

# **Web-based Patient Portal to Directly Elicit a Comprehensive Medical History**

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# POLL

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# Today's discussion

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- Frame the opportunity
- Describe the innovation and results
- Share lessons learned



# The unmet need

- Remote triage of patients to the appropriate care setting improves quality, increases patient satisfaction, and reduces cost
- An accurate and timely medical history is essential for enabling remote patient triage
- Current methods for collecting medical histories often deliver inaccurate and delayed results
  - Generic paper-based forms
  - Clinicians serving as expensive scribes
  - Partial and/or perishable EMR data



# The opportunity

- Leverage the internet to facilitate patient self-service in providing a timely and accurate medical history, specific to the context of care
- Provide this patient-directed medical history in real-time to clinicians to facilitate optimal patient triage and management



# VA preoperative triage opportunity

- Patients and families unnecessarily inconvenienced with in-person visits
- Preoperative clinics needlessly overwhelmed with patient volume
- VA incurring substantial excess cost

**Need for  
effective  
triage**



# TVHS preop situation—a microcosm

VA Tennessee Valley Healthcare System (TVHS)—  
Nashville campus

- 4500 surgeries annually
- All pre-surgical patients are evaluated in PEP clinic except inpatients ( ~ 6000 patient visits)
- Significant burden on elderly; time off work for the younger Vets
- In-person visits, associated mileage reimbursement, and expensive diagnostic/ lab tests may be unnecessary for many patients



# VHA Innovation Program grant

## Background

- Central Office sought innovative solutions to the preoperative issues highlighted at TVHS, but prevalent across the VA
- After a rigorous marketplace scan, MedSleuth, Inc. and their BREEZE™ preoperative software was identified as a good fit
- We applied for and received a VHA Innovation Program grant after a peer review evaluation of 178 submitted letters of intent



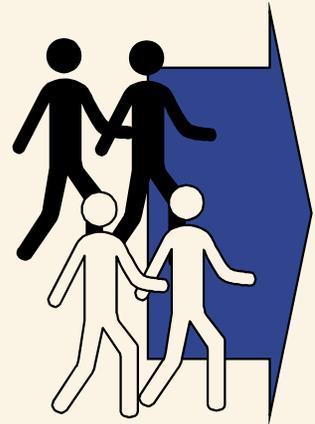
# VHA Innovation grant objective



**Provide a novel use of Software-as-a-Service in a test environment to demonstrate a functional prototype that efficiently screens and triages pre-surgical patients based on anesthetic risk**



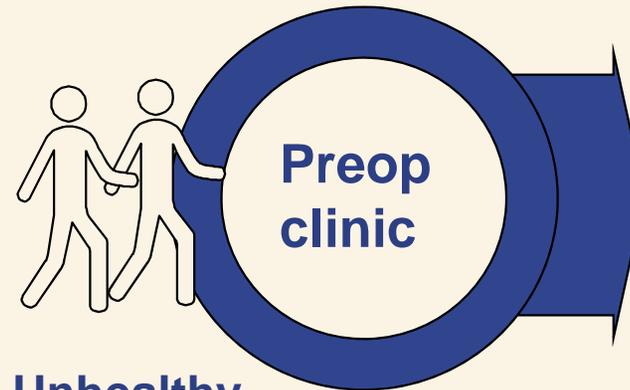
# BREEZE telemedicine triage



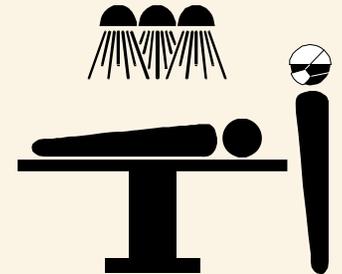
- 15-minute web-based patient questionnaire
- Triage based on patient medications and machine learning
- Summary output for patients and clinicians



Healthy  
ASA 1/2



Unhealthy  
ASA 3/4



# Medication-driven approach

BREEZE 4000+ drug database

Please enter the name of ONE of the medications you are taking exactly as shown your medication bottle or doctor's prescription. You may enter either the brand name or the generic.

Medication:

- Aspirin
- Abacavir, Lamivudine, and Zidovudine
- Atenolol
- Advair Diskus
- Abelcet

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- Abacavir and Lamivudine
- Abilify
- Abarelix
- Abatacept
- A/T/S (Topical)
- A-200 Pyninate



# Associated disease states

## BREEZE complete drug-disease association database

Why do you take Aspirin ?

