



August 21, 2007

It's a Challenge of Scale*

1. A Commercial
2. Motivation, dilemmas
3. Community HC Perspective -
complex & large, and getting
harder & bigger
4. With systems & structures that
are already not intuitive enough



*We're an end user of technology. A systems integrator.

Virtua Health

→

Today



Virtua Health Today

4 South NJ Acute Care Hospitals
Berlin, Marlton, Mount Holly, Voorhees

Outpatient Center, inc. ED
Camden

2 Long-Term Care Facilities
Berlin, Mount Holly

2 Home Health Services
Camden & Burlington Counties

2 Ambulatory Surgery Centers
Voorhees, Mount Holly



Virtua – Mid-Size Integrated Delivery Network

7,200 Employees

2,100 Physicians

56,000 Annual Admissions

270,000 Outpatient Visits

7,600+ deliveries (2006)

176,865 ED visits

1,200 Beds



What Makes Virtua Different?

Relentless measurement

Rigor and accountability

Our Tool Box

Programs of Excellence

Partnerships with Industry

Our people

Our results

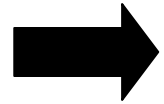


The Virtua STAR: The Backbone of Our Organization



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2. Motivation, dilemmas

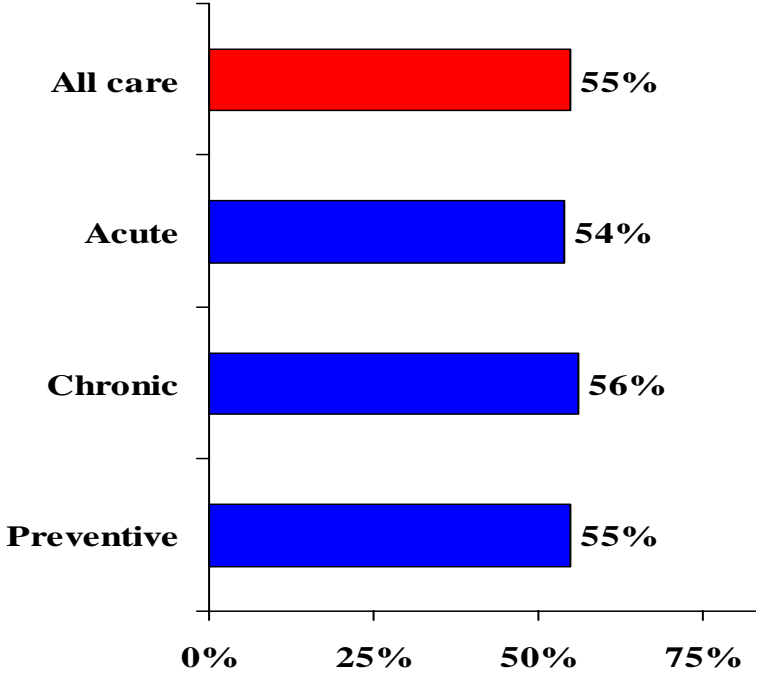
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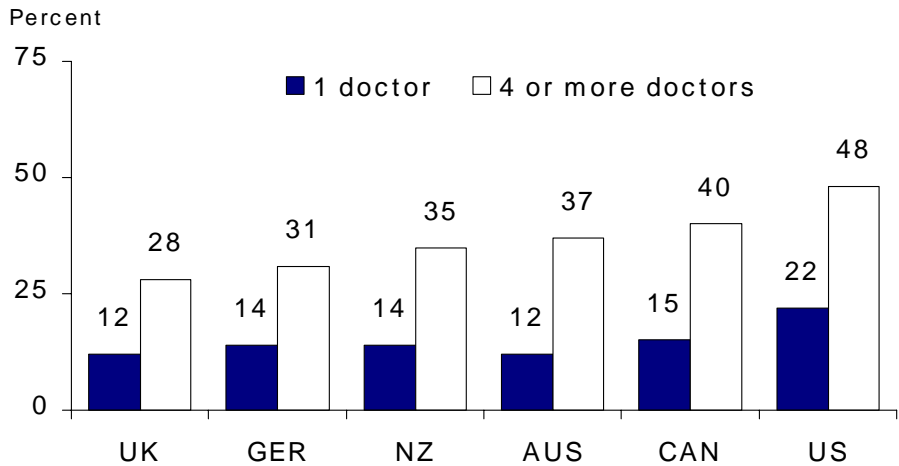


Burning Platform: Medicare Should Keep Pushing US in Quality, Safety

Patients receive recommended care 55% of the time...



Patients Reporting Any Error by Number of Doctors Seen in Past Two Years, Sicker Adults, 2005 ⁵



Burning Platform: We're Mediocre at Quality Reduce Medical Injuries (Intermountain)

Account for

***44,000 - 98,000 deaths per year
in the United States***

*More people die from medical errors than from
breast cancer or AIDS or motor vehicle accidents*

Brennan et al. New Engl J Med 1991
Thomas et al. 1999

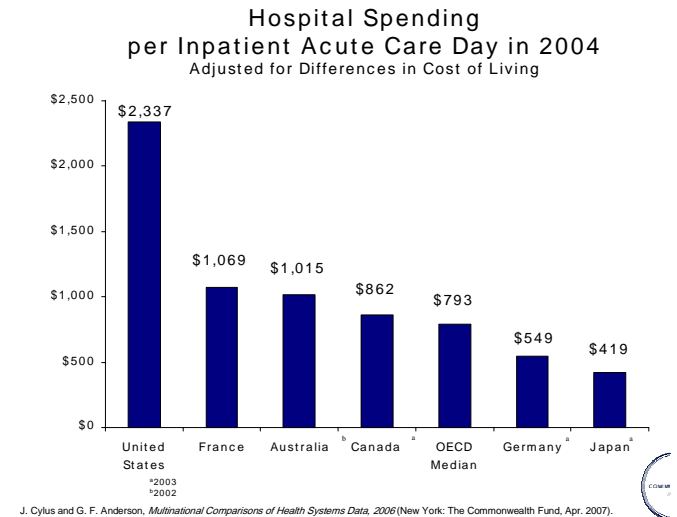
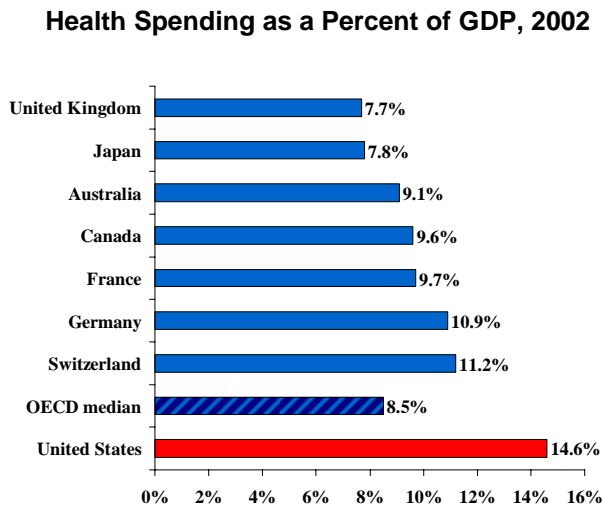
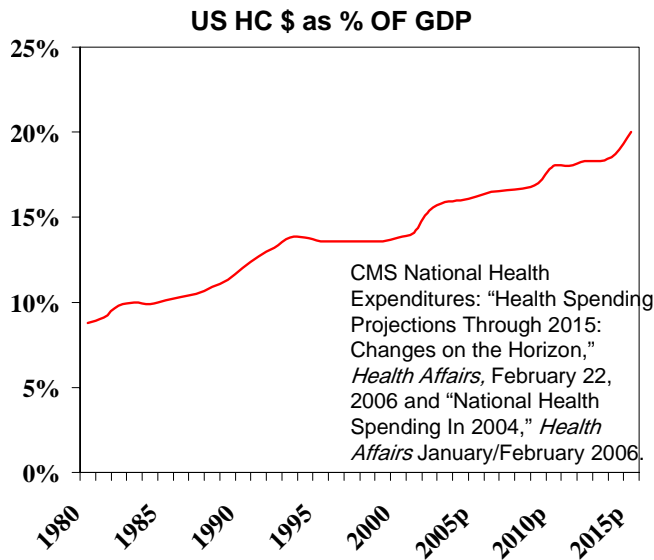
Direct health care costs totaling

\$9 - 15 billion per year-

Thomas et al. 1999
Johnson et al. 1992



Dilemma: Spending Stifling Our International Competitiveness



In Summary: we're the best at treating chronic, acute care, but still die younger.

