone Density (PACS & SQL)
- Mirror – Plastic Surgery (PACS)
- ENT
  - Audio files
  - PACS images (KayPentax)
- OIPACS – Opthamology (PACS)
- Network file shares
- MS Exchange mailbox storage
- Virtual machines (Hyper-V)
  - Failover Clustering



Impact for Doctors, Residents, Students, Nurses and Employees

- Better performance
  - Clinical and business applications run faster
- Cost
  - Minimum maintenance cost
  - Minimum cost for additional storage new projects
- Clinical services can grow on-demand
  - New medical applications can be developed
  - New medical devices can be purchased more timely
- Data will never stop growing (scalability)
  - Better positioned for current and future technology
  - Departments don’t have to wait for more IT resources for project development
  - Multiple data types can be managed easily
  - Centralized management for compliance and security

Questions and Answers

Thank you