**Please check all that apply:**

- |   |   |
|---|---|
| <input type="checkbox"/> Angina (Chest Pain)                  | <input type="checkbox"/> Peripheral Vascular Disease (Clots in my legs) |
| <input type="checkbox"/> Angioplasty Of My Heart (No Stent)   | <input type="checkbox"/> Stroke or TIA                                  |
| <input type="checkbox"/> Angioplasty Of My Heart (With Stent) | <input type="checkbox"/> Other  |
| <input type="checkbox"/> Bypass Surgery (Heart)               | <input type="checkbox"/> <b>I do not know</b>                           |
| <input checked="" type="checkbox"/> Coronary Artery Disease   |   |
| <input checked="" type="checkbox"/> I had a Heart Attack      |   |
| <input type="checkbox"/> Joint Pain/Arthritis                 |   |

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# BREEZE comprehensive output

## Pre-Procedural Medical History & Physical

|                |   |   |  |
|----------------|---|---|--|
| Name:          | <input type="text" value="Doe, John"/>                |  | <a href="#">Print</a><br><a href="#">E-mail</a><br><a href="#">Download to XML</a> |
| DOB:           | <input type="text" value="01/01/1950"/> <b>Age 60</b> |   |  |
| Patient's MR#: | <input type="text"/> <a href="#">Add</a>              |   |  |
|                |   |   | <input type="button" value="Close Tab"/>   |

### Past Medical History

Allergic Rhinitis  
BPH  
Coronary Artery Disease, NOS \*\*\*  
Hypercholesterolemia  
OSA (on CPAP) \*\*\*  
PTCA with Stent 2010 \*\*\*  
Skin Cancer, NOS

### Medications

ASA (81 mg qd)  
Plavix \*\*\* (75 mg qd)  [Click Here to Review Alert](#)  
Lipitor (20 mg qhs)  
Proscar (5 mg qd)  
Flonase Nasal Spray (2 sprays/nostril qd)

### Allergies

PCN (Rash or Hives)

### Past Surgical History

Lumbar Laminectomy and/or Discectomy

### Complications from Anesthesia

History of Difficult Intubation \*\*\*

### Health Related Behaviors

Tobacco: Denies  
EtOH: "Never"  
Illicit Drug Use: Denies

### Self-Reported Functional Status



# Project deliverables

## Central Office requirements

- ✓ Customize web-based preoperative software (BREEZE™, MedSleuth, Inc.) to VA requirements
- ✓ Evaluate and optimize BREEZE for ease of use and accuracy by the VA population
  - 30 randomly selected VA employees completed survey and traditional preanesthetic questionnaire
  - Results evaluated by 2 objective VA anesthesiologists
  - **Validated in larger patient cohort (n=75)**
- ✓ Develop bi-directional HL7 interface with non-production version of CPRS



# VA Summary Evaluation of BREEZE

Total patients evaluated = 31; Dec. 2009

| Scores       | Evaluator "A"  | Evaluator "B"  |
|--------------|----------------|----------------|
| 3 (80-85%)   | 0/31 (0%)      | 1/31 ( 0.03%)  |
| 4 ( 85-90%)  | 13/31 ( 41.9%) | 9/31 ( 29%)    |
| 5 ( 90-100%) | 18/31 ( 58%)   | 21/31 ( 67.7%) |

**Aggregate evaluation scores > 4 (i.e., greater than 85% accuracy)= 96.8%**



# BREEZE evaluation results

## VA employees and patient cohort (n=106)

- 100% of participants able to complete (alone or with help of family)
- Average time to complete  $\leq$  20 minutes
- 75% very satisfied or satisfied
- Over 97% survey accuracy and completeness