- US healthcare is called-in after the fact: Americans (esp. NJ) do not take responsibility for their own health.
- It's not just a value-chain length or an acute care problem.
- It is very difficult to see the whole person, anticipate, prevent or treat a health issue holistically.
- *US Healthcare remains specialized compendium of silos and compartments with distinct care processes and protocols.*

Germans Live Longer and for Less

Better outcomes and costs thru longitudinal patient care:

> 80 million electronic health cards

All phases of care

Access to medical data (opt in)

Gov't and private health insurance

> 750 million prescriptions every year

Annual savings > 1 billion euros

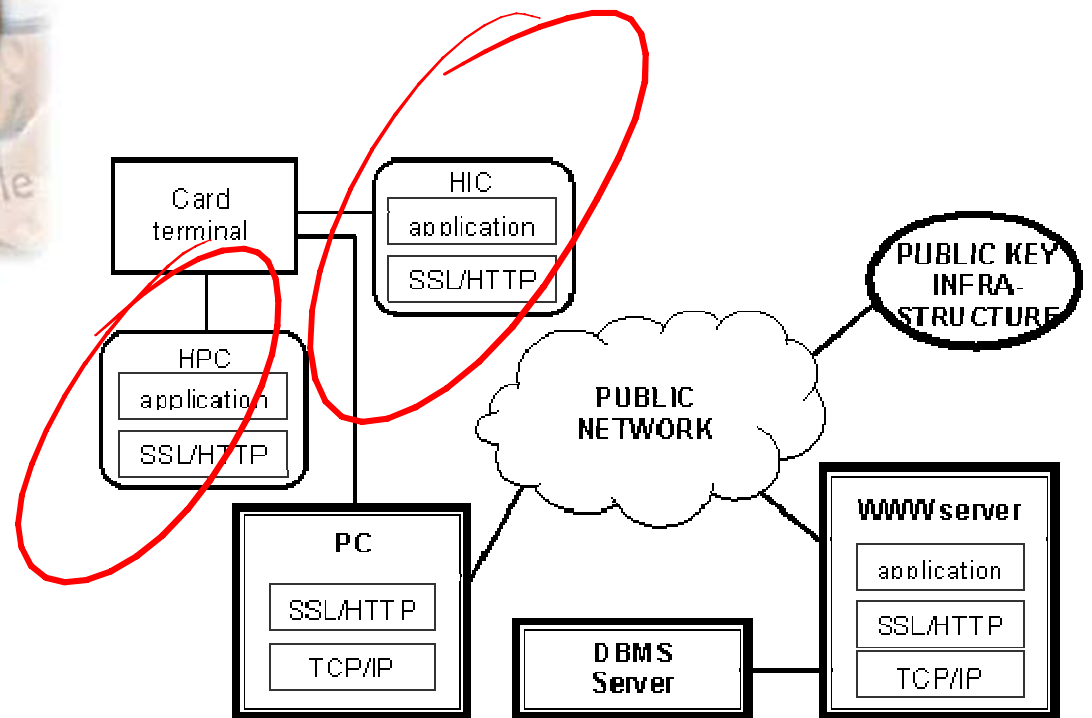
www.euser-eu.org



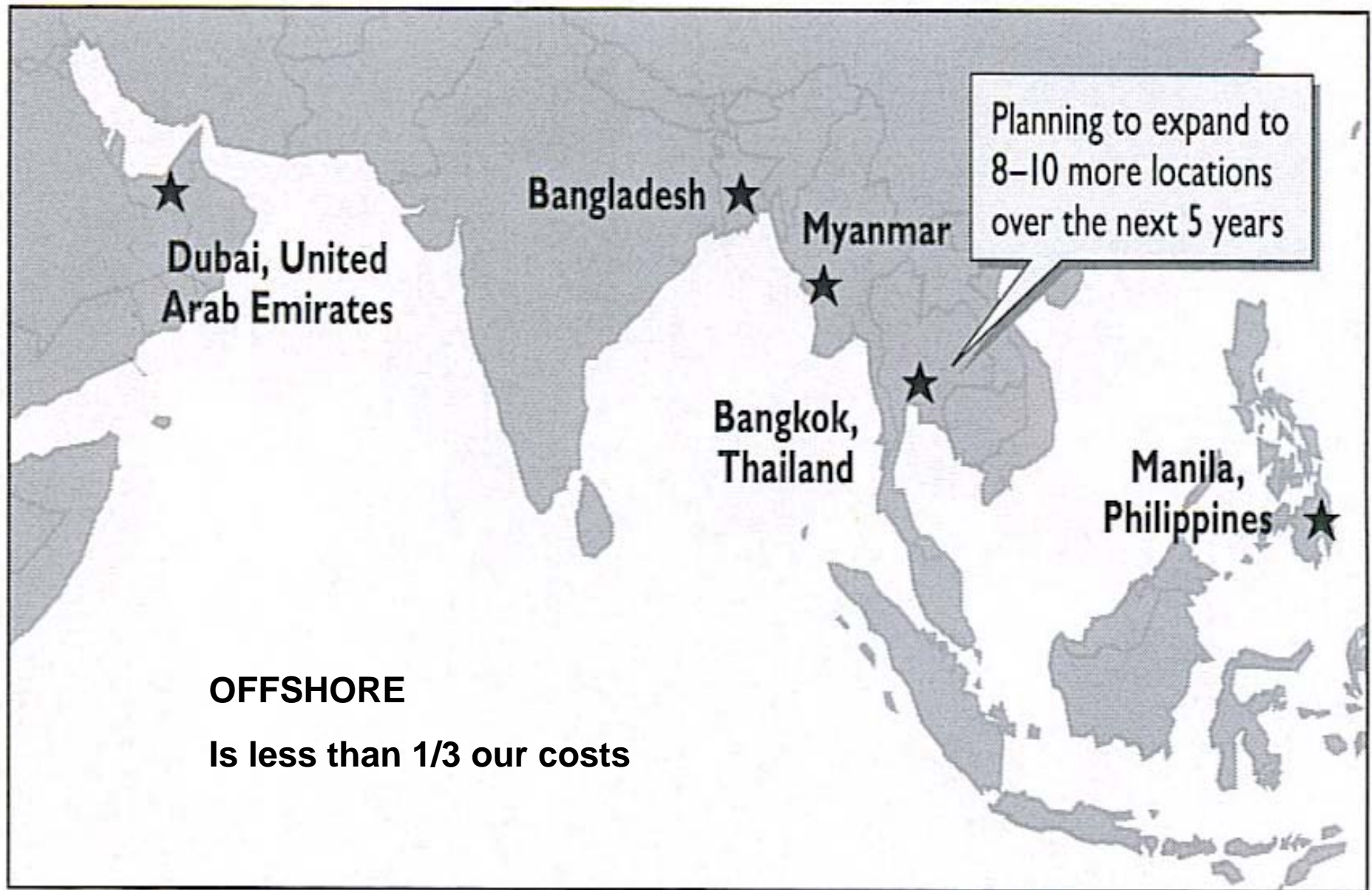
No Sunk Costs, No Baggage



Slovenia's 2nd generation
Web-based system
2007 launch

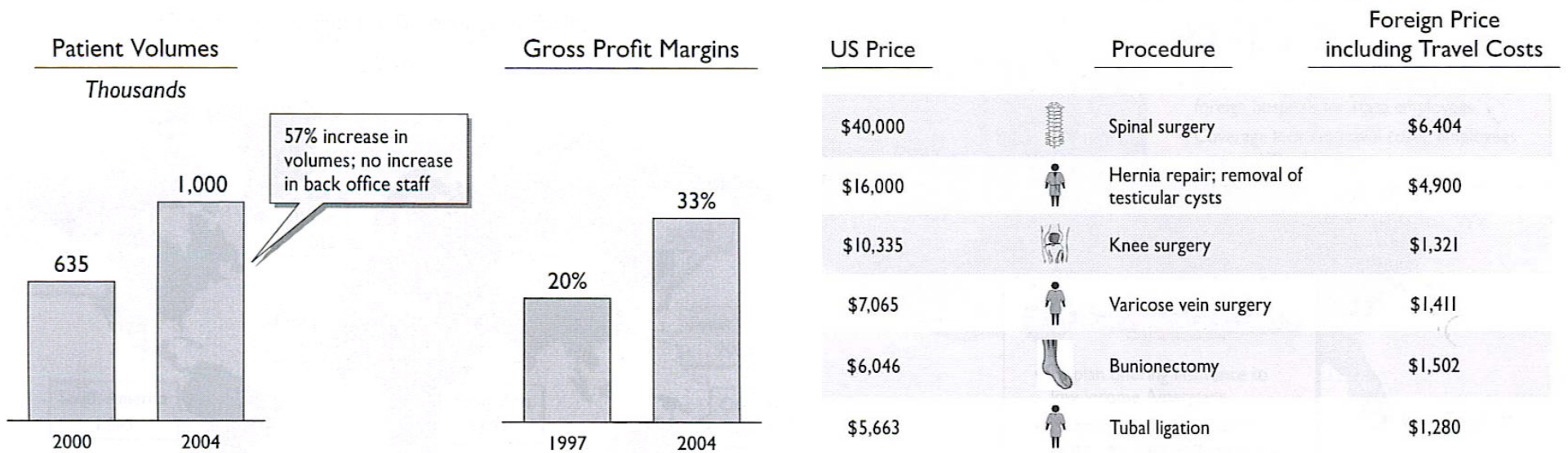


We Cost Too Much (2X healthier countries). Healthy Patients are Leaving the US.



Burning Platform: countries). Healthy Patients are Leaving the US.

Improving the Bottom Line

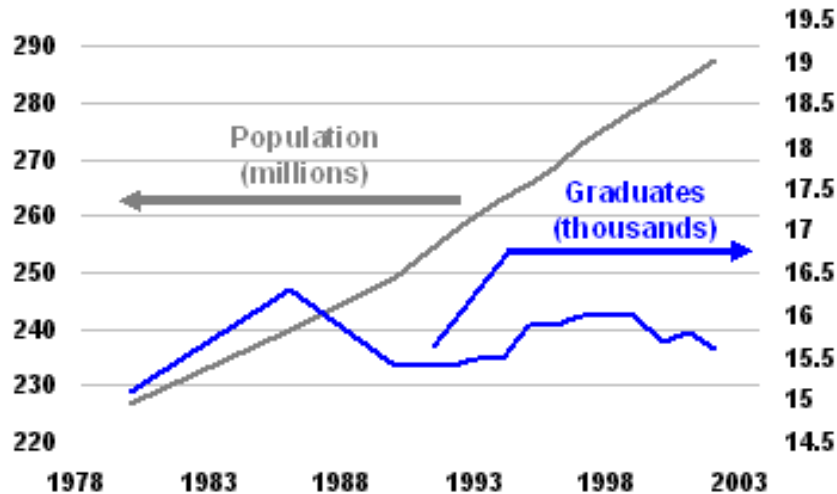


The Clincher.....

