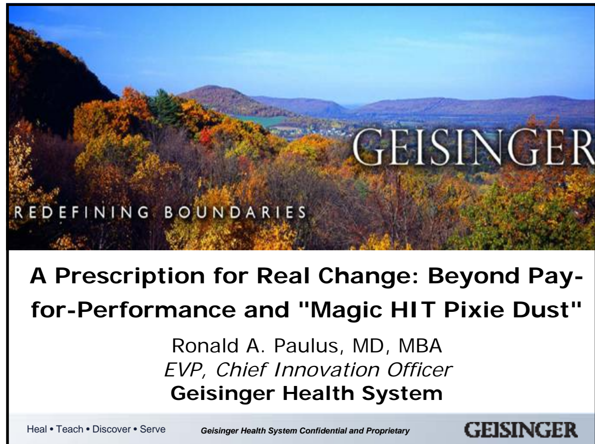
GEISINGER
REDEFINING BOUNDARIES
A Prescription for Real Change: Beyond Pay-for-Performance and "Magic HIT Pixie Dust"
Ronald A. Paulus, MD, MBA
EVP, Chief Innovation Officer
Geisinger Health System
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About Geisinger…
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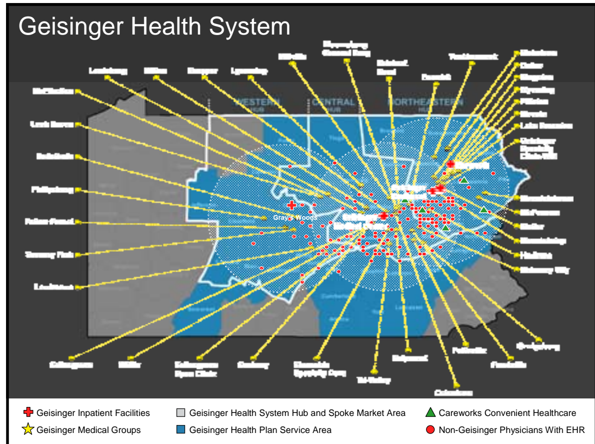


U.S.News & World Report

Friday, November 7, 2008

Nation & World | Health | Money & Business | Education | Opinion | Science | Photo | Video | Rankings

Best Health Plans Search

Refine Your Results
Click below to filter your search results.

by Another Plan Type
- go back

by Accreditation
- Only show NCQA-accredited plans (what's this?)

by Region
- North (what's this?)
- South (what's this?)
- Midwest (what's this?)
- West (what's this?)

by State: all states

by Plan Name

Search

Best Health Plans 2008 Search: Medicare

Rankings reflect success in preventing and treating illness compared with average health plan. The highest possible score is 100 points. Click on plan name for full information. Terms are explained in the glossary.

Sort by Rank | Sort Alphabetically

Rank	Plan	Score
# 1	Preferred Care (HMO), New York — Consumer assessment ★★★★★ Prevention ★★★★★ Treatment ★★★★★	88.4
# 2	Kaiser Foundation Health Plan of Southern California (HMO), California — Consumer assessment ★★★☆☆ Prevention ★★★★★ Treatment ★★★★★	88.1
# 3	Geisinger Health Plan (HMO), Pennsylvania — Consumer assessment ★★★★☆ Prevention ★★★★★ Treatment ★★★★★	88.0
# 4	Blue Cross and Blue Shield of Massachusetts (HMO), Massachusetts — Consumer assessment Prevention Treatment	87.9

Neulasta

Electronic Infrastructure

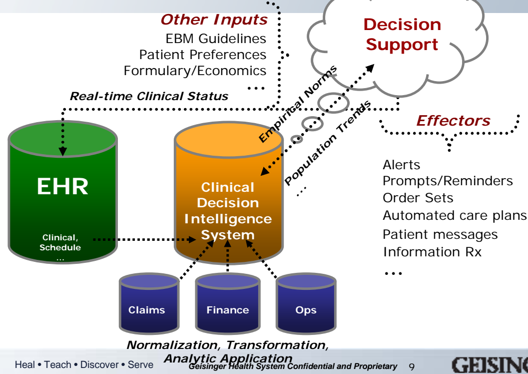
Electronic Health Record (EHR)

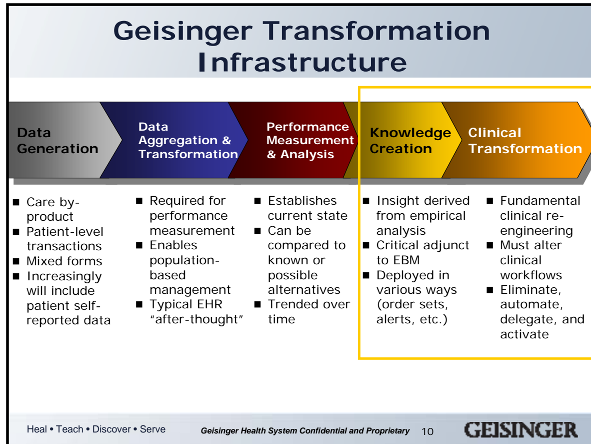
- Decision to implement Epic®: 1995
- > $120M invested to date (hardware, software, manpower, training)
- Running costs: ~ 4.6% of annual revenue of $2.0B
- EHR now fully-integrated across all ambulatory and inpatient sites of care
- > 3.5 million distinct patient records
- > 2,000 non-Geisinger users (referring physicians)
- 19 electronic check-in kiosks
- etc…

Patient Portal ("PHR")

- MyGeisinger Personal Health Record
  - ~117,000 active users; adding ~500/week
  - New Goal = 200,000 (~1/3 core active population)
- Secure portal allows patients to:
  - View lab/test results, medication list, diagnosis list
  - Schedule appointments, email care team
  - Request prescription refills
  - Access links to trusted health information specific to disease states
  - …Testing access to physician notes
- 60%/40% messaging activity split between clinical/administrative

