

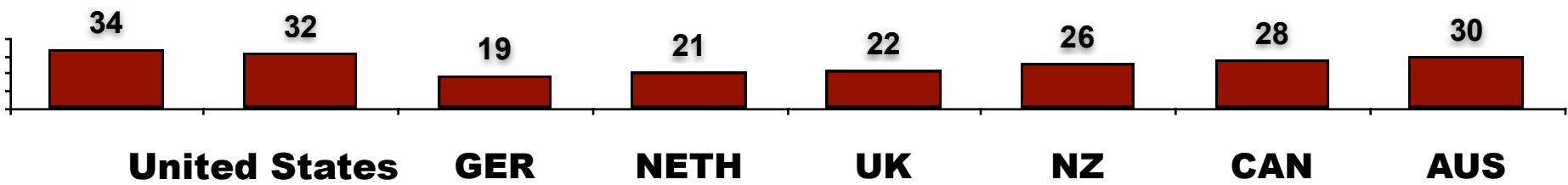
Connecting Patients, Providers, and Payers

John D. Halamka MD

CIO, Beth Israel Deaconess Medical Center
and Harvard Medical School

Medical, Medication, and Lab Errors, Among Sicker Adults

□ 2005 ■ 2007



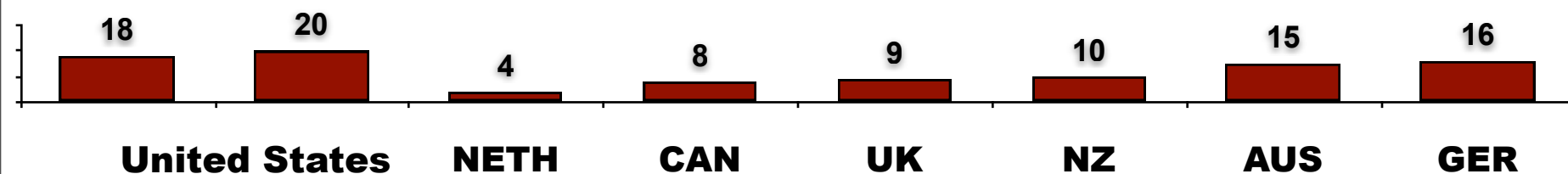
International Comparison

AUS=Australia; CAN=Canada; GER=Germany; NETH=Netherlands; NZ=New Zealand; UK=United Kingdom.
 Data: 2005 and 2007 Commonwealth Fund International Health Policy Survey.

Duplicate Medical Tests, Among Sicker Adults

Percent reporting that doctor ordered test that had already been done in past two years

□ 2005 ■ 2007



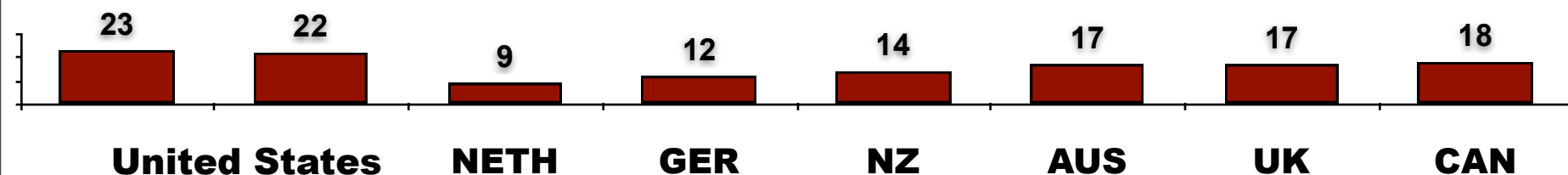
International Comparison

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Data: 2005 and 2007 Commonwealth Fund International Health Policy Survey.

Test Results or Medical Records Not Available at Time of Appointment, Among Sicker Adults

Percent reporting test results/records not available at time of appointment in past two years