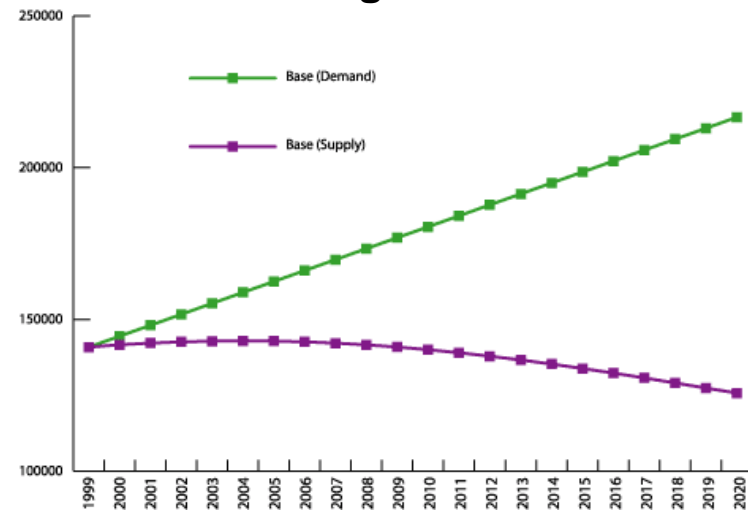


Exacerbated by Staffing Shortage

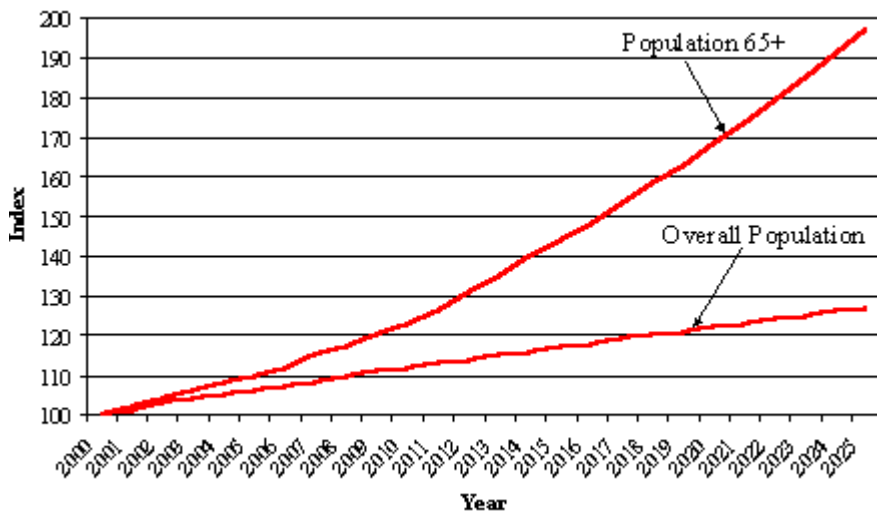
Med School Grads



US Nursing Workforce

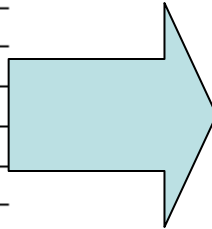


Senior Metro North America Population

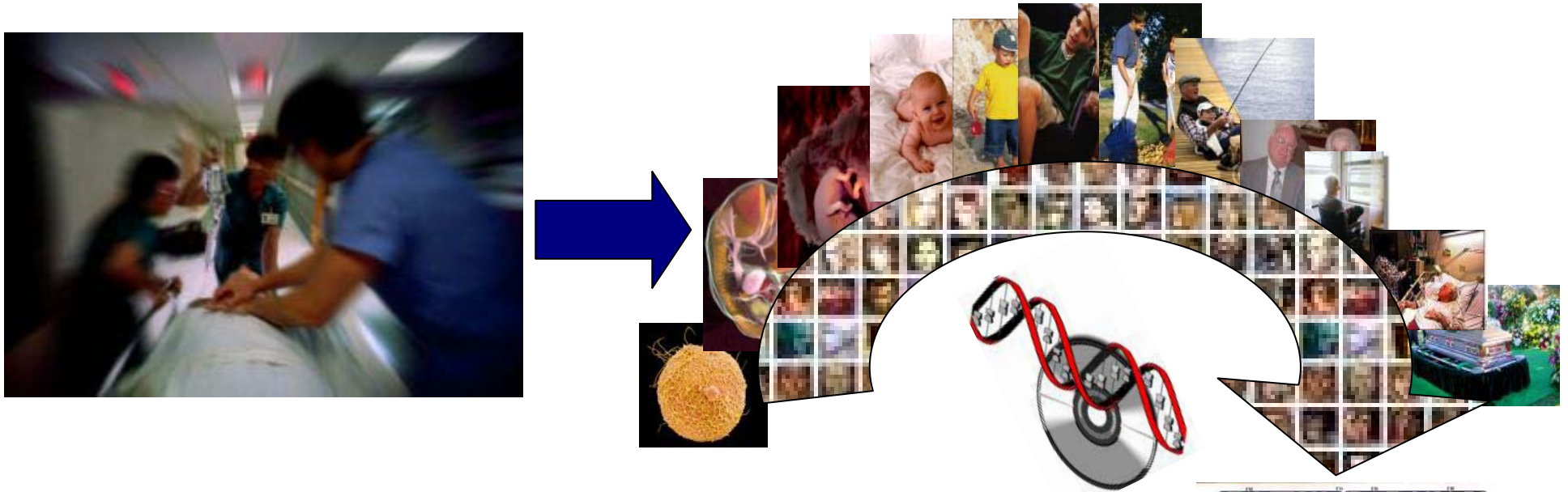


Solution - productivity

- Less in-patient, acute care
 - In-home
 - Ambulatory
- Productivity thru process, technology
 - Process optimization
 - Automate what you can
 - Flat world...



Solution: New Model of Care Systems



FROM - Reactive Cottage Industry & Individual Craft:

- Americans do not take responsibility for their own health
- Healthcare is called-in after the fact in generally isolated forms
- Result: we're the best in the world at treating chronic, acute conditions

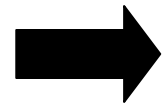
TO – Proactive, Connected Healthcare:

- Expand scope of care to cover all phases of life, prior to conception until after death
- Shift the industry culture from reactive to proactive, crisis to prevention
- *Result: Unified, preventative, holistic care processes & teams enabled by technology*

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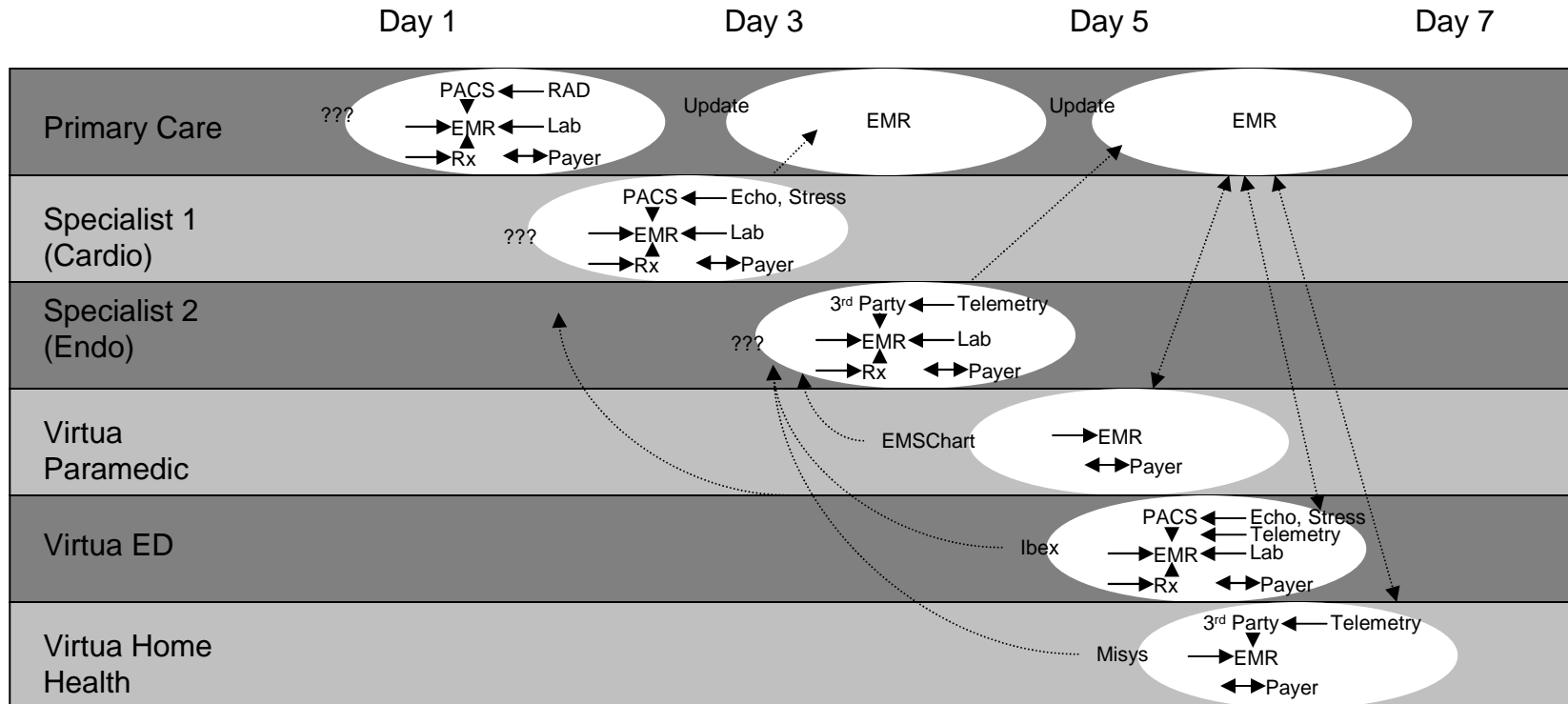


3. Community HC Perspective -
complex & large, and getting
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Example: 75 YOM Diabetic, > 10,000 Transactions



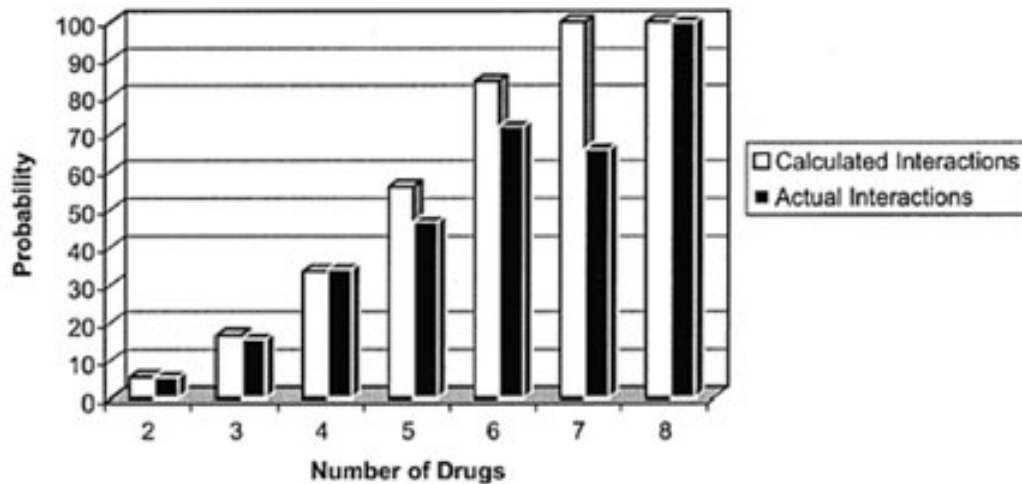
Observation

Cath Lab

ICU

Med Surg

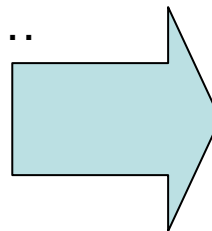
Personalized Med-Mania



The open bars represent the theoretical probabilities of a drug-drug interaction occurring. The solid bars represent potential interactions identified in patients.