Geisinger Transformation Architecture




Geisinger Transformation Infrastructure
Data Generation
Data Aggregation & Transformation
Performance Measurement & Analysis
Knowledge Creation
Clinical Transformation
Care by-product
Patient-level transactions
Mixed forms
Increasingly will include patient self-reported data
Required for performance measurement
Enables population-based management
Typical EHR "after-thought"
Establishes current state
Can be compared to known or possible alternatives
Trended over time
Insight derived from empirical analysis
Critical adjunct to EBM
Deployed in various ways (order sets, alerts, etc.)
Fundamental clinical re-engineering
Must alter clinical workflows
Eliminate, automate, delegate, and activate
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Strategic Background Context
National Landscape: Costs and Spending
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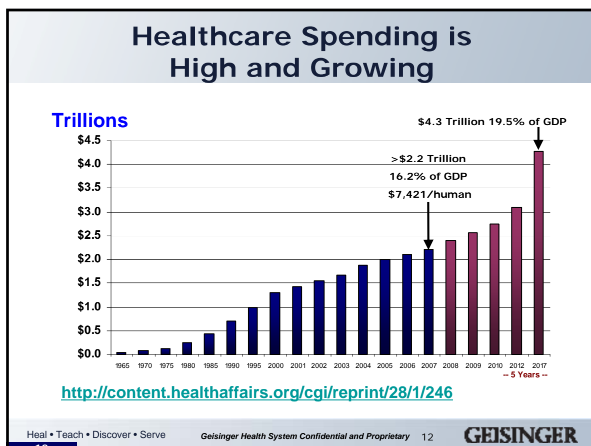
Healthcare Spending is High and Growing
Trillions
$4.3 Trillion 19.5% of GDP
>$2.2 Trillion
16.2% of GDP
$7,421/human
$4.5
$4.0
$3.5
$3.0
$2.5
$2.0
$1.5
$1.0
$0.5
$0.0
1965 1970 1975 1980 1985 1990 1995 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2012 2017
-- 5 Years --
http://content.healthaffairs.org/cgi/reprint/28/1/246
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updated 7:46 a.m. EST, Tue January 6, 2009

Make CNN Your Home Page

The $8 trillion bailout

There was $29 billion for Bear Stearns, $345 billion for Citigroup. The Federal Reserve put up $600 billion to guarantee money market deposits. All told, the price tag so far: $7.2 trillion. Now comes President-elect Barack Obama's economic stimulus plan. The bill is getting awfully close to $8 trillion. full story

- CNNMoney: Obama pushes huge tax cuts
- CNNMoney: Treasury invests more in banks

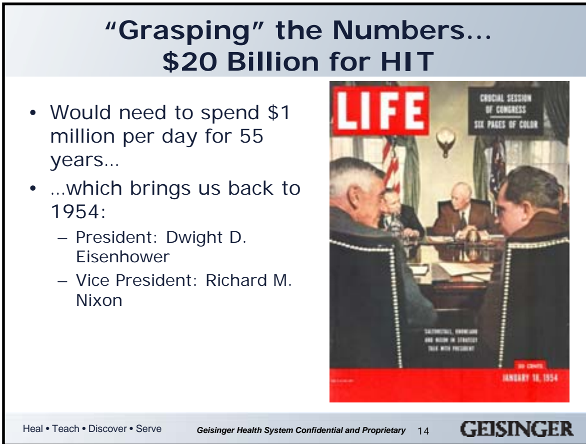
Other News

- Israel says it's killed 130 Hamas fighters 3 min
- In Gaza, living with anger, fear 49 min
- Boy goes missing; police find out 10 years later
- Russian gas supplies to Europe cut 10 min
- Obama CIA pick displeases Dem senator
- Ticker: Laura Bush to reveal 'intimate' details
- Twitter accounts of Obama, Spears hacked
- Obama girls' school debut gets attention
- Old ladies bowl better than Obama
- Rollins: How to win in Washington
- People: Source says seizure killed Travolta son
- Ali Velshi: Is a financial adviser right for you?
- Co-workers sue over $207M lottery win
- Parents share heartbreak of children's deaths
- FBI touts 'hiring blitz' for 3,000 openings
- Brown: Monogrammed towels for Interior chief?
- Twin boys born in different years
- CNN Wire: Europe gas supply suffers amid...

all news from the past 24hrs »

Popular News SEE TOP 10

Study: Teens on MySpace mention sex, violence



HOME PAGE | TODAY'S PAPER | VIDEO | MOST POPULAR | TIMES TOPICS

The New York Times

Business

Wal-Mart Plans to Market Digital Health Records System

By STEVE LOHR
Published: March 10, 2009

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REPRINTS
SHARE

Wal-Mart Stores is striding into the market for electronic health records, seeking to bring the technology into the mainstream for physicians in small offices, where most of America's doctors practice medicine.

Related
Times Topics: Wal-Mart Stores Inc.

Add to Portfolio
Wal-Mart Stores Inc
Go to your Portfolio »

Wal-Mart's move comes as the Obama administration is trying to jump-start the adoption of digital medical records with $19 billion of incentives in the economic stimulus package.

The company plans to team its Sam's Club division with Dell for computers and eClinicalWorks, a fast-growing private company, for software. Wal-Mart says its package deal of hardware, software, installation, maintenance and training will make the technology more accessible and affordable, undercutting rival health information technology suppliers by as much as half.

"We're a high-volume, low-cost company," said Marcus Osborne, senior director for

Amtrak
acela
2019
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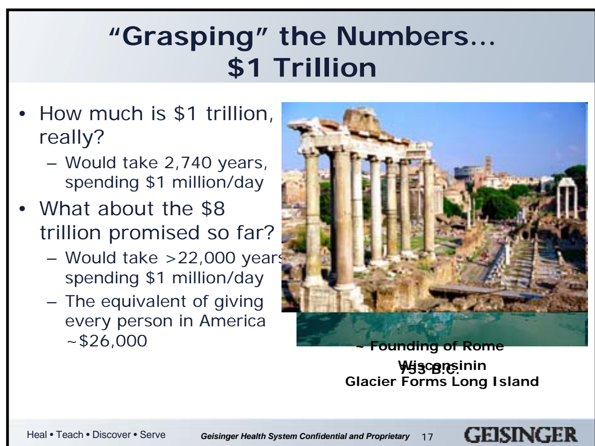
"Grasping" the Numbers…
$1 Trillion
• How much is $1 trillion, really?
– Would take 2,740 years, spending $1 million/day
• What about the $8 trillion promised so far?
– Would take >22,000 years spending $1 million/day
– The equivalent of giving every person in America ~$26,000
~ Founding of Rome
753 B.C.
Wisconsinin
Glacier Forms Long Island
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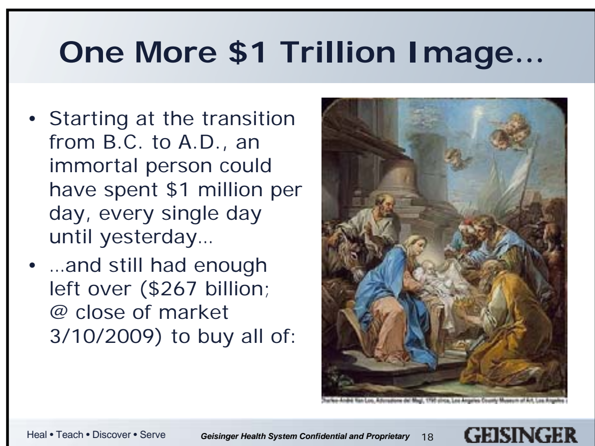
One More $1 Trillion Image…
• Starting at the transition from B.C. to A.D., an immortal person could have spent $1 million per day, every single day until yesterday…
• …and still had enough left over ($267 billion; @ close of market 3/10/2009) to buy all of:
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How Long to Spend $1 Trillion at $1/day?