□ 2005 ■ 2007



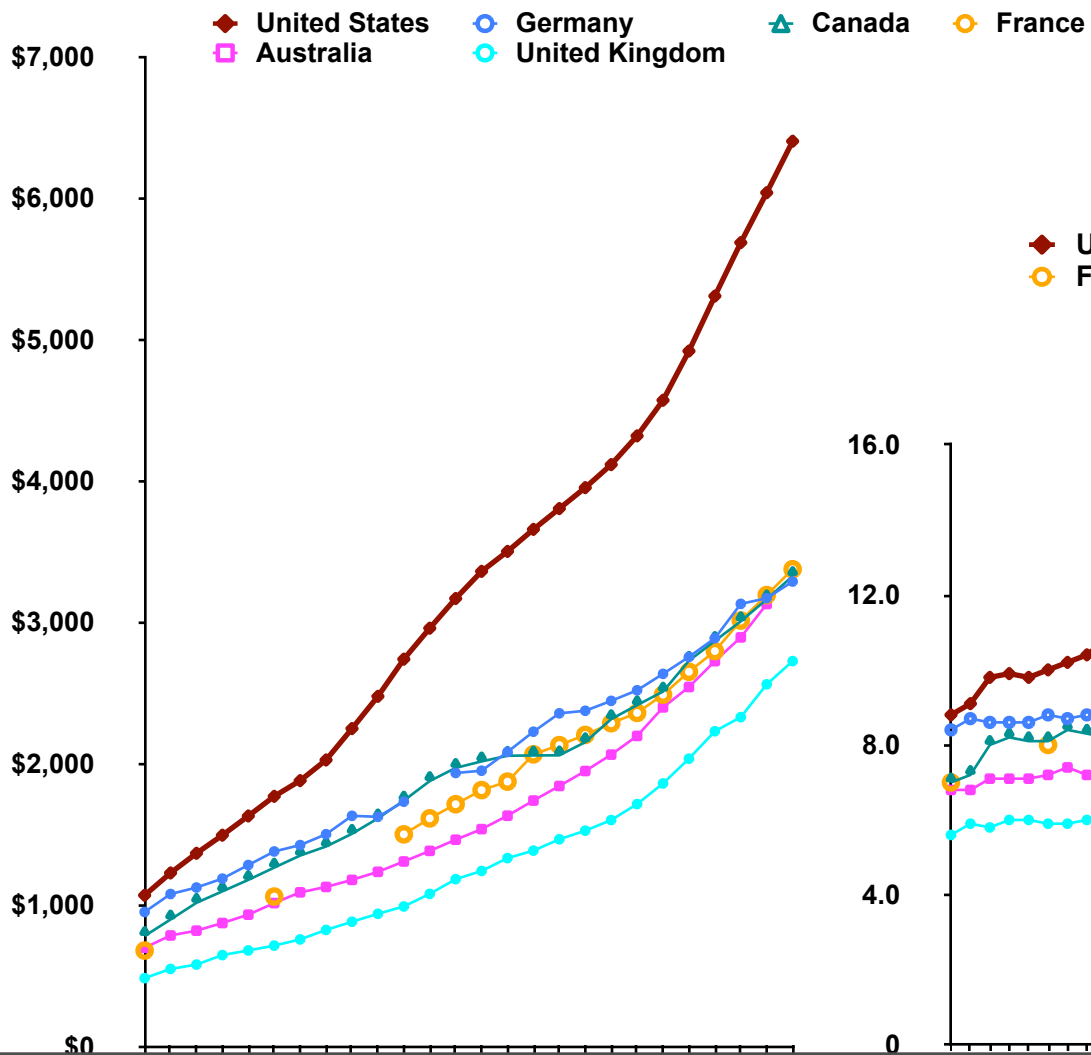
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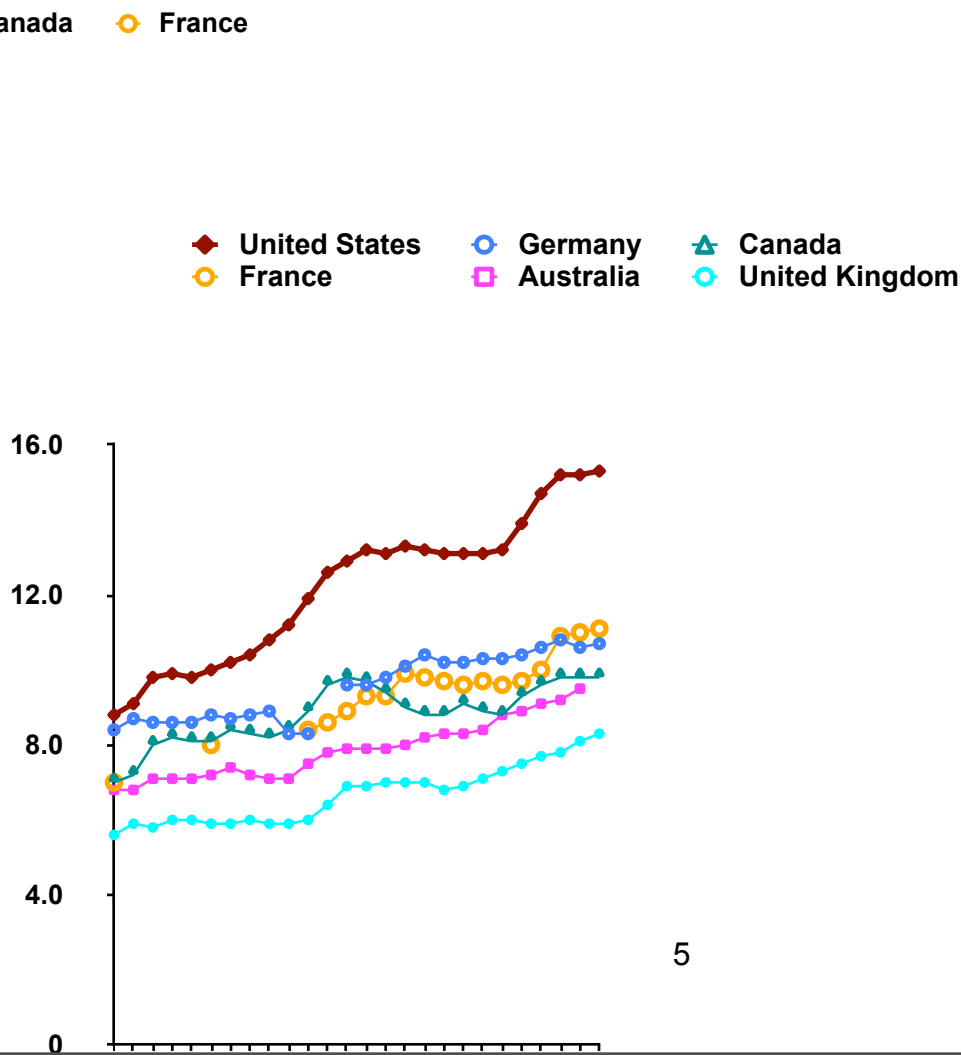
Data: 2005 and 2007 Commonwealth Fund International Health Policy Survey.