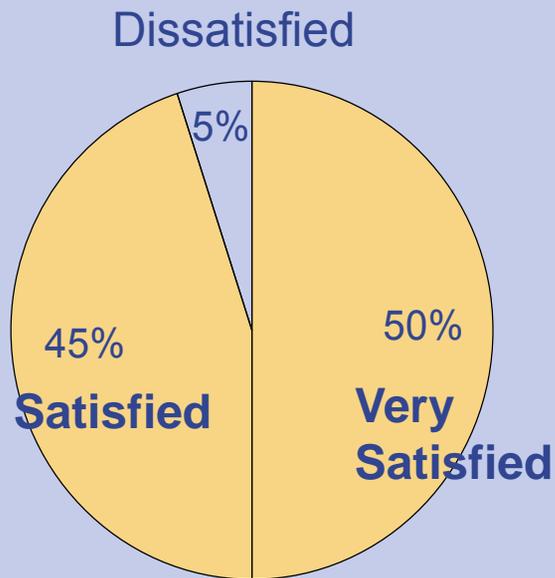


# Similar preop results elsewhere...

n = 670 patients

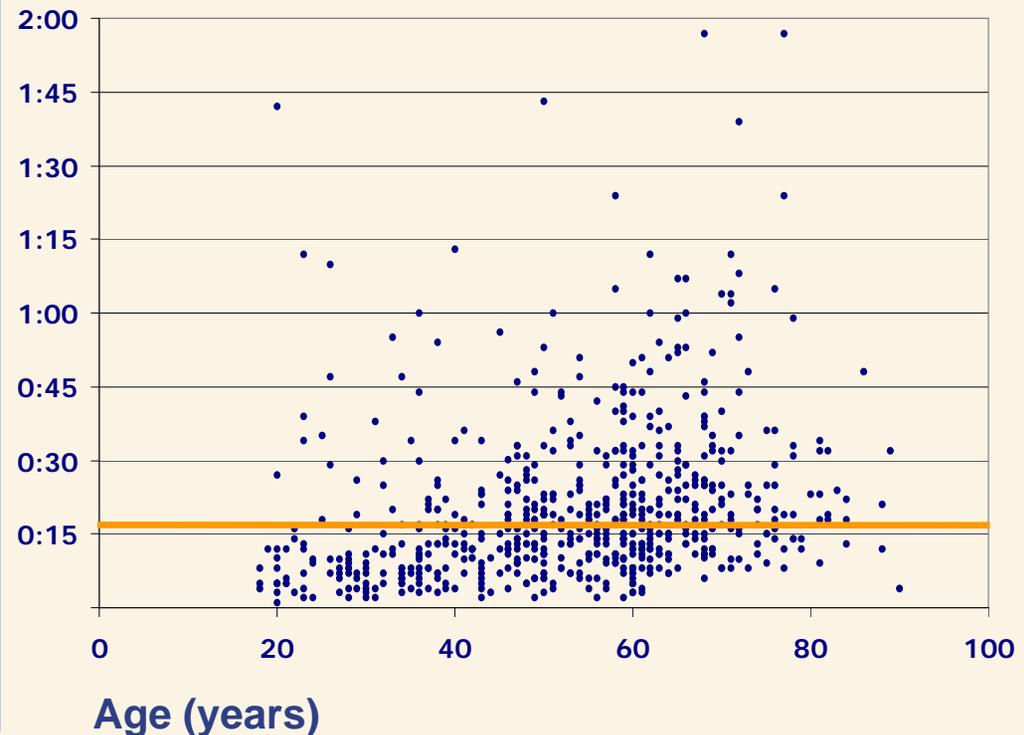
UCSF study

95% patient satisfaction



Median time to complete = 16 minutes

Time to complete (minutes)