- For Context…

Earth Formed ~4.6 billion years ago…

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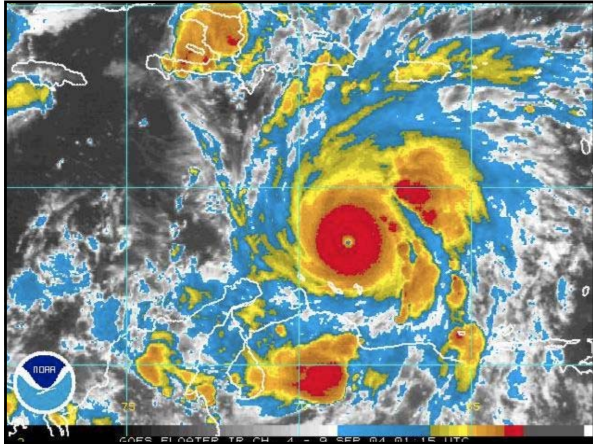


Pixie Dust Source: Jay Jacobsen, Fractalism.com; Tinkerbell Disney Corporation all rights reserved.

Geisinger's Approach

Use Our Own "Experimental Laboratory" to Make Change for Our Community…

GHS "Sweet Spot" is Our Innovation Laboratory

- Background:
  - GHS provides ~45% of GHP medical care
  - GHP members account for ~30% of GHS revenue Our
- "Sweet Spot" is the overlap area where Geisinger has financial responsibility and provides the majority of care
- Shared in common within our "Sweet Spot":
  - Clinicians
  - Population
  - EHR & Web Sites
  - Objectives and Values

Creating Real Value: Geisi… r's Core Care Transfor… tives

- Get consumers into a system of care, focused on the right things….
- Optimize the delivery of high-cost, high capital care
- Minimize hand-off errors, reduce wasteful end-of-life spending and degradation
- Get consumers involved, personalize care

…these will enable a solution …e ACCESS problem…

Continuous Innovation

Continuous Innovation In Health Care: Implications Of The Geisinger Experience

Adoption of integrated electronic health systems is the beginning of a long care-transformation journey.

by Ronald A. Paulus, Karen Davis, and Glenn D. Steele

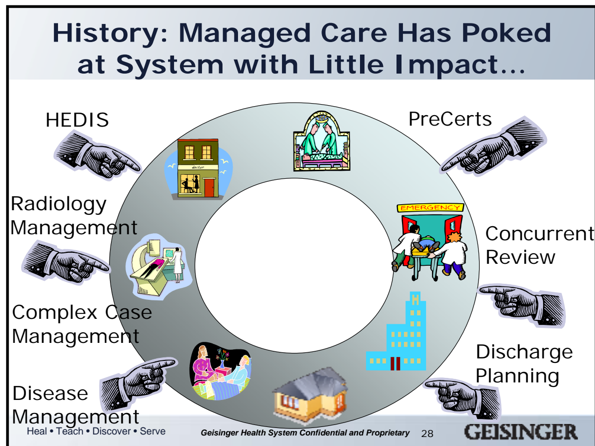
ABSTRACT: To achieve the diverse health care goals of the United States, health care value must increase. The capacity to create value through innovation is facilitated by an integrated delivery system focused on creating value, measuring innovation returns, and receiving market rewards. This paper describes the Geisinger Health System's innovation strategy for care model redesign. Geisinger's clinical leadership, dedicated innovation team, electronic health information systems, and financial incentive alignment each contribute to its innovation record. Although Geisinger's characteristics raise serious questions about broad applicability to nonintegrated health care organizations, its experience can provide useful insights for health system reform. [*Health Affairs* 27, no. 5 (2008): 1235–1245; 10.1377/hlthaff.27.5.1235]

ProvenHealth Navigator®

Geisinger's Value-based Patient-Centered Medical Home

Most Efforts to Maintain Financial Status Increase Costs

- Provide more services
- Add ancillary services:
  - Lab, CT and MRI Scanners, Cardiac Imaging
- Negotiate higher rates
- Invest in physician-owned facilities (or joint ventures...)


History: Managed Care Has Poked at System with Little Impact…
HEDIS
PreCerts
Radiology Management
Concurrent Review
Complex Case Management
Discharge Planning
Disease Management
EMERGENCY
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It Takes a Partnership: Each Party Does What It Does Best…
Health Plan
• Population analysis
• Align reimbursement
• Predictive Modeling
• Engage member and employer
• Report population outcomes
• Take to market
Clinical Enterprise
• Individual care
• Set best practice, design systems of care
• Educate consumers
• Deliver care
• Report pt. outcomes
• Continually improve
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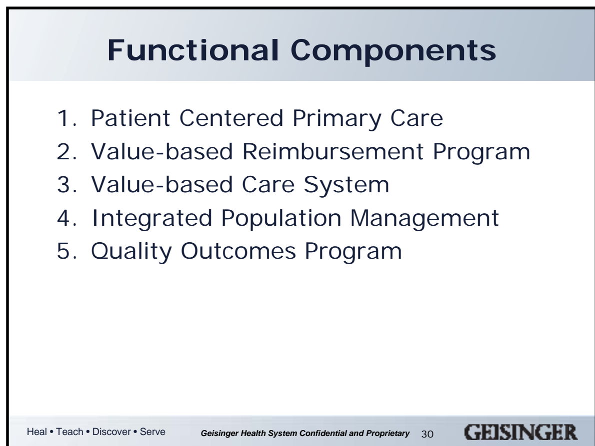
Functional Components
1. Patient Centered Primary Care
2. Value-based Reimbursement Program
3. Value-based Care System
4. Integrated Population Management
5. Quality Outcomes Program
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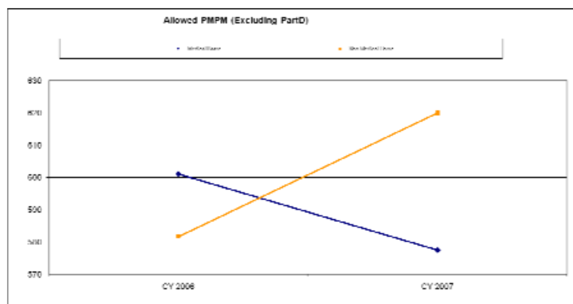
Personal Health Navigator Quality Results