International Comparison of Spending on Health, 1980–2005

Average spending on health per capita (\$US PPP*)



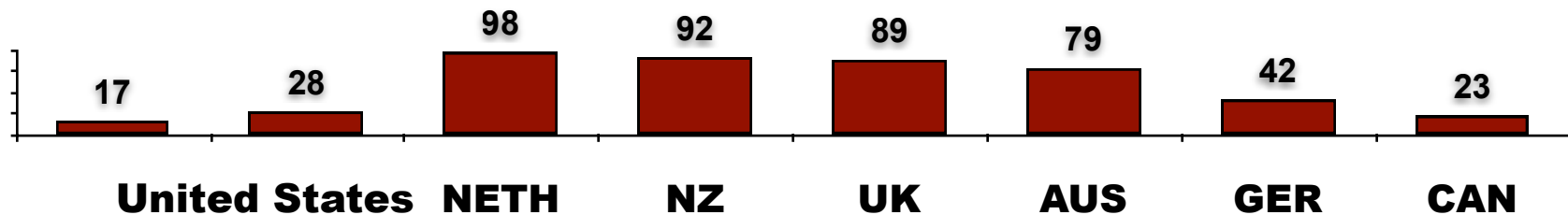
Total expenditures on health as percent of GDP



Physicians' Use of Electronic Medical Records

Percent of primary care physicians using electronic medical records

□ 2001 ■ 2006



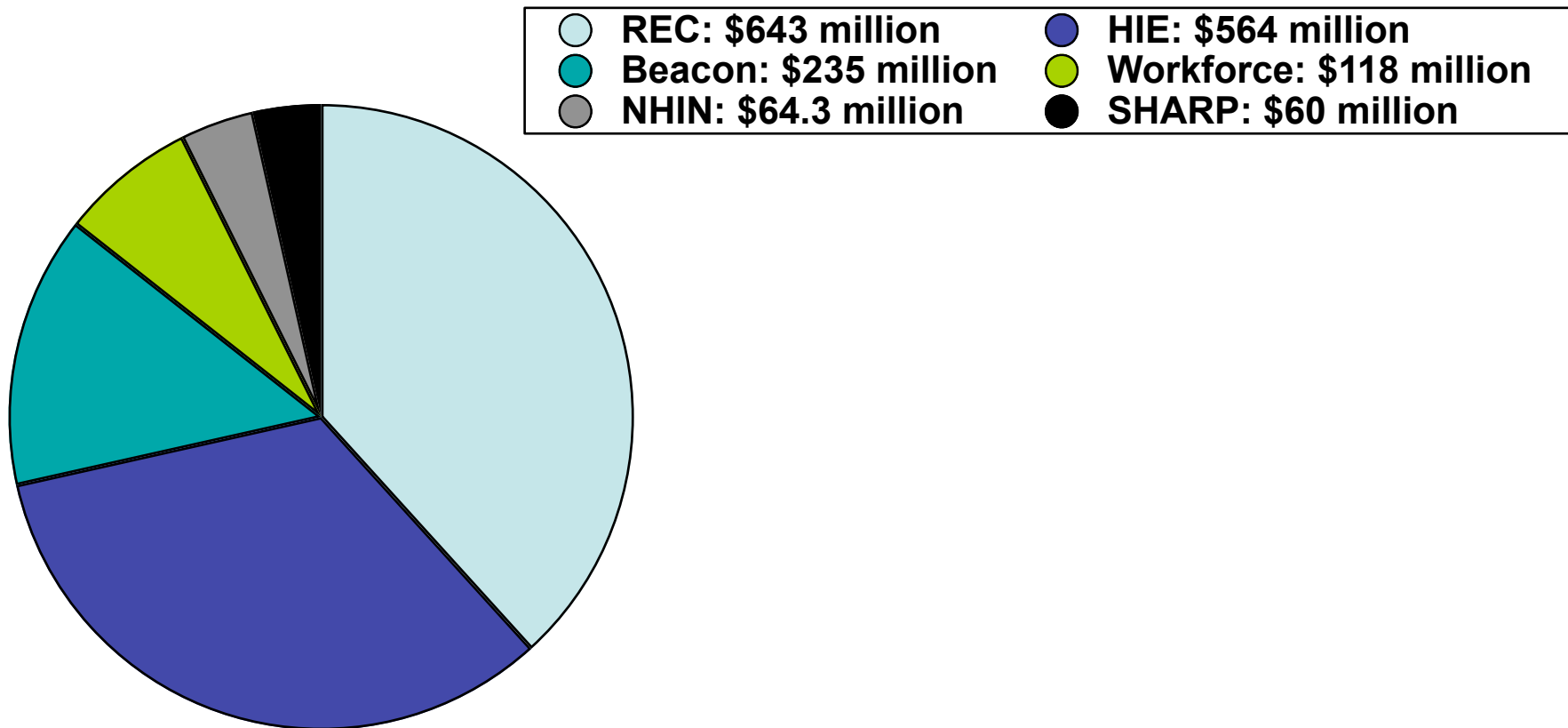
International Comparison

AUS=Australia; CAN=Canada; GER=Germany; NETH=Netherlands; NZ=New Zealand; UK=United Kingdom.
Data: 2001 and 2006 Commonwealth Fund International Health Policy Survey of Physicians.

The National Healthcare IT Program

- Policy (Health Information Technology Policy Committee)
- Certification and Standards (Health Information Technology Standards Committee)
- Privacy and Security Tiger Team
- Regional Extension Centers and Health Information Exchanges
- Meaningful Use and Stimulus dollars (\$27 billion)

Office of National Coordinator Funding



Meaningful Use

- Improving quality, safety, efficiency, and reducing health disparities
- Engage patients and families in their health care
- Improve care coordination
- Improve population and public health
- Ensure adequate privacy and security protections for personal health information

Stage 1 Core Set

- Demographics 50%
- CPOE 30%
- Drug/Drug and Drug/Allergy Safety
- e-Prescribing 40%
- Problem List 80%
- Medication List 80%
- Medication Allergy List 80%