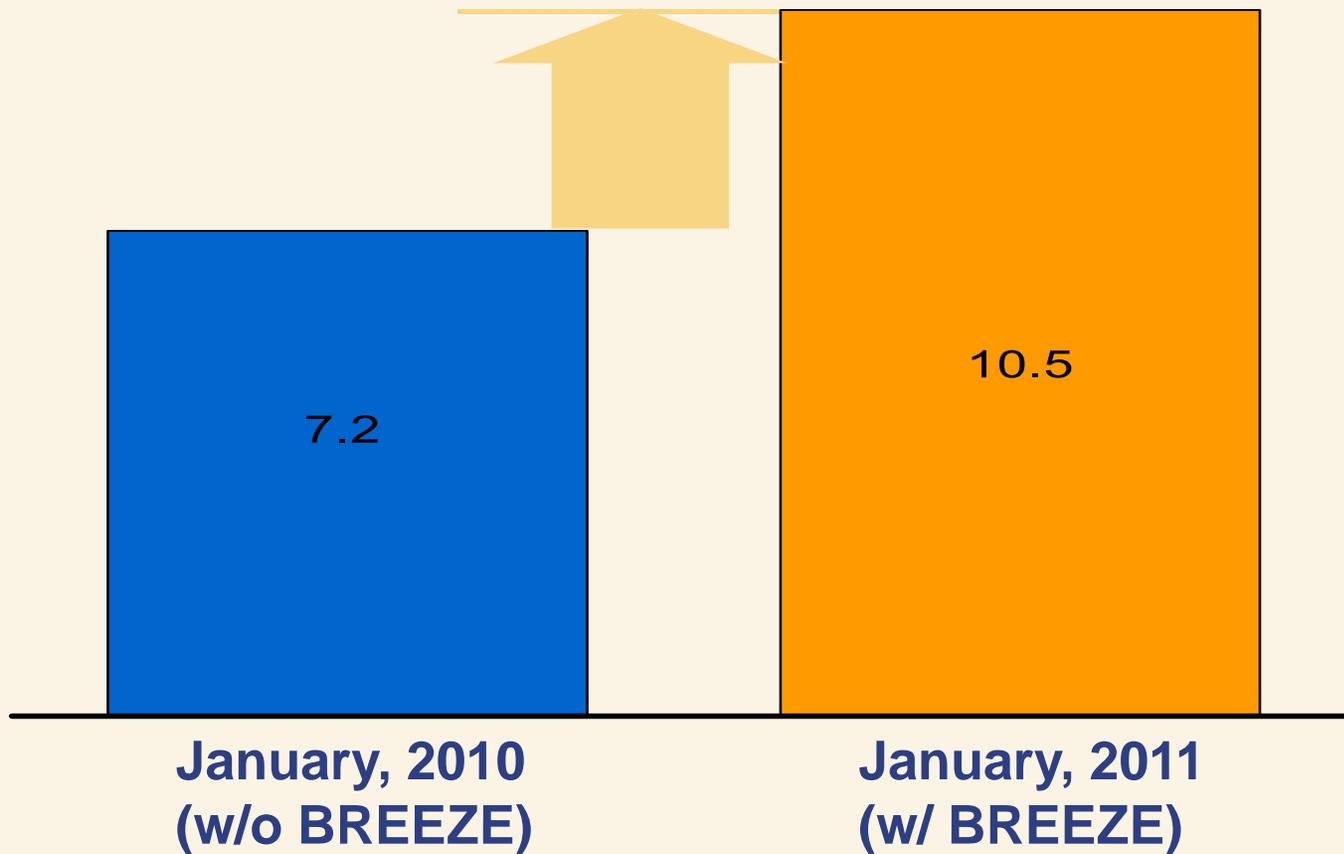


# ...including improved productivity...

Patients per nurse practitioner (NP) per day

UCSF study

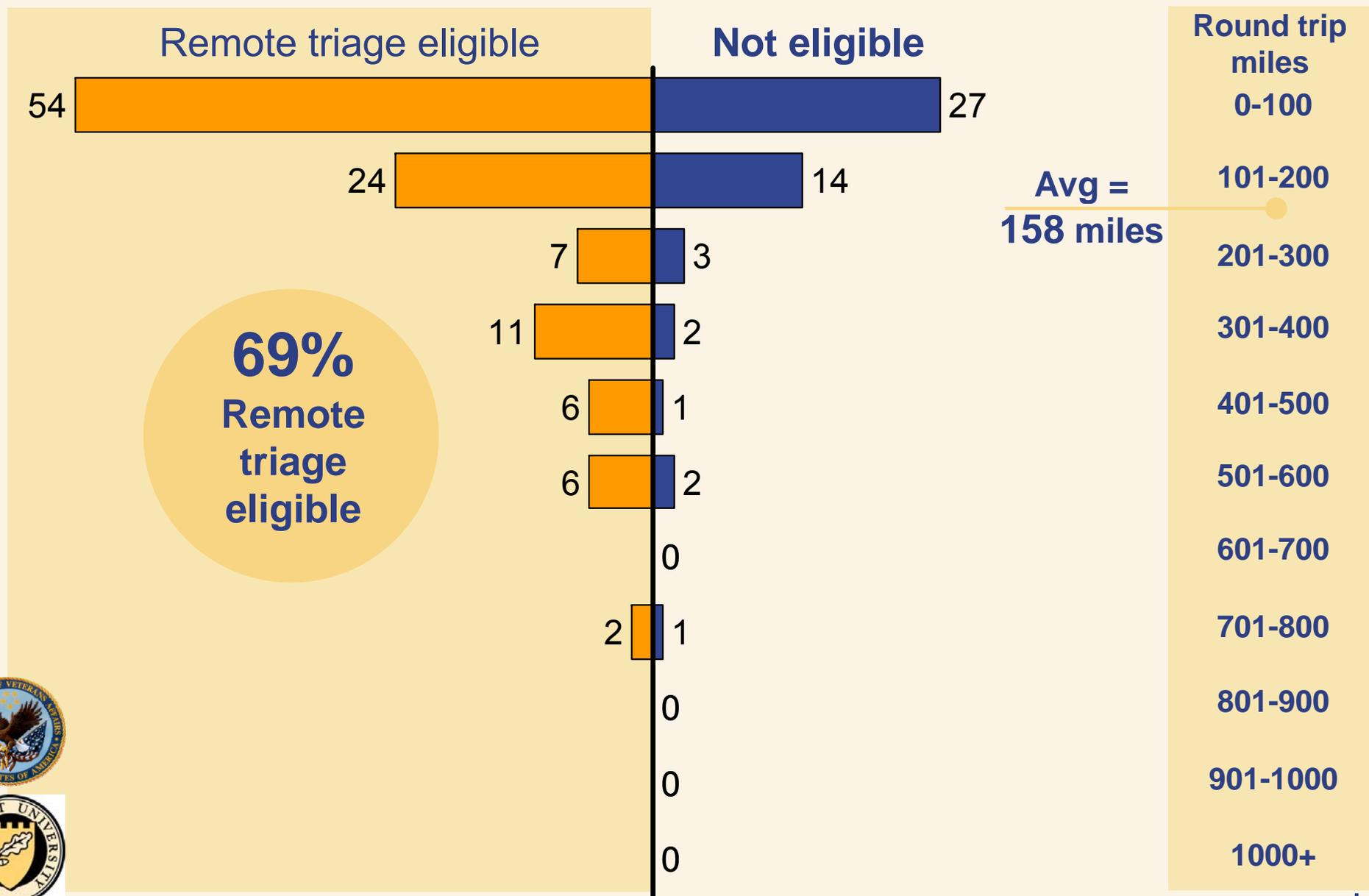
45% NP productivity improvement



# ...and reduced travel burden

n = 160 patients by round trip miles traveled

UCSF study



# Medical Histories beyond preop

n = 1000 living kidney donor evaluations

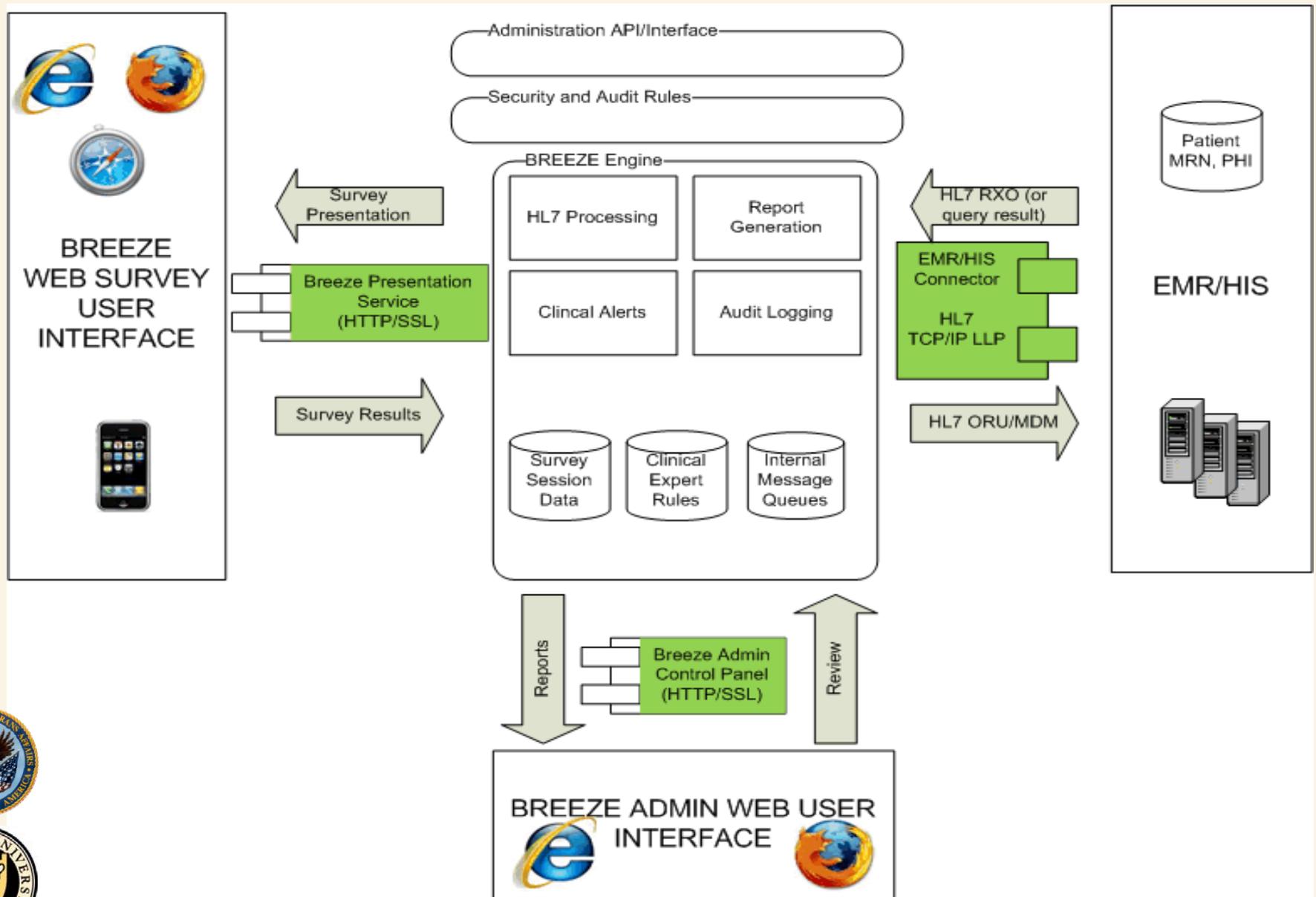
Transplant Center study

- 98% patient satisfaction
- 96% patient ease of use
- 97% completion rate
- 9 minutes median time to complete
- 24% remote triage of ineligible donors
- 41% increase in received donor medical histories vs. same time period in 2010\*
- 30% projected increase in living donor kidney transplantation \*\*
- 30% improved Transplant Nurse coordinator productivity
- Immediate availability of donor information to clinicians vs. several week delay using paper-based medical histories

\* Raw data, 3 month time period , \*\* projected on 6 months raw data 2012 when compared to 2011



