

Big Data and Health IT

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Three take-aways

- Electronic health records make a large and increasing difference in the quality of care
- The data we collect today is primitive compared to what we're about to get
- We need to do a much better job sharing data between patients and their providers

VA's health care system (2011)

- **22 million** veterans
 - Just over 8% are women
- **6.1 million** patients receive health care from VA
 - 1,400 points of contact, including 152 medical centers
- **4.1 million** beneficiaries receive disability & pension benefits
 - 924,000 students receive education benefits
- **\$53 b** for medical care; **\$59 b** for disability & pension benefits
- **300,000** employees

100% hospital EHR adoption.

EHRs matter at VA

- Increased number of patients treated by 70%
- Decreased cost per patient
- Outperformed other American health systems on 294 evidence-based, quality measures in disease prevention and treatment
- VA patients receive significantly better care for depression, diabetes, and hypertension
- Reached nearly perfect prescription accuracy
- Increased pneumonia vaccination rate from 29% to 94%; cut hospitalizations by 4,000 patients a year

The screenshot displays a VA EHR system interface for a 'Physical Therapy' clinic. It includes a navigation sidebar on the left with categories like Scheduling, Patient Manager, Physician Manager, Insurance Manager, Contact Manager, Tools, and Reports. The main area features a calendar for April 2012, a 'News & Update' section, and an 'At a Glance' summary table. Below these is an 'Agenda For: Friday, April 13, 2012' table and a 'New Patients' table.

Pending Patient Intake	11
Incomplete Patient Records	2
Incomplete Physician Records	31
Incomplete Insurance Records	6
Needs Progress Note	13
Fax Alerts	2
Ending Authorization	2
Expired Authorization	2
Incomplete Documents	12
Incomplete Cosign Docs	1

Time	Appointment	Copy	Insurance	Phone	Therapist
New Patients					
	Patient Name	DOB	Insurance	Physician Name	
	Anderson, Nolan	02/29/1983	UnitedHealth	Jochim, Robert S MD	
	Bayuk, Analiese	12/13/1984	Aetna	Forester, Paul M MD	
	Brauch, Dudley	8/15/1970	BCBS of Missouri	Roberts, Smith Sean FNP	
	Cisneros, James	4/12/1980	Wellpoint Inc.	Jann, Heidi PT	
	Campbell, Greg	6/12/1940	Highmark	King, Sarah Parker MD	
	Falbert, Pamela	8/02/1965	Wellcare	Tinsley, Holly Paul MD	
	Holtzapfel, Frank	8/25/1972	Blue Shield	Haimel, Von Hummel FNP	
	Manheimer, Amy	11/23/1985	BCBS of Arizona	Manning, Peyton MD	
	Nero, Joselyn	1/06/1988	Regence	King, Stephen Auth MD	
	Onger, But	5/14/1973	Aetna Preferred	Paulson, Robert XMD	
	Ratto, Crystal	7/30/1966	Kaiser Foundation	Heimerschmitt, Jon J MD	
	Tracey, Richard	5/22/1966	Cigna Health	Goldstein, Joseph MD	
	Walters, Barbara	10/10/1952	BCBS Florida	Thirsty, Harold MD	
	Wilson, Carl	6/31/1965	BCBS of Arizona	Edwards, Cair MD	

VA's recent health IT innovations

New Personal Health Record (PHR)

Blue Button



New Implementation Roadmap

OSEHRA



New Electronic Health Record (EHR)

**VistA, AHLTA, and the
Joint Common Platform**

Blue Button

Easy access to *personal* health information

- Designed and launched by VA, CMS, and DoD in October 2010
- More than 1.3 million users today
- Private sector partners
 - Private health plans
 - 3rd party applications
- In March 2013 OPM required all federal carriers to Blue Button-enable their PHRs

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----- MY HEALTHEVET PERSONAL INFORMATION REPORT -----
*****CONFIDENTIAL*****
Produced by the Blue Button (v12)
02 Dec 2011 @ 1023

This summary is a copy of information from your My HealtheVet Personal
Health Record. Your summary contains information that you entered and
may also include a copy of some of the information in your VA medical
record as it becomes available in My HealtheVet. Please let your health
care team know if you have questions about your health information. For
some Veterans, information from the Department of Defense (DoD) is
available. You will see this in VA Blue Button as DoD Military Service
Information.