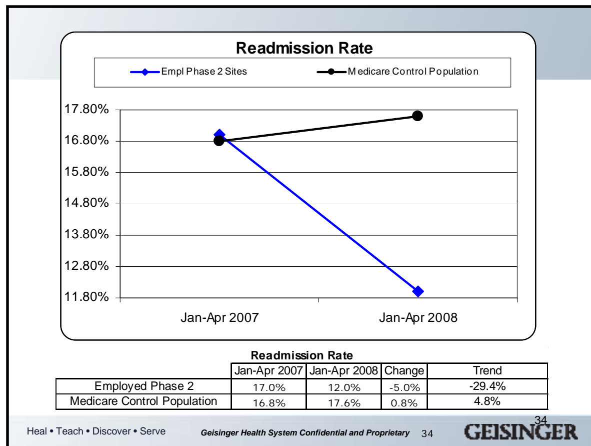
Quality Indicator	Site #1 Baseline CY 06	Site #1 PY1 CY07	Site #2 Baseline CY06	Site #2 PY1 CY07
Patient Encounters	27,400	31,875	9,996	12,537
Diabetes Bundle	9.2%	10.9%	5.3%	9.2%
CAD Bundle	11%	15.7%	15.0%	20.9%
Pneumovax	82%	85.7%	87.4%	91.0%
Influenza Vaccine	1,452	1,477	511	513
Post D/C follow up	N/M	90.1%	N/M	92.6%
Appointment Access	84.4%	83.7%	85.2%	85.5%
Care rec'd during visit	91%	92.4%	90.1%	91.8%
Risk assessment	0	100%	0	100%
Documented Care Plan	0	99%	0	98%

Individual Patients Tell a Powerful Story…

- "JS" : 71-year-old male with COPD, diabetes, pulmonary HTN, A-fib, right-sided heart failure and carotid artery stenosis
  - 2 hospitalizations 2006; 3 in 2007
  - Enrolled into ProvenHealth Navigator in January 2008
  - Monthly follow-up by team; weekly follow-up by CM
  - Pulmonary rescue kit used on several occasions
  - CM worked with pharmacy for lower cost rescue kit
  - Coordinated "donut hole" coverage for very expensive medication through pharmaceutical indigent program

Phase 1 Total Net Medical Costs Decreased 4%; ROI = 250%





Readmission Rate

	Jan-Apr 2007	Jan-Apr 2008	Change	Trend
Employed Phase 2	17.0%	12.0%	-5.0%	-29.4%
Medicare Control Population	16.8%	17.6%	0.8%	4.8%

PHN Now Live for Commercial Members in 2 non-GHS Sites

- 1,000+ Commercial Members
- Quality:
  - Similar improvements on HEDIS
- Efficiency:
  - PMPM Medical Cost decreased 10% in year 1

ProvenCare - Chronic®

Chronic Disease Optimization

All or None "Bundle" Measures

Goal	Non-Smoker	Influenza Immunization	HgbA1c <7	BP < 130/80	LDL < 100	Complete Bundle
Patient 1						
Patient 2						
Patient 3						
Patient 4						
Patient 5						
Percentage	80%	80%	60%	60%	60%	0%

Even if individual criteria have great results, when calculated as an "All or None" metric – the need to work differently (systems of care) becomes evident

Our Diabetes Bundle

Measures	Quality Standard	FY07
HgbA1C measurement	Every 6 months	X
HgbA1C control	< 7	X
LDL measurement	Yearly	X
LDL control	< 100	X
Blood pressure control	< 130/80	X
Retinal exam	Yearly	
Urine (protein) exam	Yearly	X
Foot exam	Yearly	
Influenza immunization	Yearly	X
Pneumococcal immunization	Once	X
Smoking status	Non-smoker	X
Use of ACE/ARB for microalbuminuria/DM nephropathy	Yes	
Use of ACE/ARB for hypertension	Yes	
Patients who receive/achieve ALL of the above	Yearly	X

Diabetes Care EHR-based Work Flow Redesign

- Data mining prior to arrival
- Nurse Rooming Tool
- Single screen visualizations
- Order entry support
  - Delegated orders
  - Longitudinal orders (e.g., recurring labs, pre-filled refills)
- Other decision support
- Patient reporting
- Physician and practice reporting
- Incentive redesign

Nurse Rooming Tool

Sunfish, Ralph

Rooming Tool

New Reading | Go to Doc Flowsheet

Nurse Rooming Tool

VISIT 8/30/07

Questions?:

Patient Identified by Name and DOB?

Is the patient age 18 years or over?

Tobacco History Verified?

Patient provided with Tobacco use Cessation Education?

Med List Updated?

MyGeisinger Active?

DM Best Practice Alert/Order Set

Charting

BestPractice Alerts

Dx of DM. LDL every 12 months, Standard <100.

Open SmartSet: BPA GHS DIABETES LDL

Dx of DM. Pneumovax - at least one lifetime vaccine. One time revaccination >64 years old (if vaccine given more than 5 years ago).

Open SmartSet: BPA_GHS_PNEUMOVAX

Dx of DM. Flu vaccine - once per flu season is standard.

Open SmartSet: BPA-GHS_DIABETES_FLU

Dx of DM. HgbA1c every 3 months, Standard < 7%

Last HGBA1C: Not on file

Open SmartSet: BPA - GHS DIABETES - HGBA1C Greater than 7.0

Dx of DM. Microalbumin every 12 month, Standard < 30.

Open SmartSet: BPA GHS DIABETES MICROALBUMIN

Accept

MyGeisinger
Patient Reminder View

MyGeisinger.org

Your online health management tool

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Patient Trend Report

Personal Diabetic Report Card: Abigail L George
4/28/2006

Below is a summary of relevant Diabetes values that we feel could help you manage your health better. Feel free to discuss this with your care provider.

HEMOGLOBIN A1C

Your most recent Hemoglobin A1c values are:

HEMOGLOBIN, A1C(%)

Coll DtTm	Resulted	Value	Status
3/2/06 11:23A	3/2/06	6.6*	FINAL
11/21/05 4:21P	11/22/05	8.7*	FINAL

The above values should be LESS than 7 (<7). If these are more than 7 then you have a higher chance of having eye, kidney, and heart problems in the future.