- Vital Signs 50%

Stage 1 Core Set

- Smoking Status 50%
- Decision Support
- Quality Measures Reporting
- Electronic Copy of Health Info. 50%
- Electronic Discharge Summary 50%
- Clinical Summaries 50%
- Exchange Key Clinical Information
- Privacy & Security Risk Analysis

Stage 1 Menu Set

- Implement Drug Formulary Checks* enabled
- Advanced Directive 50%
- Lab Results into EHR* 40%
- Generate Patient List for specific condition
- Patient Reminders (pts <5 & >65) 20%
- Electronic Access to Health Information 10%
- Patient Specific Education 10%
- Medication Reconciliation* 50%
- Summary of Care 50%
- Immunization Registry*
- Lab Results to Public Health
- Syndromic Surveillance*

[Influenza Vax High Risk](#) Last: 06/07/2010
[Pneumococcal \(PPV\)](#) Last: none
[Td Vax](#) Next: 06/13/2009
[Zoster Vax Live \(Zostavax\)](#) Last: none

Allergies Last Updated on 12/21/2010

Morphine
Valium
 Amoxicillin
 Mold Extracts
 Percocet (Oxycodone Hcl/Acetaminophen)
 Red Dye
 apple butter

Problem List Last Updated: 12/22/2010

General Medicine/Primary Care:
AIDS 10/25/1996
HEALTH MAINTENANCE 06/20/1996
HEALTH MAINTENANCE 6/19-97
ATRIAL FIBRILLATION
DIABETES TYPE I
SEIZURE DISORDER
OSTEOPENIA
ANXIETY
BREAST CANCER
HEART FAILURE
SCHIZOAFFECTIVE DISORDER
SEIZURE DISORDER
OTITIS MEDIA
DIABETES, TYPE II
RENAL INSUFFICIENCY
DIABETES, TYPE II 06/20/1996
ANXIETY 06/20/1996
SOCIAL 06/20/1996
BACK PAIN
 Clinical Research Center.