Reprinted from Crit Rev Oncol Hematol, 48, Delafuente JC, Understanding and preventing drug interactions in elderly patients, 133-43, 2003, with permission from Elsevier.

- As if medication & therapy management was not hard enough...
- Add genetically tailored meds
- Add ten times the codes, protocols with ICD-10 in 2010

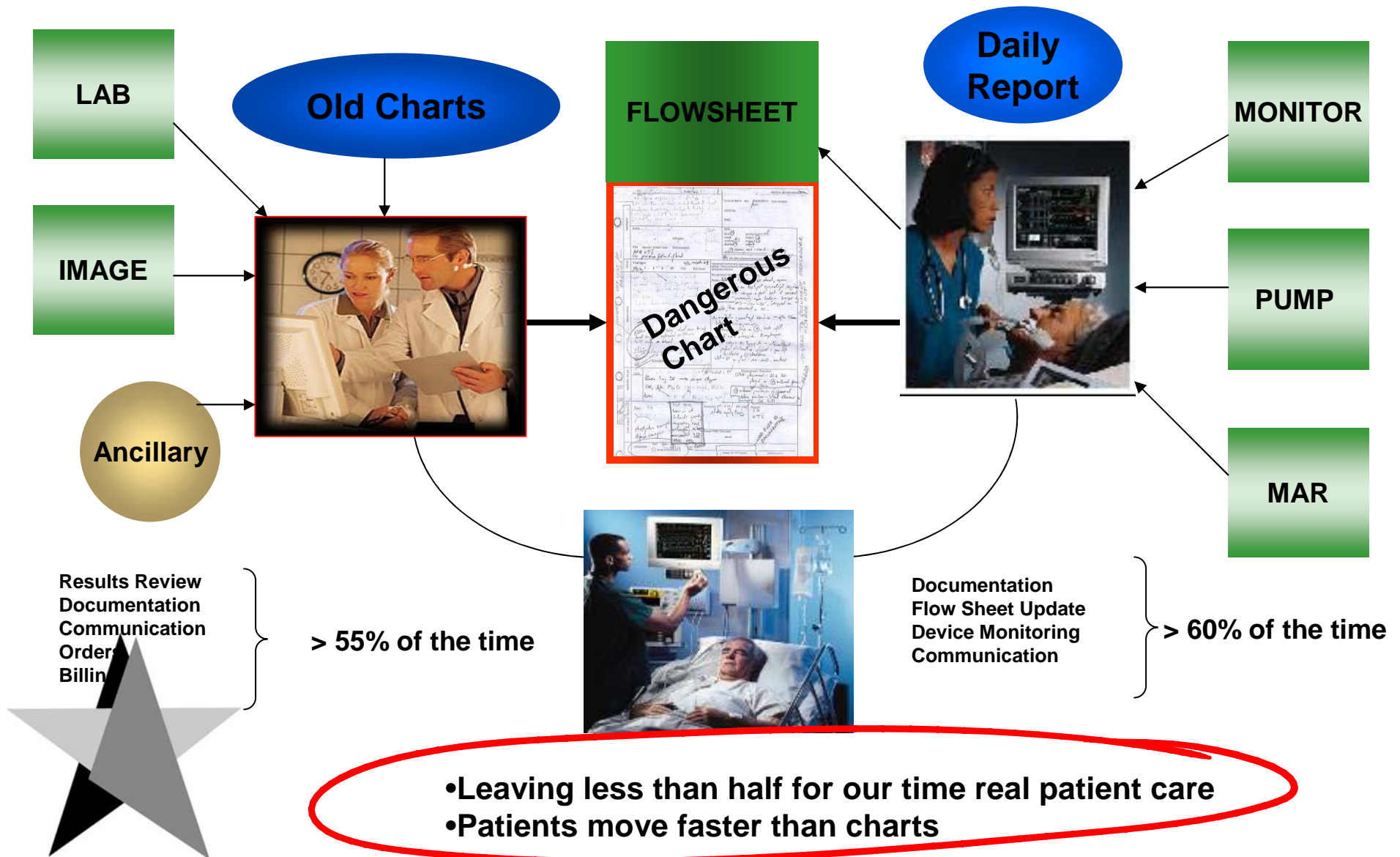


Solution – Larger scale systems:

- Decision support systems
- Realtime, on-line I's and O's
- Automated H&Ps, notes, etc.
- Medication management
- Proactive diagnosis, therapy assist
- Realtime coding (charging)

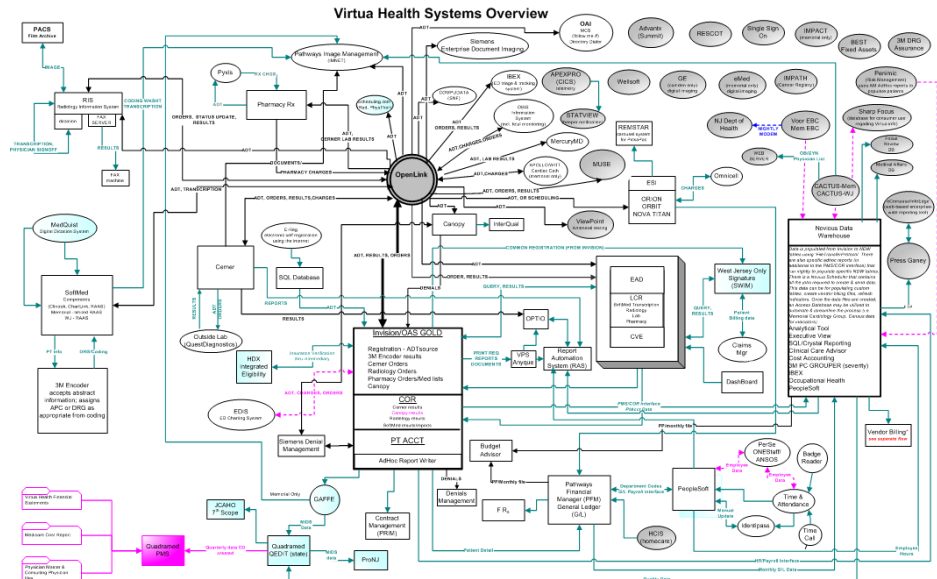
One Simple Transaction

Paper Processes Invite Errors, Make for a Clerical Day



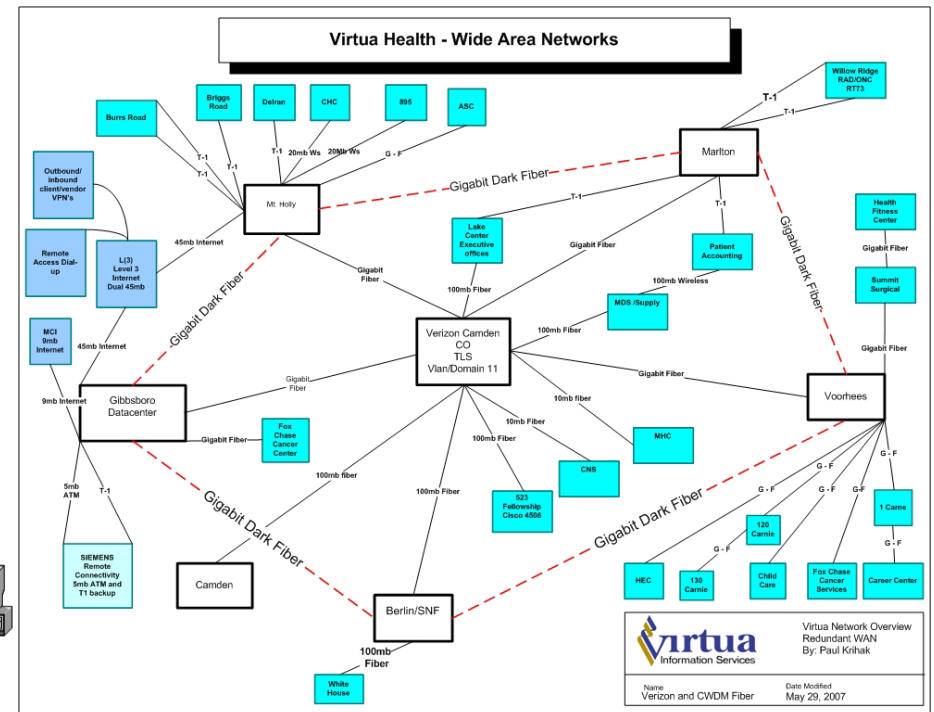
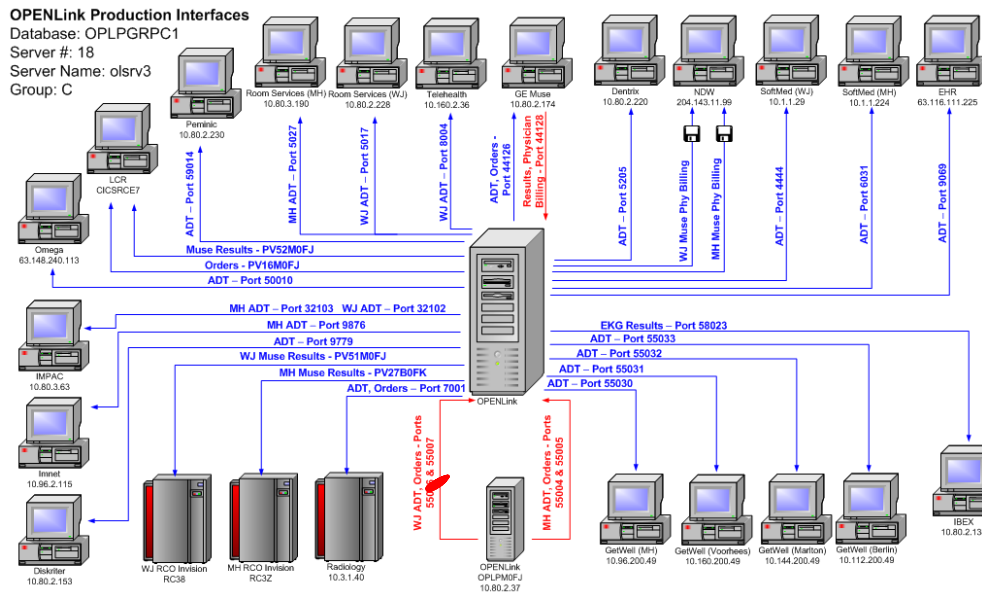
Community Healthcare Under the Hood