CHOLESTEROL

Your most recent LDL cholesterol (bad cholesterol) results are:

LDL (CALCULATED)(mg/dL)

Coll DtTm	Resulted	Value	Status
11/15/05 8:20A	11/15/05	110	FINAL

The above values should be LESS than 100 (<100). If these are consistently higher than 100, then your chance for heart attack and stroke increases yearly.

BLOOD PRESSURE

Your most recent Blood Pressure readings are:

Last 3 BP Readings:

Date:	BP:
04/28/2006	100/60
04/25/2006	140/80
03/02/2006	124/80

The above values should be LESS than 130/80. Contact me if your readings at home are consistently higher than this.

Most recent values displayed

Therapeutic goals are stated

Clinical consequences are stated

Site Based Trend Report

% Diabetes Bundle Measures (FY-07 Goal is 16%)

12.0%
10.0%
8.0%
6.0%
4.0%
2.0%
0.0%

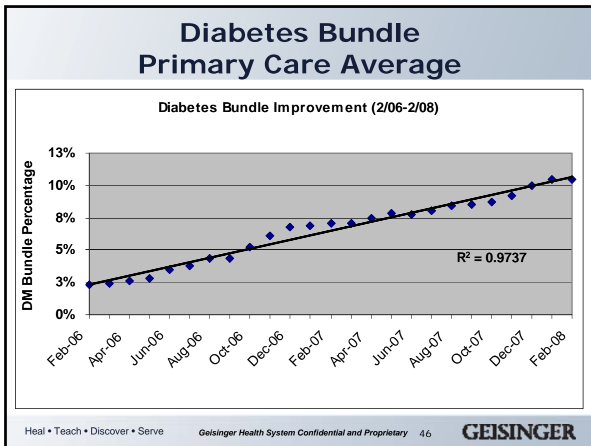
	Jan-06	Aug-06	Sep-06	Oct-06
SITE % BUNDLE	7.3%	8.2%	7.1%	11.1%
PC SITE AVERAGE	2.4%	4.4%	4.4%	5.3%
PC BEST SITE	7.3%	10.5%	9.1%	11.1%

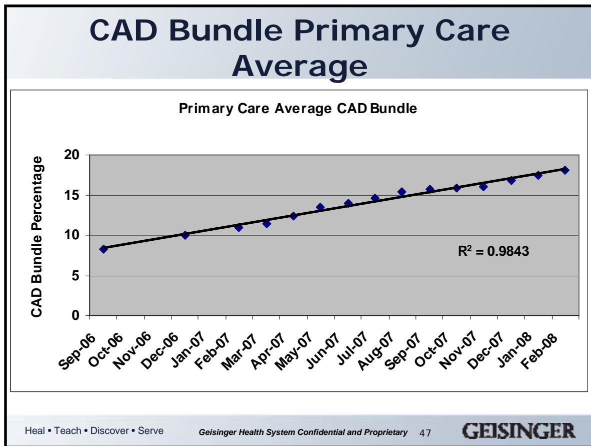
Diabetes Bundle Change (>22,000 Patients)

35%
30%
25%
20%
15%
10%
5%
0%

% Pts - 0 Measures Met | % Pts - 1 Measure Met | % Pts - 2 Measures Met | % Pts - 3 Measures Met | % Pts - 4 Measures Met | % Pts - 5 Measures Met | % Pts - 6 Measures Met | % Pts - 7 Measures Met | % Pts - 8 Measures Met | % Pts - All Measures Met

12.0% @12/08
6/08
11.6%
12/07
6/07
12/06
9/06
2.4%
3/06





GHP GOLD Geisinger HEDIS Performance vs. Panel Providers

Study	HEDIS 2008			Results	
	Total Rate	Clinic	Panel	Test of Means	
				or	
				Population Inferences	
Effectiveness of Care				(a = .10), two tail	
Comprehensive Diabetes Care:					
HbA1c tested	94.2%	**98.8%**	87.7%	Statistically Higher	P<0.0001
HbA1c Good control <7.0%	51.3%	**55.8%**	45.0%	Statistically Higher	P=0.0308
HbA1c Poor controlled >9.0% (Lower rate indicates better performance)	12.7%	**5.4%**	22.8%	Statistically Higher	P<0.0001
Lipid Profile performed	92.0%	**95.4%**	87.1%	Statistically Higher	P=0.0023
LDL-C <100	54.5%	**58.3%**	49.1%	+/- Statistically Higher	P=0.0643
Diabetic Retinal Eye Exams	88.1%	**92.5%**	81.9%	Statistically Higher	P=0.001
BP controlled <130/80	44.3%	**52.9%**	32.2%	Statistically Higher	P<0.0001
BP controlled <140/90	69.6%	**75.4%**	61.4%	Statistically Higher	P=0.0023
Kidney Disease monitored	93.4%	**96.7%**	88.9%	Statistically Higher	P=0.0016
Breast CA Screening	83.5%	**88.6%**	77.6%	Statistically Higher	P<0.0001
Colorectal CA Screening	65.8%	**70.8%**	60.5%	Statistically Higher	P=0.0324
Cholesterol Mgmt after Acute Cardio					
- LDL Screening	93.0%	**97.6%**	88.3%	Statistically Higher	P=0.0003
- LDL <100	67.1%	**72.6%**	61.4%	Statistically Higher	P=0.0178
Controlling High Blood Pressure	67.2%	**73.9%**	60.1%	Statistically Higher	P=0.0051
Antidepressant Med Mgmt					
- Optimal Practitioner Contacts	16.1%	**14.7%**	17.0%		
Spirometry Testing for COPD	41.8%	**59.4%**	33.2%	Statistically Higher	P<0.0001
Glaucoma Screening	76.7%	**81.0%**	71.9%	Statistically Higher	P<0.0001

ProvenCare® - Acute

Acute Episodic Care Optimization

GHS Receives "All In" Global Fee

- One fee for the ENTIRE 90-day period:
  - ALL surgery-related pre-admission care
  - ALL inpatient physician and hospital services, including cardiologists, cardiac surgeons, anesthesia, consultants, etc
  - ALL surgery-related post-operative care
  - ALL care for any related complications or readmissions
- Eliminates perverse incentives
- Enhances cooperation between physicians, hospitals and plan

Core Components

- Establishing appropriateness screen
- Hard wiring evidence-based care
- Defining related complications and readmissions
- Determining episode length
- Negotiating bundled payment rate
  - 50:50 split of historical complication rate
- Establishing mechanism for paying claims (including non-participants)
- Defining outcome metrics
- "Look Backs"