Outpatient Medications Last Action Date: 12/28/2010

There are hem/onc orders

Last Prescribed	Med	By
12/28/2010	acyclovir...	Snow
12/28/2010	cimetidine...	Ives
12/28/2010	diazepam...	Ives
12/22/2010	atenolol...	Sands
10/18/2010	Amlodipine...	THEBERGE
10/18/2010	amlodipine...	THEBERGE
10/18/2010	atorvastatin [Lipitor]... (Q)	Li
03/04/2010	warfarin...	Leddy

Labs (none on file)

Labs - Microbiology (none on file)

Reports (none on file)

EW Visits (since 06/28/09)

Admissions (since 06/28/09)

Appointments (since 06/28/09)

01/02/11 02:00p	HEFFERNAN, JAMES J. SC SHAPIRO CENTER, 6TH FLOOR HCA MEDICAL UNIT (SB) Create Visit Summary
01/02/11 12:00p	DAY, CHARLES S. SC SHAPIRO CENTER, 2ND FLOOR ORTHOPEDIC CLINIC (SB) Create Visit Summary
01/02/11 11:40a	X-RAY ORTHO SCC2 SC SHAPIRO CLINICAL CTR, 2ND FLOOR X-RAY ORTHO SCC2 Create Visit Summary
12/28/10 10:10a	HEFFERNAN, JAMES J. SC SHAPIRO CENTER, 6TH FLOOR HCA MEDICAL UNIT (SB) Create Visit Summary
12/22/10 04:10p	IVES, DAVID V. 482 BEDFORD STREET (LEXINGTON, MA), 2ND FLOOR LEXINGTON INTERNAL MEDICINE (NHB) Create Visit Summary
12/15/10 01:00p	BUSH, BOOKER T. HCA MEDICAL UNIT (SB) Print Visit Summary More...

OR Cases Completed (since 06/28/09)

Scheduled OR Cases (through 03/28/11)

Kept

[Print](#) [Print out declined](#) [Back](#) [Close](#)

Beth Israel Deaconess Medical Center

Summary of your visit(s) on 01/07/2011

Thank you for choosing Beth Israel Deaconess Medical Center for your healthcare needs. This letter contains important information about your recent visit.

Patient Name	DOB	MRN	Address	Phone
Txxx Xxxx	JAN 23, 1937	nnn-nn-nn	1 ELM ST READVILLE, MA, US 02136	617-555-0122

Visit Information

Date and Time	Scheduled to	Practice
01/07/2011, 01:45pm	Ives, David V. MD	LEXINGTON INTERNAL MEDICINE (NHB)

Reason for Visit:

Headache and URI

Patient Instruction:

Take meds as prescribed and get some rest. Call if you don't feel better in 3 days.

Vital Signs

Blood Pressure: 170/60
Heart Rate: 48
Weight (Lbs): 125
Height (Inches): 65
BMI (kg/m2): 20.8

Medications Added or Edited on 01/07/2011

Medication	Disp / Ref	Prescribed By	Take
amoxicillin 500 mg Capsule	12 Capsule / 3 (Three)	Ives, David V. MD	4 Capsule(s) by mouth 30 mins pre dental work

Current List of Medications (as of 01/07/2011)

Medication	Disp / Ref	Prescribed By	Take
acyclovir 800 mg Tablet	20 Tablet / 1 (One)	Sands, Daniel Z. MD, MPH	2 Tablet(s) by mouth once a day
amlodipine 10 mg Tablet			
Amlodipine 2.5 mg Tablet			
amoxicillin 500 mg Capsule	12 Capsule / 3 (Three)	Ives, David V. MD	4 Capsule(s) by mouth 30 mins pre dental work
atenolol 25 mg Tablet	30 Tablet / 2 (Two)	Sands, Daniel Z. MD, MPH	1 Tablet(s) by mouth once a day
atorvastatin [Lipitor] 10 mg Tablet	30 Tablet / 5 (Five)	Li, Janet MD	1 (One) Tablet(s) by mouth once a day
cimetidine 400 mg Tablet	30 Tablet / 5 (Five)	Ives, David V. MD	1 Tablet(s) by mouth once a day
diazepam 2 mg Tablet	30 Tablet / 2 (Two)	Ives, David V. MD	1 Tablet(s) by mouth once a day

Allergies/Adverse Drug Reactions on File

*Morphine
*Valium
Amoxicillin
Mold Extracts
Percocet (Oxycodone Hcl/Acetaminophen)
Red Dye
apple butter

Orders Placed 01/07/2011

Immunizations
Lab

Immunizations Administered Today

Pneumococcal (PPV)

Future Scheduled Appointments

Date and Time	Scheduled To	Where	Phone	Parking Garage	Best Entrance
09/16/2011, 10:40am	INTERPRETER,SPANISH				
09/16/2011, 10:40am	ZSPECIALTY	ONE BROOKLINE PLACE (BROOKLINE, MA) 6TH FLOOR	617-667-9600	FREE PARKING ON SITE	OFF-SITE

Important Notes

Your medical record shows current address, phone number, list of medications, drug allergies or intolerances as listed above. It is important that this information is up to date and accurate. Please review and let us know if anything has changed or is inaccurate.