- 4M Transactions per day, across
- Over 220 Applications, Servers but dropping
- CCW: logical messaging, physical messaging, WAN



OPENLink Production Interfaces

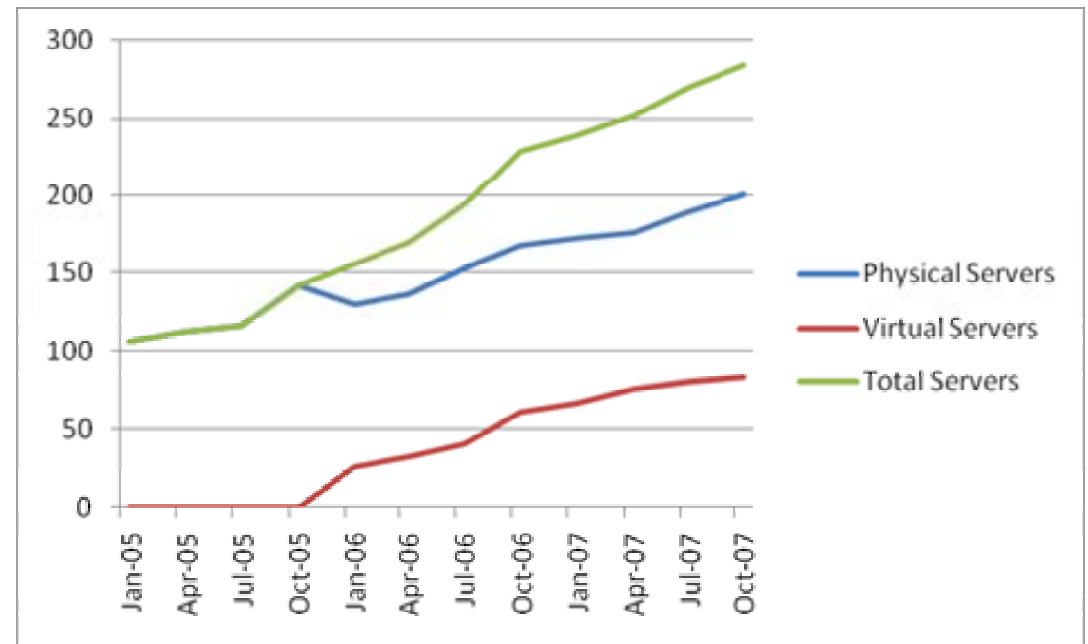
Database: OPLPGRPC1
 Server #: 18
 Server Name: olsrv3
 Group: C



Digital Transformation Increases Computing Infrastructure

Server Growth

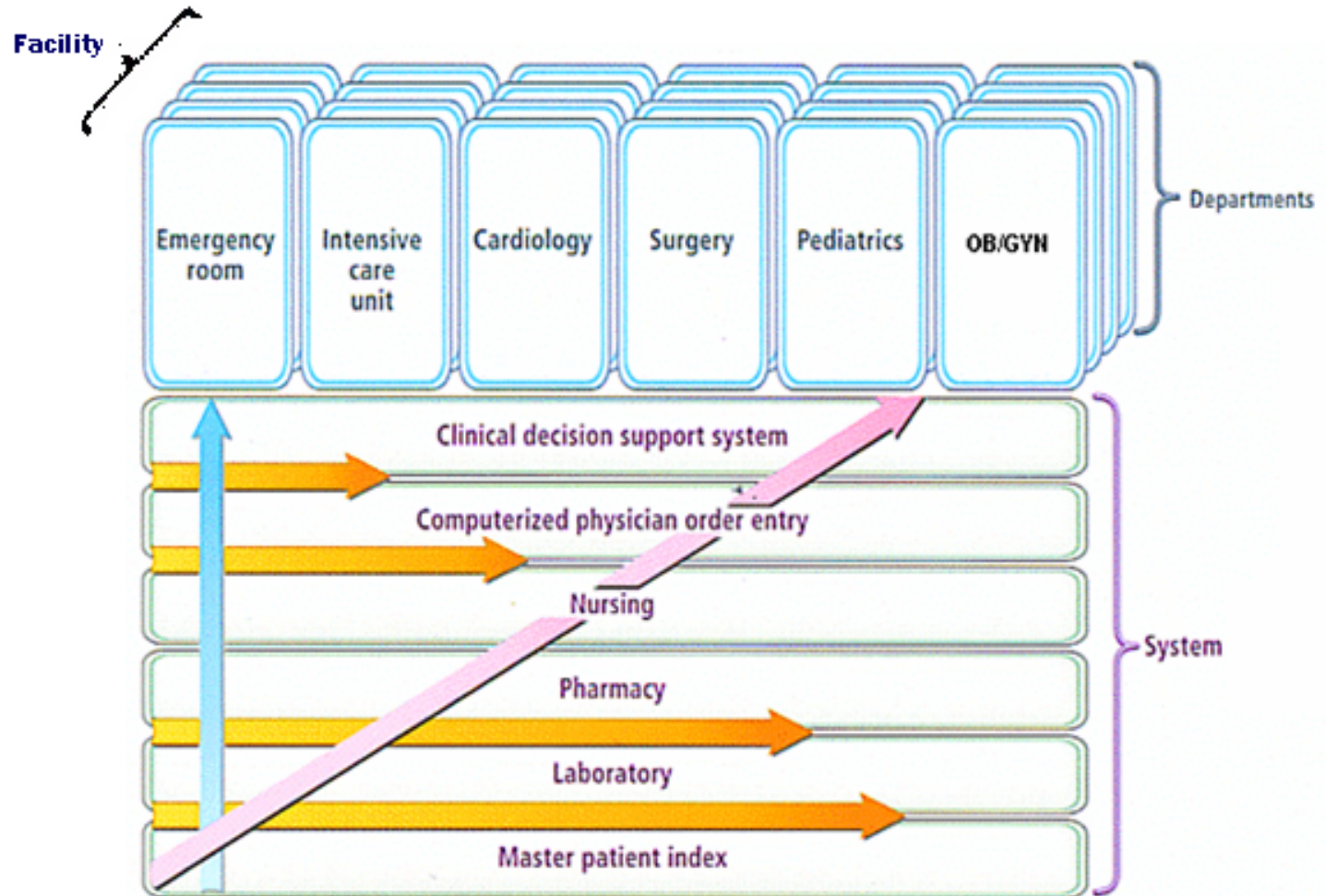
- Net new functionality - create new operating system, database, etc. licenses
- In house only
- Some services and servers get retired