Evidence-based Care Hardwiring: CABG Example

ACC/AHA Class I Recommendations

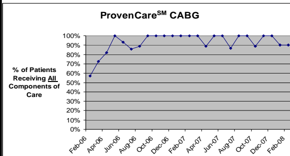
- Pre-op antibiotics
- Pre-op carotid doppler studies
- Aspirin
- Epiaortic echocardiography to identify atherosclerotic ascending aorta
- Aggressive debridement and revascularization for deep sternal wound infections
- Perioperative beta blockers (or amiodarone) to reduce atrial fibrillation
- Statins
- Smoking cessation education and pharmacotherapy
- Cardiac rehab
- Withholding of clopidogrel for 5 days pre-op
- Left internal mammary artery as graft for the LAD artery

ACC/AHA Class II Recommendations

- Pre-operative use of a CABG operative mortality risk model
- Anticoagulation for recurrent/persistent postoperative Afib
- Anticoagulation for postoperative anteroapical MI with persistent wall motion abnormality
- Carotid endarterectomy for carotid stenosis that is symptomatic or >80%
- Inta-aortic counterpulsation for low LV ejection fraction
- Blood cardioplegia
- Delay operation for patients with recent inferior MI with significant RV involvement
- Tight peri-operative glucose control

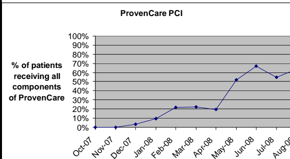
40 discrete care process steps

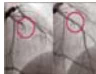
ProvenCare Cardiac Initiatives



ProvenCare CABG

Snapshot:
-5 Surgeons
-2 hospitals
-100 surgeries/year





ProvenCare PCI

Snapshot:
- 3,000 Diagnostics ->1000 PCI
- 8 Interventionalists
- 35 Cardiologists
- 2 Hospitals

CABG Clinical Outcomes

	Before ProvenCare (n=132)	*With ProvenCare* (n=181)	Change (% Reduction)
In-hospital mortality	1.5%	0%	
Patients with any complication (STS)	38%	30%	21%
Patients with >1 complication	7.6%	5.5%	28%
Atrial fibrillation	23%	19%	17%
Neurologic complication	1.5%	0.6%	60%
Any pulmonary comp	7.3%	4.0%	46%
Blood products used	23%	18%	22%
Re-operation for bleeding	3.8%	1.7%	55%
Deep sternal wound infection	0.8%	0.6%	25%
Readmission within 30 days	6.9%	3.8%	45%

Value Financial Outcomes (18 months)

- Average total LOS fell 0.5 days (6.2 vs. 5.7)
- Hospital net revenue grew 7.8%
- Index hospitalization contribution margin grew 16.9%
- 30 day readmission rate fell 44%

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May 17, 2007 The New York Times nytimes.com

In Bid for Better Care, Surgery With a Warranty

By REED ABELSON

What if medical care came with a 90-day warranty?

That is what a hospital group in central Pennsylvania is trying to learn in an experiment that some experts say is a radically new way to encourage hospitals and doctors to provide high-quality care that can avoid costly mistakes.

The group, Geisinger Health System, has overhauled its approach to surgery. And taking a cue from the makers of television sets, washing machines and consumer products, Geisinger essentially guarantees its workmanship, charging a flat fee that includes 90 days of follow-up treatment.

Bypass by the Book

Geisinger Health System has devised an approach to elective heart bypass surgery, which it calls ProvenCare, that includes a 40-item checklist to ensure that patients get recommended treatments. A Geisinger study of the first-year results of the program found that fewer patients returned to the intensive care unit and that they were more likely to go directly home from the hospital rather than to a nursing home.

ProvenCare checklist for heart bypass surgery

1. **Before admission** 12 checks, including screening for stroke risk.
2. **Just before and during surgery** 8 checks, including confirming that the patient received the correct doses of medications and was screened for hyperglycemia.
3. **After surgery** 10 checks, including tobacco screening and counseling.

Some results of using ProvenCare

	Before	After
Patients with any complication	39.0%	35.0%
Supplemental blood products used	23.0	16.0
Discharged not to home	19.0	9.0

ORIGINAL ARTICLES

"ProvenCare[SM]"

A Provider-Driven Pay-for-Performance Program for Acute Episodic Cardiac Surgical Care

Alfred S. Casale, MD, Ronald A. Paulus, MD, Mark J. Selna, MD, Michael C. Doll, PA-C, Albert E. Bothe, Jr., MD, Karen E. McKinley, RN, Scott A. Berry, MS, Duane E. Davis, MD, Richard J. Gilfillan, MD, Bruce H. Hamory, MD, and Glenn D. Steele, Jr., MD

Objective: To test whether an integrated delivery system could successfully implement an evidence-based pay-for-performance program for coronary artery bypass graft (CABG) surgery.
Methods: The program consisted of 3 components: (1) establishing implementable best practices; (2) developing risk-based pricing; (3) establishing a mechanism for patient engagement. Surgeons reviewed all class I and IIa "2004 American Heart Association/American College of Cardiology Guidelines for CABG Surgery" and translated them into 40 verifiable behaviors. These were imbedded within a new ProvenCare[SM] program and "hardwired" within the electronic health record system, including order sets, templates, and "time outs". Concurrently preoperative, inpatient, and postoperative care within 90 days was packaged into a fixed price. A Patient Compact was developed to highlight the importance of patient activation. All elective CABG patients treated between February 2, 2006 and February 2, 2007 were included (ProvenCare[SM] Group) and compared with 137 patients treated in 2005 (Conventional Care Group).
Results: Initially, only 59% of patients received all 40 best practice components. At 3 months, program compliance reached 100%, but fell transiently to 86% over the next 3 months. Reliability subsequently increased to 100% and was sustained for the remainder of the study period. The overall trend in reliability was significant at $P = 0.001$. Thirty-day clinical outcomes showed improved trends (Table 1) but only the likelihood of discharge to home reached statistical significance. Length of stay decreased by 16% and mean

Healthcare delivery in the United States faces significant quality and cost problems. Medical care is often inappropriate when judged against accepted standards with numerous examples of excess utilization and conversely, appropriately indicated care is frequently not provided.[1] This inconsistency leads to wide, unexplained variation in rates of procedures, expenditures, and outcomes.[2] Landmark publications by the Institute of Medicine and the Rand Corporation[3–5] have focused increased professional and public attention on these issues. Nevertheless, healthcare providers continue to be paid for units of care delivered independent of quality or results achieved. Poor outcomes, such as postoperative complications that require reoperation, often result in more payment.