Results from any tests taken or orders placed today will be reviewed by your provider and communicated to you according to your provider's instructions at the time of your visit.

Stage 2 and 3

- Electronic discharge instructions should include a statement of the patient's condition, discharge medications, activities and diet, follow-up appointments, pending tests that require follow up, referrals, scheduled tests
- 80% of patients offered the ability to view and download via a web-based portal, within 36 hours of discharge, relevant information contained in the record about inpatient encounters. Data are available in human-readable and structured forms.
- Inpatient summaries include: hospitalization admit and discharge date and location; reason for hospitalization; providers; problem list; medication lists; medication allergies; procedures; immunizations; vital signs at discharge; diagnostic test results (when available); discharge instructions; care transitions summary and plan; discharge summary (when available); gender, race, ethnicity, date of birth; preferred language; advance directives; smoking status.

Stage 2 and 3

- Patients have the ability to view and download relevant information about a clinical encounter within 24 hours of the encounter. Follow-up tests that are linked to encounter orders but not ready during the encounter should be included in future summaries of that encounter, within 4 days of becoming available. Data are available in human-readable and structured forms
- Patients have the ability to view and download (on demand) relevant information contained in the longitudinal record, which has been updated within 4 days of the information being available to the practice. Patient should be able to filter or organize information by date, encounter, etc. Data are available in human-readable and structured forms .
- For providers, online secure patient messaging is in use
- Patient preferences for communication medium recorded for 20% of patients in stage 2, 80% in stage 3

Stage 2 and 3

- Offer electronic self- management tools to patients with high priority health conditions
- EHRs have capability to exchange data with PHRs using standards-based health data exchange
- Patients offered capability to report experience of care measures online
- Offer capability to upload and incorporate patient- generated data (e.g., electronically collected patient survey data, biometric home monitoring data, patient suggestions of corrections to errors in the record) into EHRs and clinician workflow
- List of care team members (including PCP) available for 10% of patients in EHR in stage 2, 50% in stage 3
- Record a longitudinal care plan for 20% of patients with high- priority health conditions in stage 2, 50% in stage 3