Name: MHSVETERAN, ONE A                               Date of Birth: 01 Mar 1948
----- DOWNLOAD REQUEST SUMMARY -----


System Request Date/Time: 02 Dec 2011 @ 1023
User Request Type: Download all of my available data from My HealtheVet
File Name: mhv_MHSVETERAN_20111202.txt

Data Types Selected:
My HealtheVet Account Summary
Demographics
Health Care Providers
Treatment Facilities
Health Insurance
VA Wellness Reminders
VA Appointments (Future)
VA Appointments (Limited to past 2 years)
VA Medication History
Medications and Supplements
VA Allergies
Allergies/Adverse Reactions
Medical Events
Immunizations
VA Laboratory Results
Labs and Tests
Vitals and Readings
Family Health History
Military Health History
DoD Military Service Information

----- MY HEALTHEVET ACCOUNT SUMMARY -----

Source: VA

Authentication Status: Authenticated
Authentication Date: 19 Aug 2010
```



Point One:

There are plenty of commercial EHRs,
but they don't communicate well

- Interoperability has been historically neglected
- We're making progress on standardization
 - but progress is really slow
- One idea was to create an ordinary ascii file
 - this has proven to be surprisingly well adopted
- VA's system was already in the public domain
 - now we've 'closed the loop' with OSEHRA

The taxonomy is . . . quite granular

It will also have a code for recording that a patient's injury occurred in a chicken coop. ([See code.](#))

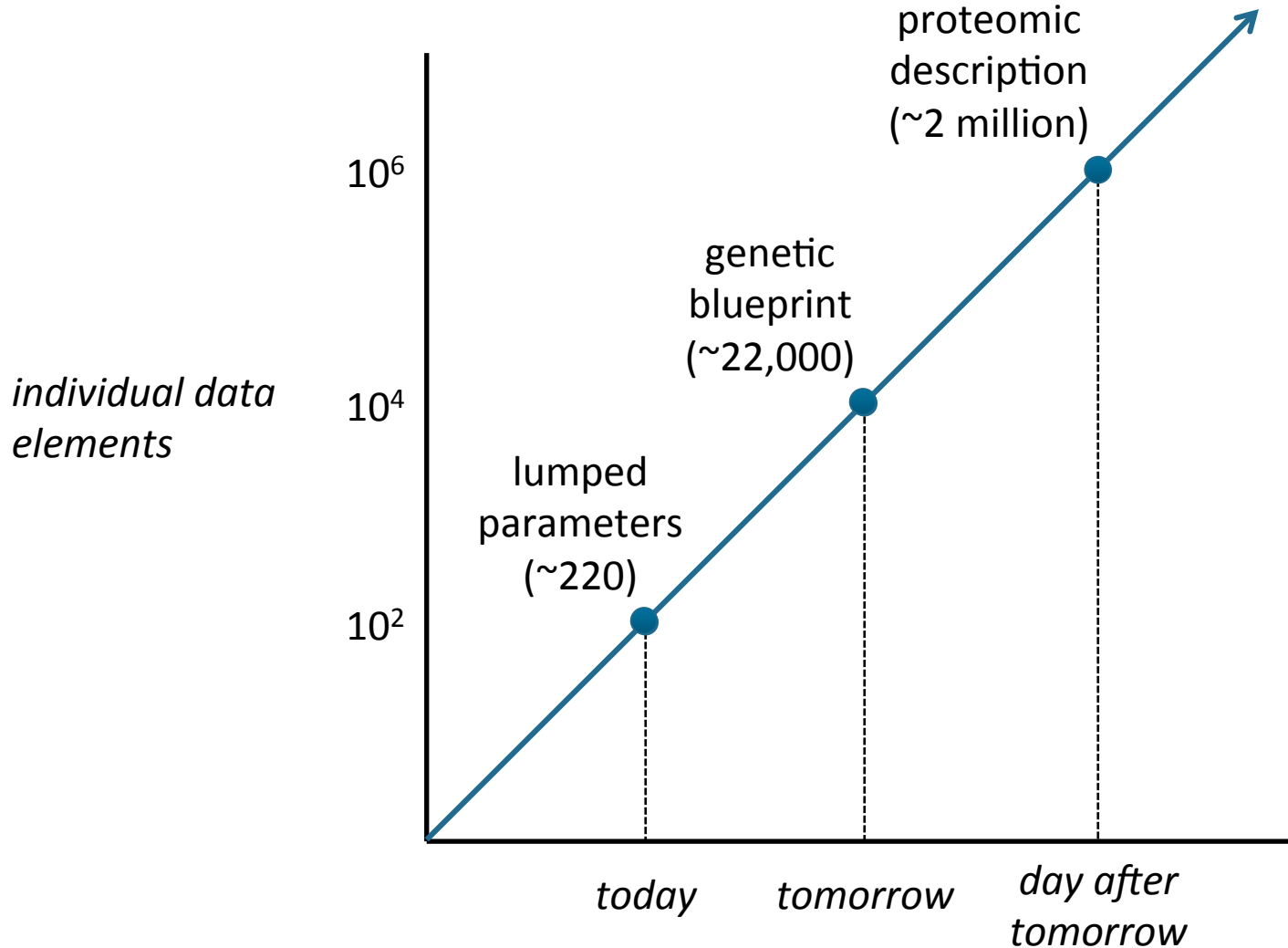
Indeed, health plans may never again wonder where a patient got hurt. There are codes for injuries in opera houses ([see code](#)), art galleries ([see code](#)), squash courts ([see code](#)) and nine locations in and around a mobile home ([see codes](#)), from the bathroom to the bedroom.

Some codes could seem downright insulting: R46.1 is "bizarre personal appearance ([see code](#))," while R46.0 is "very low level of personal hygiene ([see code](#))."

It's not clear how many klutzes want to notify their insurers that a doctor visit was a W22.02XA, "walked into lamppost, initial encounter" (or, for that matter, a W22.02XD, "walked into lamppost, subsequent encounter").

- Excerpts from a Wall Street Journal review of ICD-10 codes

Data about ourselves



Managing complexity

- 13,000 diagnoses
- 6,000 drugs
- 4,000 medical procedures
- 200,000 deaths per year from medical errors (2009)
- 1.5 million adverse reactions or Rx errors

I went through eight years of training to become a surgeon, and yet I still see mistakes every week. So we... worked with Boeing to learn [how to make] a two-minute checklist for operating rooms. And when we implemented it in eight hospitals, ranging from rural Tanzania to Seattle and London, the average reduction in deaths was 46%.

- Atul Gawande

Scope of data

Size of one proteomic snapshot for a single patient:

0.04 terabytes

Amount of (non-image) data contained in the entire
AHLTA electronic health record for 9.7 million patients
today:

113 terabytes

Storage space required for a single proteomic snapshot