Care reliability is inconsistent. Best practice guidelines are sometimes based on equivocal evidence, and are often ignored or poorly applied.[6] Translation of even the best guidelines into actual behavior is difficult and slow-paced. The fragmentation of our delivery systems[7] and the influence of diverse and often opposing economic factors can overwhelm the influence of science and well-meaning intentions in determining acceptance and dissemination of best practices.[8]

Strategies to improve this system have included mandates from regulators, federal and state agencies, and payers. Public reports of outcome measures are often derived from

Virtual Care Models: Epo Management

Epo CKD (n=62)	Control (n=74)
Median days to goal = 47.5 days	Median days to goal = 62.5 days
% Time below goal = 13.7% % Time in goal = 69.8% % Time above goal = 16.5%	% Time below goal = 39.7% % Time in goal = 43.9% % Time above goal = 16.4%
Avg Epo Units/week = 6,698*	Avg Epo Units/week = 12,000
Home/Clinic = 58.1%/41.9%	Home/Clinic = 39.2%/60.8%
Expanded Dose Utilization = 40%	Expanded Dose Utilization = 16%
Avg Hgb at start = 9.6 mg/dl	Avg Hgb at start = 10.0 mg/dl
Avg T-Sat at start = 18%	Avg T-Sat at start = 18%

*Savings $3,860/pt/year @$0.014/unit of Epo (p<.001)

Bucaloiu et. al, Managed Care Interface, June 2007.

ProvenCare Portfolio (Jan 2009)

- Live:
  - Coronary Artery Bypass
  - Coronary Angioplasty/Stents
  - Total Hip Replacement
  - Cataract
  - Bariatric Surgery
  - Prenatal Care
- Beta Live:
  - Low Back Pain
  - Spinal Fusion

ProvenTransitions®

Care Hand-off Optimization
(including end-of-life transitions)

A Major Medicare Issue…

- "Potentially Preventable" admissions account for $12+ billion in Medicare spending (>8% of $146B total Part A spend in 2006)

30 Day Readmission Rate	60 Day Readmission Rate	90 Days Readmission Rate
18%	35%	67% (or dead)

TABLE 5-1 Hospital readmission rates

	Percent of patients readmitted to hospital within:		
	7 days	15 days	30 days
Total	6.2%	11.3%	17.6%
Non-ESRD	6.0	10.8	16.9
ESRD	11.2	20.4	31.6

Note: ESRD (end-stage renal disease).

Source: MedPAC analysis of 2005 Medicare Provider Analysis and Review file data.

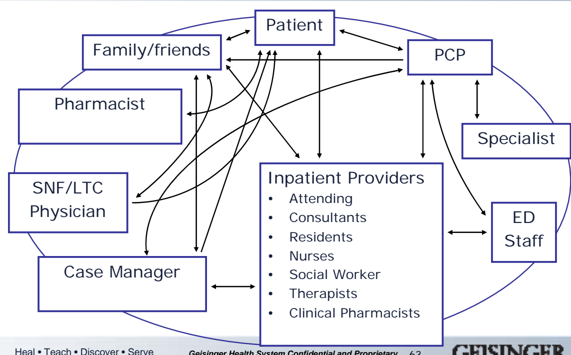
…as 3/4 of Readmissions Deemed "Preventable"

TABLE 5-2 Potentially preventable hospital readmission rates

	Patients readmitted to hospital within:		
	7 days	15 days	30 days
Rate of potentially preventable readmissions	5.2%	8.8%	13.3%
Spending on potentially preventable readmissions (in billions)	$5	$8	$12

Source: 3M analysis of 2005 Medicare discharge claims.

Multiple Hand-Offs Ripe for Error

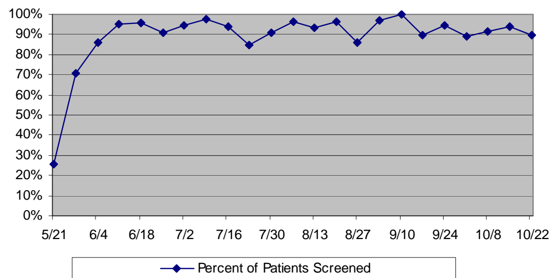


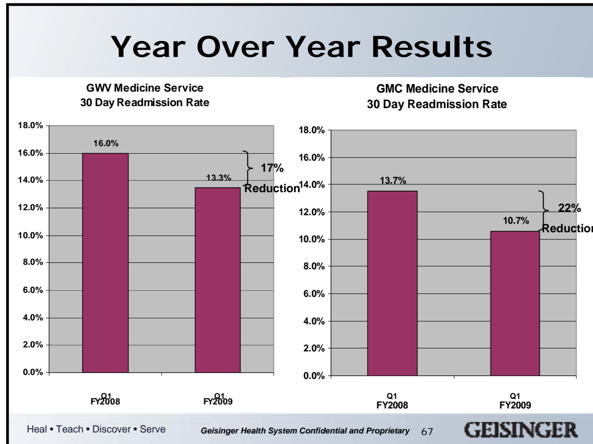
Transition Patient Flow Design

Pre-admit/ED	Admit	Inpatient Stay	Discharge	Post Acute
Screening for High Risk	Detailed Assess-ment	Interdisci-plinary Rounds	PCP Appt.	Proactive Outreach
Pre-Hospital Care Mgmt for Elective Pts	Early Nurse Care Activation	Teach Back	Discharge Synopsis	Enhanced Nsg. Home Clinical Capabilities
	Discharge Plan	Palliative Care		

ED Screening Instrument

Based upon combination of literature review, expert interviews, Geisinger data and clinician experience





Geisinger MyCode™

- Population cohort inclusion criteria
  - >18 years old
  - Geisinger primary care physician
  - No dementia
- Consented participants:
  - Provide blood samples to be banked for broad use
  - Banking blood draw "piggy-backed" onto clinical blood draw
- 20,000 consented in Phase I (ended Fall, 2008)
  - Enrolled at one of six Geisinger community-based primary care clinics
  - 89% enrollment rate
- New goal = 200,000

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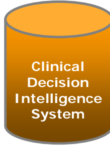
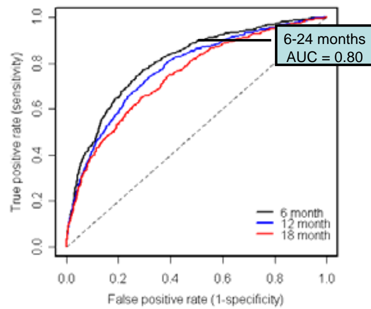
Predictive Model Example