The Standards Work ahead

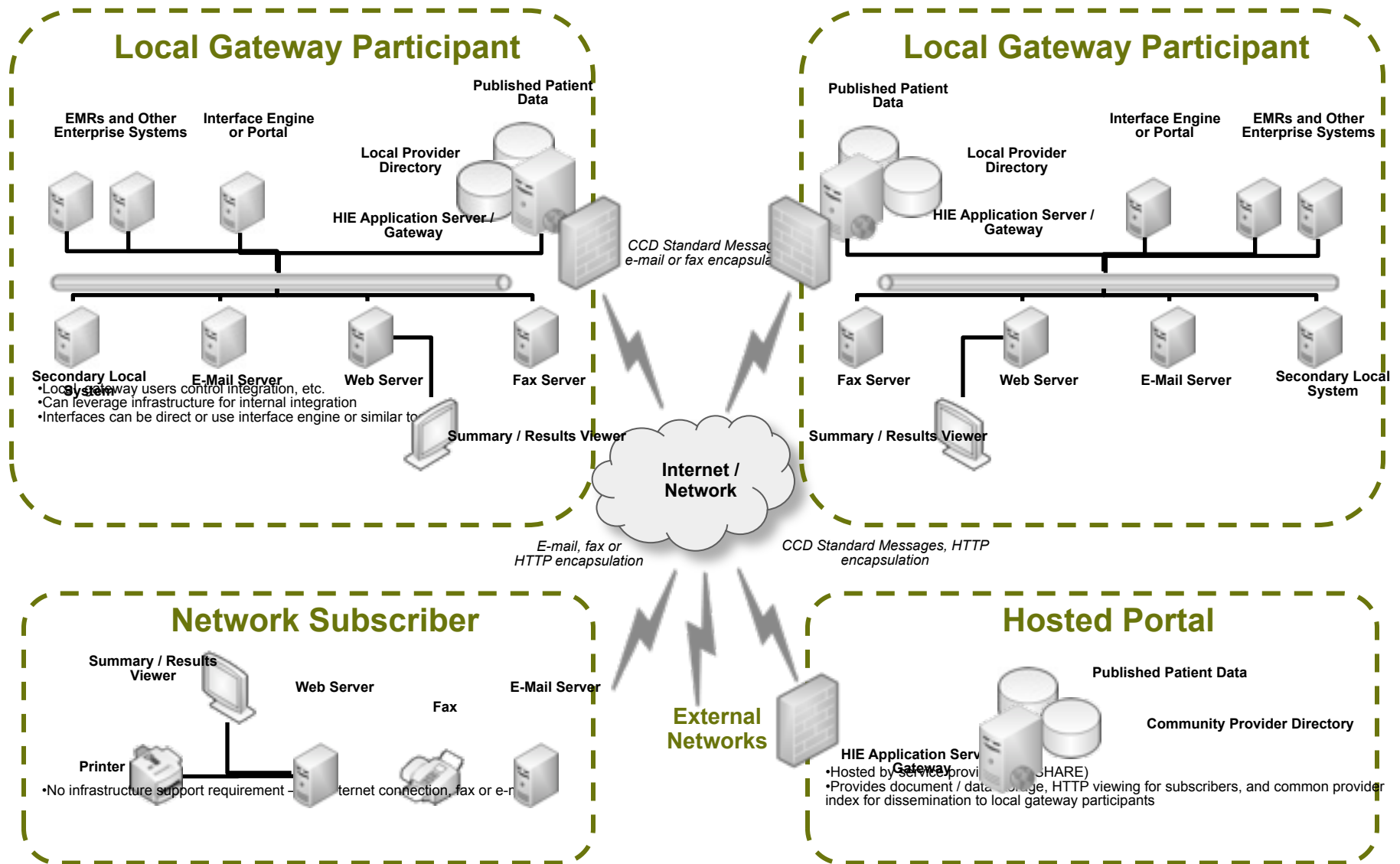
April

- Certificate management
- Metadata for patient id, provenance and privacy
- Patient Matching

May

- ePrescribing of discharged medications
- Vocabulary recommendations
- Directory recommendations
- Metadata preliminary review

Health Information Exchange



The Standards Work Ahead

June

- Syndromic Surveillance
- Quality Measurement
- Metadata recommendations
- EHR/PHR data exchanges

July

- Simple Lab Results
- Transitions of Care
- CDA Cleanup
- Nationwide Health Information Network

Personal Health Records

The screenshot shows a Google Health profile for user 'jdhalamka'. The profile includes personal information such as age (unknown), sex (male), race/ethnicity (white), and blood type (O-). It features several sections: 'Wellness' with a height of 6 feet 2 inches and weight of 175.7 lb (22.6 BMI); 'Problems' listing Glaucoma and Tachycardia; 'Medications' listing Centrum Silver and Vitamin D; and 'Allergies'. The right sidebar contains 'Updates', 'Notices (148)', and 'Import medical records' options. The 'Withings' and 'Beth Israel Deaconess Medical Center' logos are visible in the sidebar.

Google health Search the Web [Browse all health topics](#) [Take our survey!](#)

Profiles: **jdhalamka** [Options](#) [Print](#) [Share](#) [Shared](#)

jdhalamka [Add another profile](#)

Caring for someone? [Add another profile](#)

Medical contacts

Age: unknown
Sex: Male
Race / Ethnicity: White
Blood type: O-

[Edit](#)

Summary [All records](#)

Wellness [Add](#)
Hide wellness

Height (1) 6 feet 2 inches - Apr 14, 2009

Weight (with BMI) (163) 175.7 lb, 22.6 BMI - Jan 23, 2011

[Remove from summary](#) [Delete forever](#)

Problems [Add](#)
Hide problems

GLAUCOMA (2) [Current](#)

TACHYCARDIA (2) [Current](#)

[Remove from summary](#) [Delete forever](#)

Medications [Add](#)
Hide medications

Centrum Silver (2) [Current](#) 1 tablet, once a day

Vitamin D (2) [Current](#) 1,000 unit - 1 capsule, once a day

[Remove from summary](#) [Delete forever](#)

Allergies [Add](#)

Updates [Check now](#)

- New records received from Body Scale by Withings
- New records received from Beth Israel Deaconess Medical Center
- Body Scale by Withings is now linked with your profile
- Personal Genome Project is now linked with your profile
- Beth Israel Deaconess Medical Center is now linked with your profile

[Notices \(148\) - Activity report](#)

Import medical records [Browse all 25 import sources](#)

Withings [Beth Israel Deaconess Medical Center](#)

Put your information to work [Browse all 38 services](#)