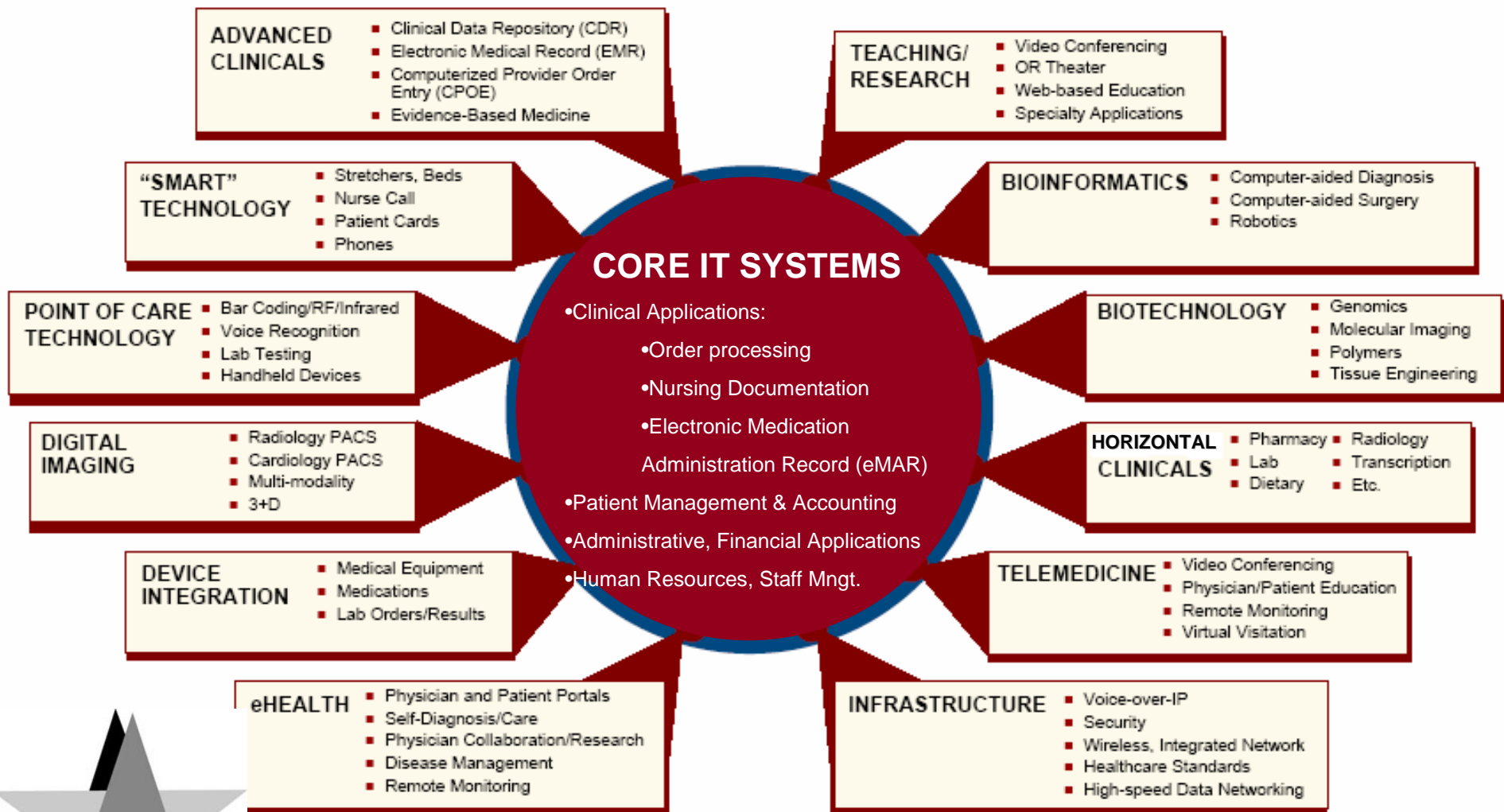
Client Growth

- Each project creates new applications... some get retired
- Creates new mobile, portable and/or desktop license requirements
- Net new employees

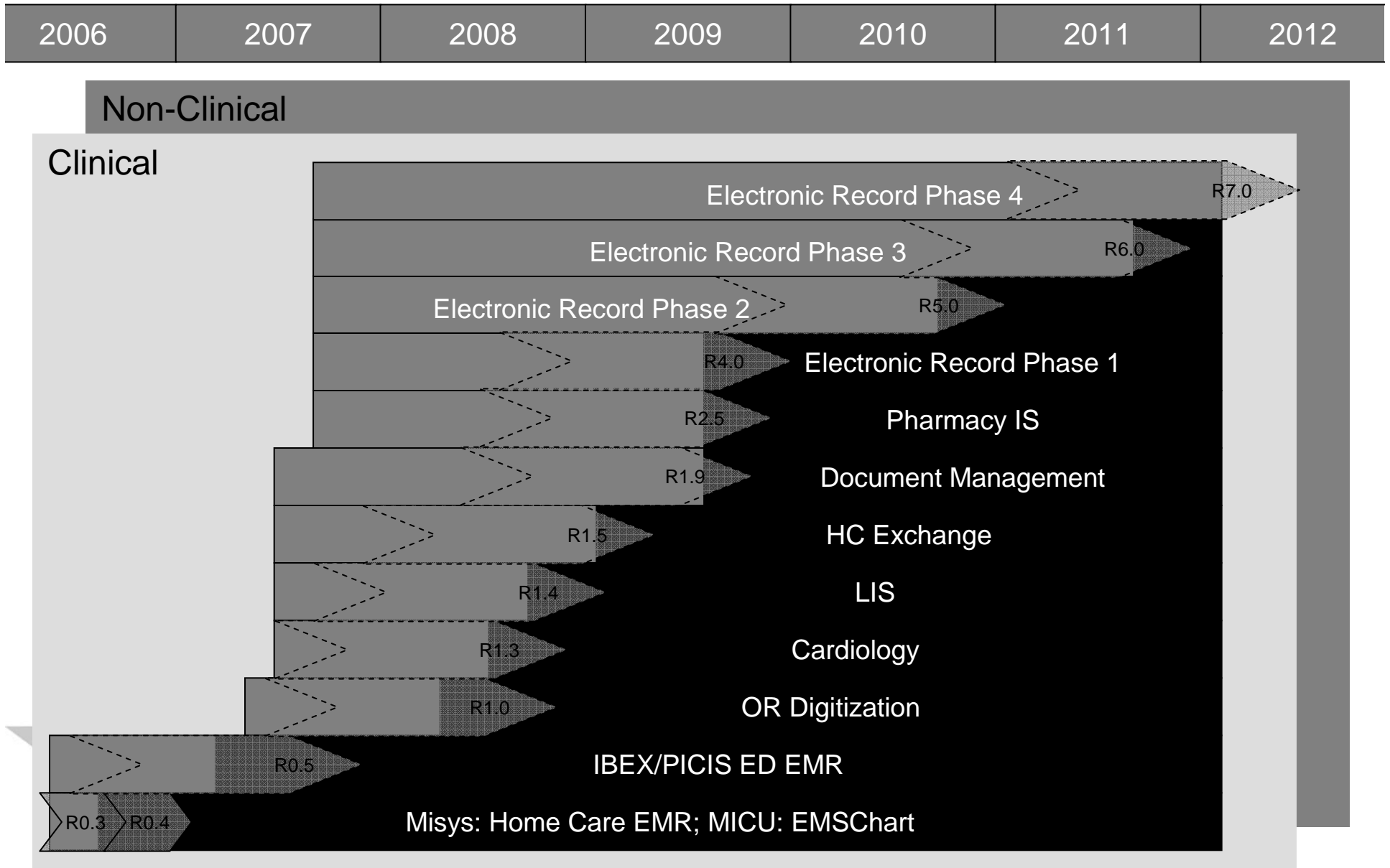
Traditional Inpatient-Focused Architecture



Typical Architecture – 315 Best-of-Breed Services and Growing

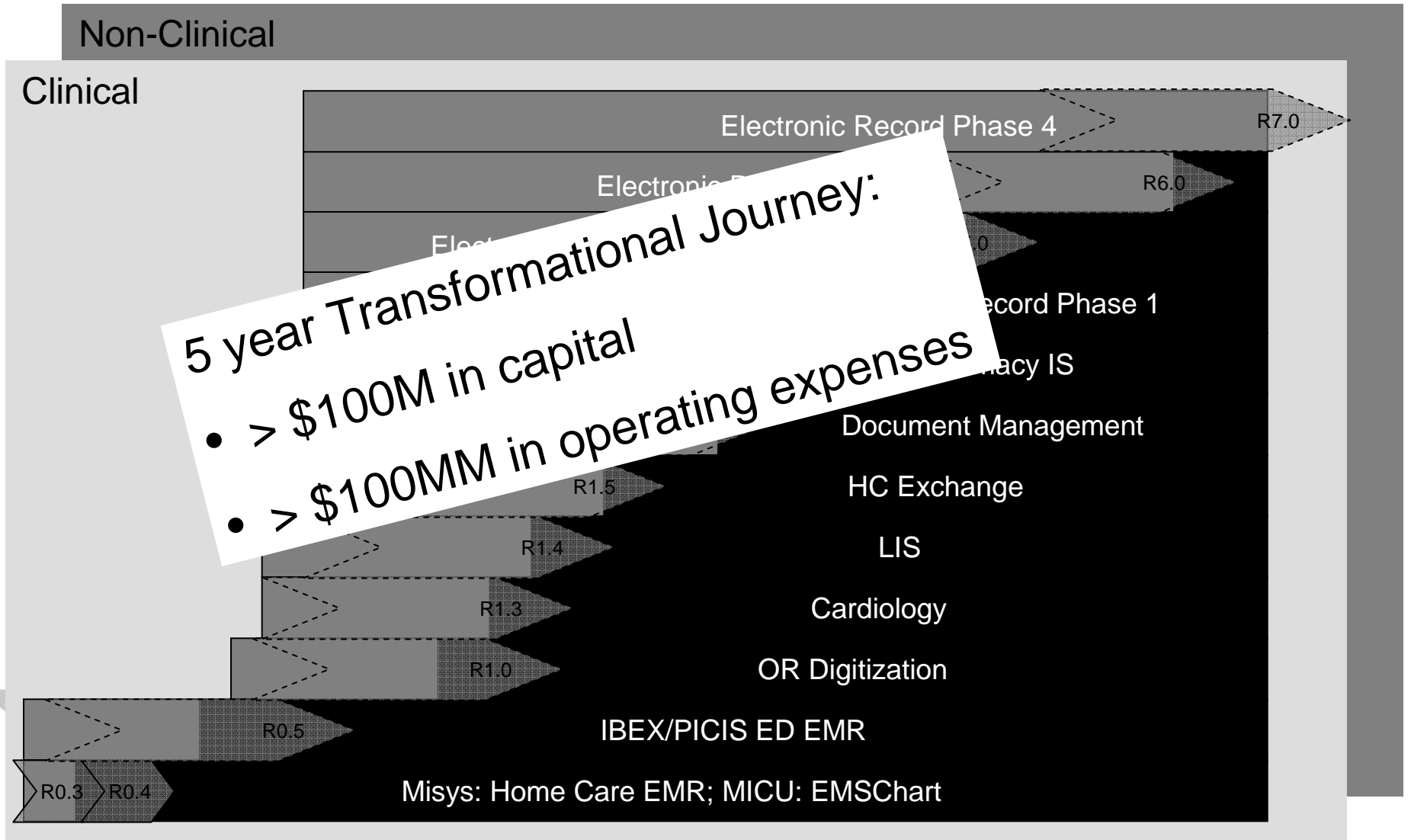


Virtua Health – Current Timeline



Virtua Health – Current Timeline

2006	2007	2008	2009	2010	2011	2012
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Recent Launch Successes