- Can longitudinal electronic health record data be used to predict if a patient will be diagnosed with CHF?
  - Value: Earlier detection → Earlier intervention
    - Prevent disability and reduce costs
- Used six years of longitudinal EHR data to develop robust prediction model
- Result: 50% of CHF patients apear to be detectable 6 to 24 months before usual diagnosis

ALL CHF CASES

Predictive model based on >2,000 cases and >20,000 controls



Clinical Translation

- Translating prediction model to clinical care:
  - Calculate formula that results in an aggregate risk score
  - Use decision logic to interpret score and display relevant data to facilitate appropriate decision making

CHF Look-back Methodology

- Apply CHF prediction model to current EHR data on primary care patients
  - Identify patients at high (n=3,000), moderate (n=5,000) and low (n=2,000) risk
  - Daily search for matching blood sample
  - Expect to measure three biomarkers in 12,000 blood samples over 18 month
- Link biomarker data to de-identified EHR data 18 months later
  - Evaluate biomarkers as predictors of CHF Dx

New vs. Traditional Model For Biomarker Research

Traditional	New
• 5 to 7 years study	• 18 to 24 months
• $5 to $10 millions	• < $2 million dollars
• Selective dropout	• No dropout
• No direct link to patient care	• Directly relevant to patients in care

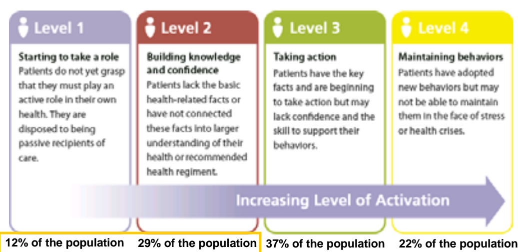
Patient Activation

The Real Caregivers…

"People with chronic conditions are the principal care-givers. Each day, patients decide what they are going to eat, whether they will exercise and to what extent they will consume prescribed medicines."

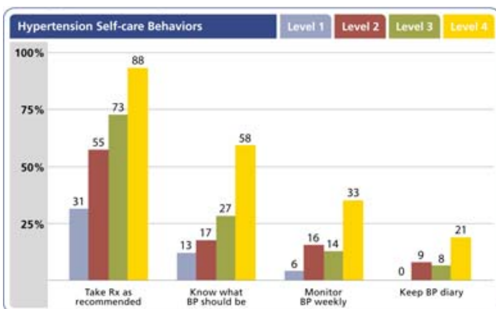
Bodenheimer et al, JAMA 2002

Population by Activation Level



Source: J.Hibbard, University of Oregon

HTN Patients Who Engage in Self-management Behaviors



Source: J.Hibbard, University of Oregon

How do you want to lower your blood pressure ?

Your blood pressure may be higher than normal. Lower your blood pressure and improve your health by reducing your salt intake and increasing physical activity.

Chances of Heart Attack

20% 15% 10% 5% 0%

5% current | 2.2% target | 5% choice

master_db_FRS = 5%

You currently have a 1 in 19.7 chance of a heart attack in the next 10 years.

The good news is that with proper and effective interventions you can decrease your chance of heart attack to as low as 1 in 44.9

☐ +/- target interventions (iRank=1).

Choose from the list on the right to see how your risk of having a heart attack changes.

☐ +/- choosen interventions

Choose up to 3 ways to lower your blood pressure.

- ☐ I want to take medication to lower my blood pressure.
  - ☐ One or more medications
  - ☐ One medication
- ☐ I would like to see a dietician to help me lower my blood pressure.
- ☐ I want to eat right to lower my blood pressure.
  - ☐ Low fat diet high in fruits and vegetables
  - ☐ Diet low in salt and fat
  - ☐ Low salt diet
- ☐ I want to reduce how much I drink to lower my blood pressure.
- ☐ I would like to exercise to lower my blood pressure.
- ☐ I want to use one-on-one counseling to lower my blood pressure.
- ☐ I want to monitor my blood pressure at home.
- ☐ I want to use one-on-one Internet coaching.
- ☐ I do not want to do anything.

Submit for Review | Reset | Clear

How do you want to lower your blood pressure ?

Patient: 627566

Your blood pressure may be higher than normal. Lower your blood pressure and improve your health by reducing your salt intake and increasing physical activity.

Chances of Heart Attack

20% 15% 10% 5% 0%

5% current | 2.2% target | 4% choice

master_db_FRS = 5%

You currently have a 1 in 19.7 chance of a heart attack in the next 10 years.

The good news is that with proper and effective interventions you can decrease your chance of heart attack to as low as 1 in 44.9

☐ +/- target interventions (iRank=1).

Implementing your choices could decrease your chance to 1 in 25.1

☐ +/- choosen interventions

Choose up to 3 ways to lower your blood pressure.

- ☑ I want to take medication to lower my blood pressure.
  - ☐ One or more medications
  - ☐ One medication
- ☐ I would like to see a dietician to help me lower my blood pressure.
- ☑ I want to eat right to lower my blood pressure.
  - ☐ Low fat diet high in fruits and vegetables
  - ☐ Diet low in salt and fat
  - ☐ Low salt diet
- ☐ I want to reduce how much I drink to lower my blood pressure.
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- ☐ I want to use one-on-one counseling to lower my blood pressure.
- ☐ I want to monitor my blood pressure at home.
- ☐ I want to use one-on-one Internet coaching.
- ☐ I do not want to do anything.

Submit for Review | Reset | Clear

Review the choices you have made to reduce your risk of a heart attack. Choices at the top of the menu will help you more than choices at the bottom. You will be more successful by starting with one or two choices and then adding others later. Please check what you want to do first.

Blood_Pressure_Risk — click here to choose intervention

1. ☐ I want to take medication to lower my blood pressure.
2. ☐ I want to eat right to lower my blood pressure.

Submit to Record Session

Reset | Clear

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We Can Take Action…

- Approaches to “reform” must be based upon common sense:
  - Incentivize what we want, enable market-based innovation
  - “Eliminate the hamster wheel” and “downgrade the knife”
- Focus on a few key drivers that could really transform our care system:
  - Get consumers into a real system of care focused on value
  - Optimize chronic disease via team-based care supported by technology
  - Bundle acute care into episodes that align incentives, promote cooperation, quality and efficiency
  - Maximize the efficiency and safety of care transitions, including end of life
  - Engage and activate patients in their own self-care
  - Use predictive models to customize care

We Can Take Action…

- Whether Integrated Delivery Systems are the “solution” or not, there simply must be enhanced cooperation between payors and providers to solve real problems
- No pixie dust or magic wands required, just execution

Pixie Dust Source: Jay Jacobsen, Fractalism.com; Tinkerbell Disney Corporation all rights reserved.