# BREEZE IT architecture



# BREEZE connectivity to CPRS

- Bi-directional HL7 data connection established and confirmed between BREEZE and CPRS within Innovation “sandbox” environment
- Sample HL7 message exchanged:

| Header                               | HL7 Message  | Trailer                          | Carriage Return        |
|--------------------------------------|--|----------------------------------|------------------------|
| <b>Vertical tab character (0x0B)</b> | The HL7 message is wrapped using a header and trailer (immediately followed by a carriage return):<br>MSH ^~\& .  199908180016  ADT^A04 ADT.1.1698593 P 2.5<br>PID 1  000395122  TEST^PATIENT^C^^^  19880517180606 M | Field separator character (0x1C) | Carriage return (0x0D) |



- Opportunity for easy integration with existing VA- ARK systems (e.g., Innovian, Centricity)

# Preoperative benefits of remote triage

- Identify and stratify perioperative risk early
  - Implement clinical care pathways
  - Reduce post-op complications and LOS
  - Mitigate day-of OR delays and cancellations
  - Optimize ordering of expensive lab and diagnostic tests
- “Fast-track” 20-30% of patients in a 1a facility, eliminating unnecessary travel & testing burden
- Improve patient and clinician satisfaction
- Decompress preoperative clinic and reduce cost



# Potential benefits beyond preop

- Potential to utilize BREEZE platform for all medical history needs within the VA, e.g.,
  - Initial medical history for new patients including C&P
  - Efficient tool to populate CPRS patient record
  - Scheduling triage for all outpatient appointments
  - Medication reconciliation
- Opportunity to create a truly patient-friendly interface within the VA system, unleashing all the benefits of telemedicine for patients and their caregivers (My HealtheVet)



# Lessons learned

- Patients can provide their medical histories on their own, via a web-based platform
- The medical histories collected are at least as accurate, if not more accurate, than those collected through current modalities
- With an accurate and timely medical history, the full benefits of remote triage can be realized for patients and their caregivers
- Preop process recognized as a problem area by VA leadership.
- Breeze to be incorporated as THE primary portal for history in SQWM initiative.