- Team efforts working:
 - Home Health EMRs, remote sensing
 - Paramedics with EMRs
 - Material management automation
 - Integrated hemodynamics, cardiology
 - ED automation, tagging, tracking



ED Information System

ibex PulseCheck

File Edit View Favorites Tools Help

Address: http://medicalcenter.org/ibexpulsecheck

Costs

- \$3.2M capital (phase 2&3)
- \$300K/yr maint
- 1 FTE Informatic, training support

The Medical Center
Daniel Pabouin, MD 19:45

Orders | Meds | Rx | DCI | Dispo | Help

Bed/Urgency	Patient	Age	Sex	Chief Complaint	MD	RN	Room	Admission	Disposition	Comment	LOS	RH Time
ED 01	Patterson, Brian								AV		:22	-01
ED 02	Kaufman, Larry				JSH	Dwyer			ADMIT		:11	-54
ED 03	Wills, Nancy								ADMIT		:17	-05
ED 04	Simons, Anthony	M72	M	Shortness of Breath	MDC	JSH	Jones	MCL	EV		:18	-56
FT 01	Casper, Kendall	M06	M	Left Ankle Pain	MDC	JSH	Garcia	*	Y		:21	1:40
TRAUMA 01	Dylan, Underwood	M09	M	Head Injury	JB1	NK	Jadorowsky	*	AV		:22	-05
WAIT	Brown, Brian	M34	M	Fever	****			*	Y		:19	1:40
WAIT	Medina, Lola	F39	F	Vomiting	****			*			:11	-09

Benefits

- \$2.7M/yr charge capture (CBIZ)
- Compliance ↑
- ED thrupt ↑ pending process rationalization

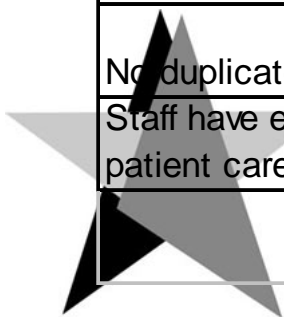
Patient Flow	Greet	Triage	Transfer		Disposition
Patient Information	Enter		Display		Area
Administration	MyPatients	PulseCheck	Ambulance (2)	Admin	Help
				Logout	

Main | MyPatients | Display | Logout | Orders | Meds | Rx | DCI | Dispo | Help | Tools

Systems of Systems Improving Care

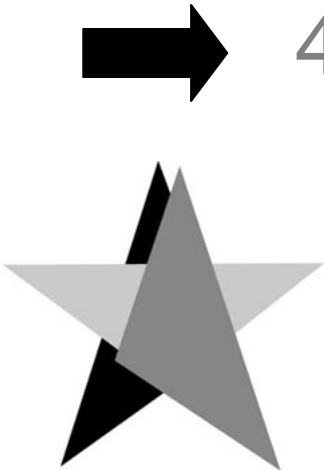
Design Goal	Facilitates
Chartless	No medical record file room
Filmless	No film storage room
One Network	Low cost, highly integrated data, voice, video, monitoring
Wireless	Data in/out everywhere needed, patients & visitor access
Decision Support	The right order sets for quality, productivity
Documentation	Speed with completeness & compliance (safety, quality, automated coding & charges)
Staffing Automation	Acuity, skills & credential based, opt-in

Which Enables	Delivering
Clinical staff spend more time at the bedside	Increased patient satisfaction
Increased collaboration, communication among care providers	Comfort, compassion replace fear, anxiety
Vital, real-time patient information available when & where its needed	Speed via real-time decision support
No duplicate tasks or re-work performed by staff	Evidence-based medicine to get complex diagnosis right
Staff have efficient & optimized workflows – more patient care, less clerical/administrative tasks	Personalized medicine yielding proactive, predictive care
	A connected South Jersey - Individualized, real-time digital records
	Integrated, future proof, technology-based facility designs



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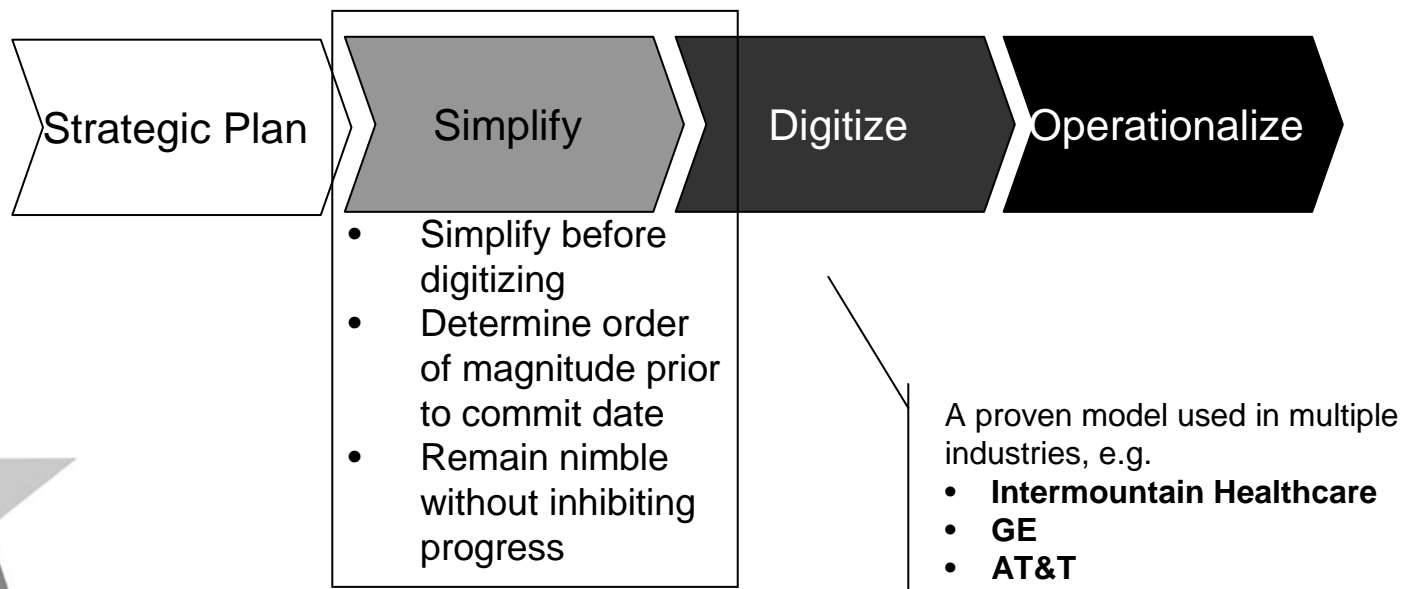
Recent Launch Successes

- Team efforts working:
 - Home Health EMRs
 - Paramedics with EMRs
 - Material Management Automation
 - Integrator Dynamics
 - Automation, tagging, tracking
- Big Take Aways After 3 Years of Progress:
 - Technology is NOT the problem, process and people transformation is.
 - Most caregivers do not get, trust or want to count on technology – it's too hard to use.



Combating Complexity with an Improved Formula

- New model for collaboration and planning
- Leverage the Virtua toolkit – Six Sigma, Manufacturing Engineers, IT alignment
- Standard deployment, standardized processes



Aging US HC Facilities - Collaborative Method for Design

Digital Hospital Planning Update

Concurrent people-process-technology collaborative design:

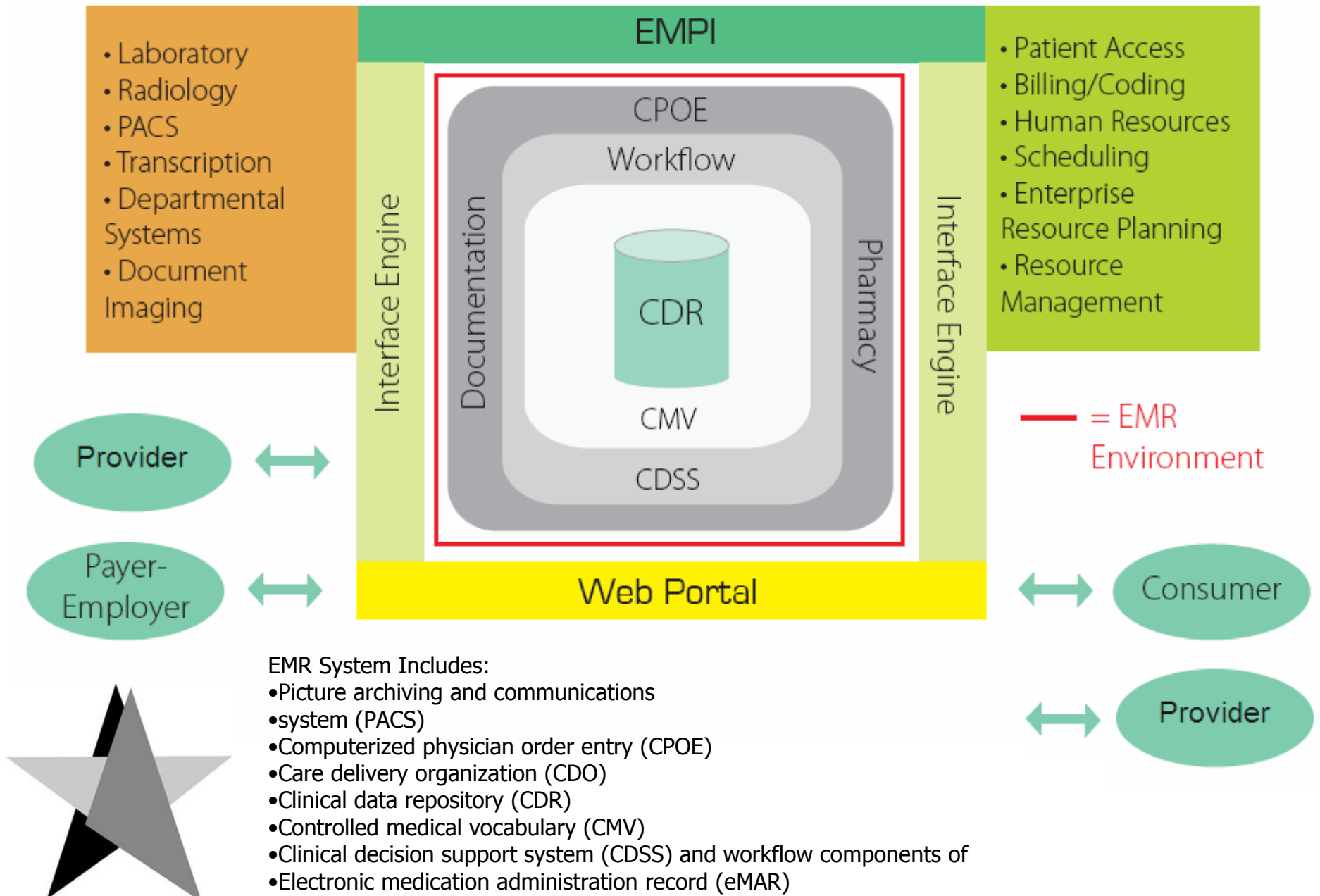
Photo Journaling – Take pictures and notes to capture how the environment can be improved.