Personal Genome Project

The Standards Work Ahead

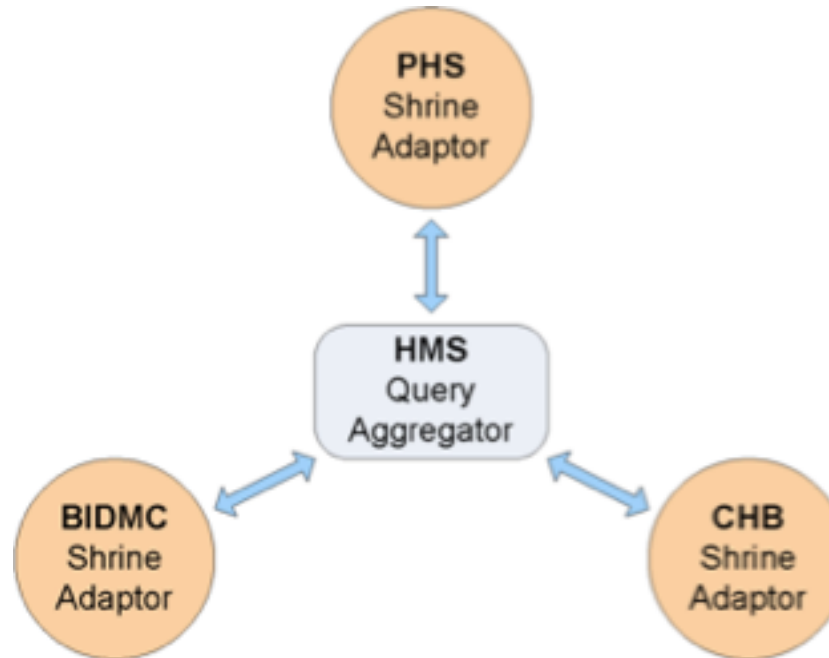
August

- Distributed Queries

September

- Review and final preparation for regulation development

Prototype Architecture



Central “aggregator” broadcasts query to local hospital “adaptors”, which return aggregate counts only

SHRINE Prototype

izb2 Query & Analysis Tool Logout

Navigate Terms **Find Terms**

- Demographics
 - Age
 - Gender
 - Female
 - Male
 - Unknown
 - Language
 - Marital-Status
 - Race
 - Vital-Status
- Diagnoses **drag an item from here**

Query Tool

Query Name: _____

Group 1			Group 2			Group 3		
Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude	Dates	Occurs > 0x	Exclude
			Regional enteritis Ulcerative colitis	Male		Neoplasms		

one or more of these AND none of these AND one or more of these

Run Query New Query 3 Groups New Group

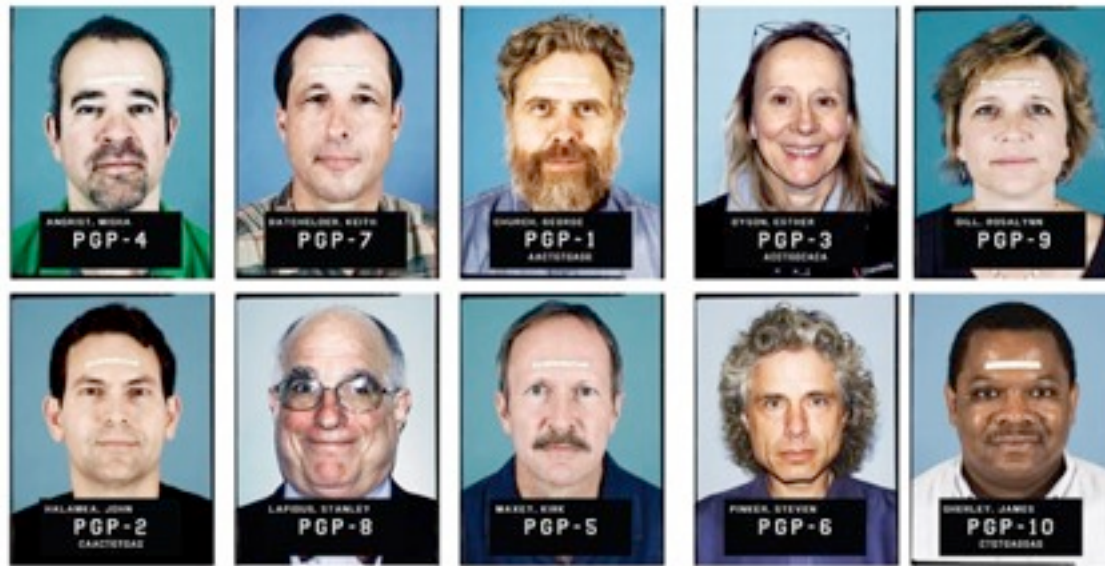
Previous Queries

- Noninfe-Female@16:39:03
- Nonin-Femal-Neopl@16:39:11
- Circulatory sys@16:39:18
- Circulatory sys@17:01:03
- Circula-Events @17:04:11
- Demographics@17:04:21
- 10-19 years old@17:04:39
- Albanian@02:31:25

Query Status

Executing query...
Elapsed time (seconds): 14.0
Query Finished...
Matching patients (hospital 1): 332 (+/-3)
Matching patients (hospital 2): 16 (+/-3)
Matching patients (hospital 3): 151 (+/-3)

The Personal Genome 10



My Genome

- Charcot Marie Tooth IV
- Severe Combined Immunodeficiency
- Susceptibility to Tuberculosis
- 2x risk of Prostate Cancer
- Negative Kell Antigen
- Glaucoma

Questions?

jhalamka@caregroup.harvard.edu

<http://geekdoctor.blogspot.com>