data for those 9.7 million AHLTA patients:

390 thousand terabytes

If every patient who had an office visit last year had a
single proteomic snapshot taken, it would equal:

10 million terabytes

Amount of data passed over the internet globally in 2010:

250 million terabytes

If everyone in the United States had a proteomic
snapshot taken **every day** for one year, it would equal:

4600 million terabytes

Point Two:

There are too many “codes, concepts, and descriptions”, and the situation will get worse

- Shift from infectious disease to chronic care management
- We’re on a path to increase individual datasets by four orders+ of magnitude (between 10,000 and 100,000x)
- Interoperability will be even more important

A slice of the healthcare cost equation

US health care spending (2010)

\$2.6 trillion

↳ Health care percentage of GDP

↳ **17.9% of GDP**

(US defense spending is **4.8%**)

Estimated and combined health IT operation budgets for the Departments of Defense and Veterans Affairs

\$5 billion

Cost of computerizing US's largest private health care system

\$4 billion

Meaningful Use reimbursements to date (7/11)

\$7 billion

Hospital EHR adoption

U.S. hospitals using an EHR (2011)

35%

Total ED visits (2011)

123 million

Total hospital admissions (incl. readmissions, 2011)

37 million

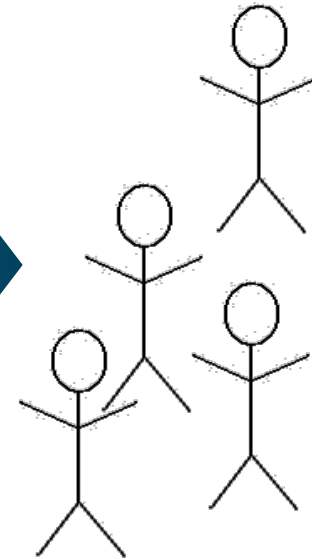
If those admissions and ED visits were equally distributed across hospitals, it would mean EHR coverage for about...

**56 million
admissions & visits**

... so already not great, right? ...

The big question: how can we...

\$2,600,000,000,000



220 lumped parameters today

Damming the Information Cascade

“Our members are particularly concerned with the proposed [Meaningful Use] objective to provide patients with the ability to view, download and transmit large volumes of protected health information via the Internet (a “patient portal”). The AHA believes that this objective **is not feasible as proposed, raises significant security issues, and goes well beyond current technical capacity.**”

- *American Hospital Association letter to CMS on Meaningful Use Stage 2 (April 30, 2012)*

Point Three:

There are plenty of commercial EHRs, but the market potential is still a large untapped market

- VA/DoD health IT spending of \$5 billion covers approximately 5% of the U.S. population
 - implies a \$100 billion market
- U.S spending of \$17.9 billion on health IT covering approximately 50% of the population
 - implies a \$35.8 billion market

Today we're at \$24 billion.

In Conclusion

- The amount, quality, and texture of health information we're about to get is really large
- We haven't figured out how to share what we do have, let alone what we are about to receive
- Information hierarchies don't work anymore, and the people who control information won't relinquish it happily

We should figure out how to solve these problems, the public health, market and job-creating opportunities are tremendous