Process Mapping – study patient and clinician flow, analysis for optimal department design to optimize travel distances, access to materials, supplies and information. Drive efficient layout and flow.

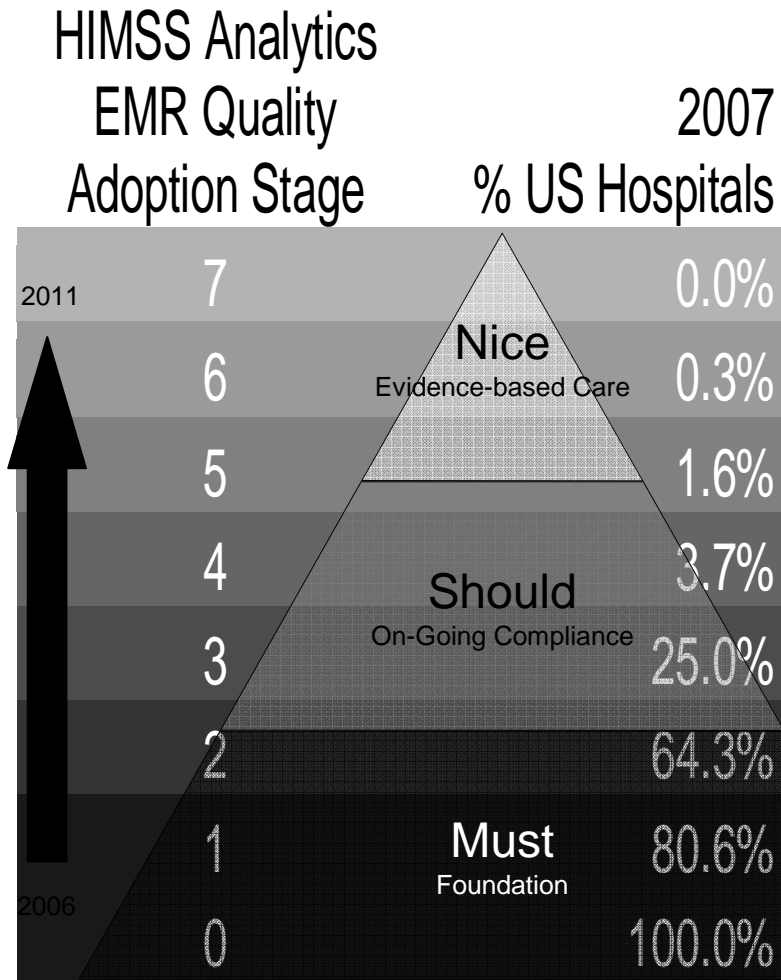
Information System Planning – Crystal ball for “state of the art” care leveraging the best clinical and information technology.



A Nation Becoming Patient-Centric



Industry Framework – Benchmark Evolves



“Paperless”, RFI-free, fully digital medical records by end of 2010:

- CDO able to contribute to Integrated Community Care
- Community EHR as byproduct of Shared EHR
- Physician documentation (structured)
- Full CDSS (var., comp.) & PACS
- CPOE, CDSS (clinical protocols)

“Paperlite”, RFI-lite by end of 2009, physician doc, orders paper:

- Closed loop med administration
- Clinical documentation (flow sheets)
- CDSS (error checking), inpatient PACS

Digital Building Blocks by end of 2008:

- CDR, CMV, CDSS, reference engine, document imaging
- Ancillaries - Lab, Rad, Pharmacy
- Ambulatory, outpatient EMRs (disparate)

Trailing national IDS
Mean 1.94, Media 2.1



- Picture archiving and communications system (PACS)
- Computerized physician order entry (CPOE)
- Care delivery organization (CDO)
- Clinical data repository (CDR)

- Electronic Medical Record (EMR)
- Controlled medical vocabulary (CMV)
- Clinical decision support system (CDSS) and workflow components of
- Electronic medication administration record (eMAR)

HIMSS Benchmark basis for new release strategy

HIMSS EMR/SEHR Adoption Model Scores Q1 2007

Stage	Description	% US Hospitals
7	Medical record fully electronic; CDO able to contribute to Integrated Care EHR as byproduct of Shared EHR	0.0%
6	Physician documentation (structured), full CDSS (var., comp.), PACS	0.3%
5	CPOE, CDSS (clinical protocols)	1.6%
4	Closed loop med administration	3.7%
3	Clinical documentation (flow sheets), CDSS (error checking), inpatient PACS	25.0%
2	CDR, CMV, CDSS inference engine, document imaging	64.3%
1	Ancillaries - Lab, Rad, Pharmacy	80.6%
0	Basic platform, outpatient EMR	100.0%

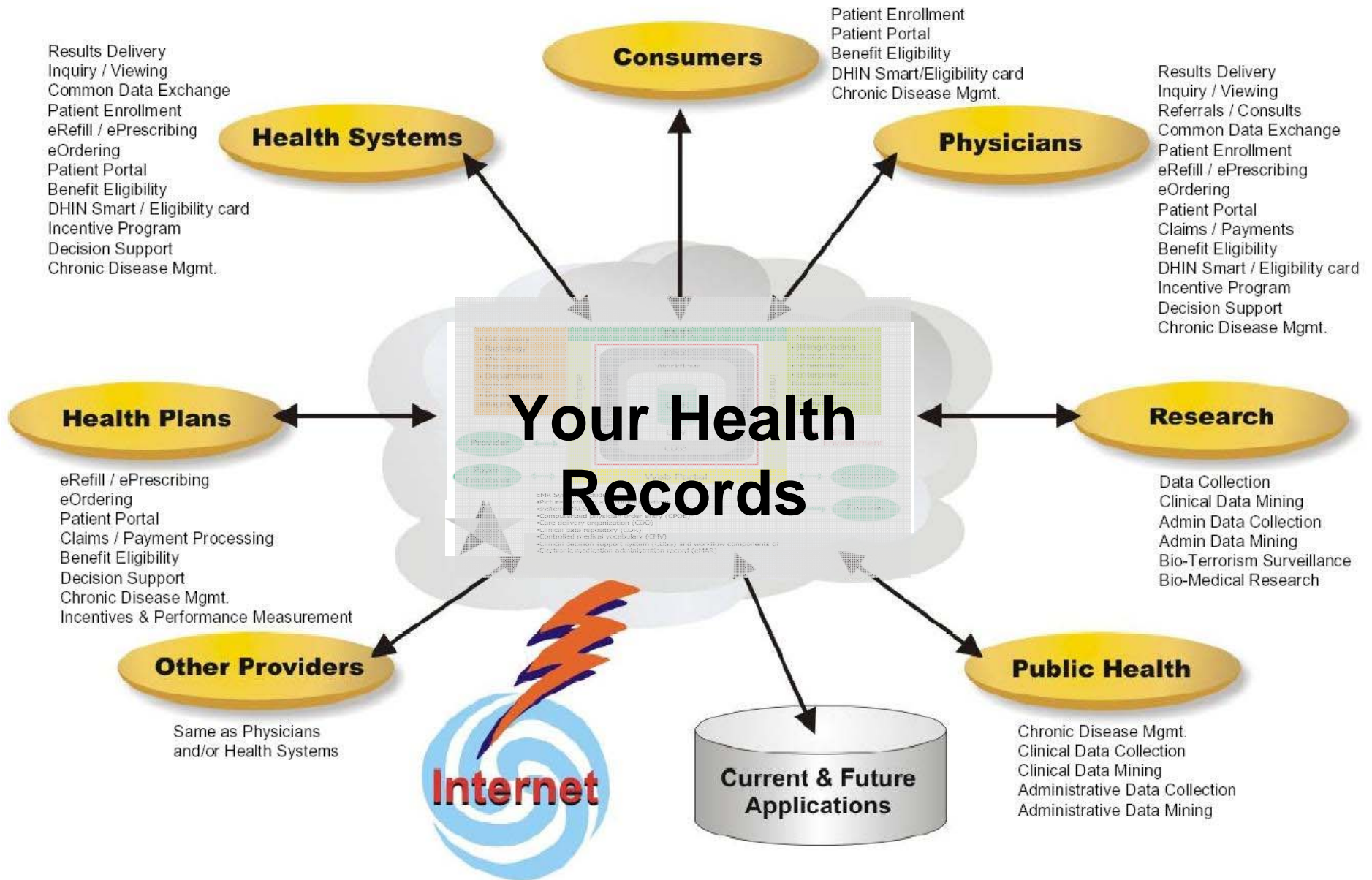
•A 2006 study of 107 UHC hospitals found a correlation between this score and AHRQ quality indicators. See [EMR Sophistication Correlates to Hospital Quality Data](#).

•Source: HIMSS Analytics Databases (derived from the Dorenfest IHDS+ Database™)

N = 4298



And Facing Outward...



And Facing Outward...

