

# Lessons in Laboratory Test Utilization at Cleveland Clinic Laboratories

How First-Generation Successes Fueled a Second  
Generation of Added-Value Utilization Breakthroughs



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# Speaker Disclosure



None

# Beginning at the Beginning

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- ❧ Define the “Why”
- ❧ Establish/Confirm Leadership Support
- ❧ Define the Team
- ❧ Be Strategic
- ❧ Define the Projects
- ❧ Report Back

# Defining the *Why*



❧ Read or Listen to the TedTalk: *Start with Why*

❧ Have Faith –

❧ Do the right thing and good things will follow (including cost savings).

❧ Long-term maintenance

❧ Chasing \$\$ is just chasing \$\$.

❧ Improving patient care is sustaining



# Opportunities to...



- ❧ Improve Quality & Patient Safety
- ❧ Enhance Patient Care and the Patient Experience
- ❧ Increase Laboratory Efficiency and Effectiveness
- ❧ Decrease Cost
- ❧ Enhance Your Position on Healthcare Delivery Teams

# Addressing the IOM's Charge



- ❧ Crossing the Quality Chasm: A New Health System for the 21st Century
- ❧ The IOM defined quality health care as “*safe, effective, patient-centered, timely, efficient and equitable.*”
- ❧ Evidence-based, *patient-centered* test utilization practices, particularly those deployed through the electronic medical record, are *timely* and *equitable*.

# Establish / Confirm Leadership Support

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- ❧ How we started at CC:
  - ❧ Charged by Pathology Leadership
  - ❧ Sought Permission/Support from Chief Medical Operations
- ❧ What if they are not ready?
  - ❧ Sow the seeds, and ready the fields.
  - ❧ Find and highlight drivers (*e.g.*, The Dark Report).
- ❧ Allies:
  - ❧ Chief Medical Officer / Chief of Staff
  - ❧ Chief Quality Officer
  - ❧ Patient Experience Officer
  - ❧ Pathology/ Laboratory Medicine Leads
  - ❧ Clinical Leads

# Building the A Team



- ❧ Physician / Laboratory Professional Led
- ❧ Leadership Support
- ❧ Open/ Transparent/ Multidisciplinary
- ❧ Active Support/ Partnership Information Technology
  - ❧ Clinical Decision Support Tools (CDST) and  
Computerized Physician Order Entry (CPOE)
  - ❧ Interact with (not harass) the physician at the time of order entry.
- ❧ Best Practice / Patient Care Focused; Not Cost-Reduction Focused
- ❧ Monitoring and Reporting
  - ❧ Building credibility and support for your next project.
- ❧ Share Successes





# Be Strategic



- ❧ Reverse Engineer It
  - ❧ What would you like this to look like five years from now?
- ❧ Do What is Doable
  - ❧ There is nothing worse than an initial failure to
    - ❧ Dishearten a team
    - ❧ Make leadership lose confidence in your ability
- ❧ Build Trust
  - ❧ Do what you said you'd do.
  - ❧ Success denotes ability, which builds confidence, which produces more support.
- ❧ Give credit and remember...
  - ❧ Magic words are still *Magic*.

# Cleveland Clinic Embedded Initiatives



❧ Pilot: Soft Stop Initiative -> Hard Stop Initiative

❧ Restricted Use Initiative

❧ Laboratory-Based Genetic Counseling

❧ Regional Smart Alerts

❧ Expensive Test Notification

❧ Extended Hard Stop

❧ Once-in-a-Lifetime Orders

❧ 3 Day Rule for Stool Cultures/O&P examinations

❧ Daily Orders.....

Initial Initiatives

Secondary  
Initiatives

# The Initial Project



- ❧ Stopping Same-Day, Unnecessary Duplicate Orders
- ❧ Initiated by a patient care/experience complaint to the CEO
  - ❧ -Why this is great-
    - ❧ 1. High-level support defined
    - ❧ 2. This is a *Why* opportunity
      - ❧ Improve patient care, experience and quality, oh – and save money.
- ❧ How to change a culture?
  - ❧ Thoughtfully/Deliberate/ Vetted



# The Hard Stop



- ❧ The soft stop studies provided evidence to medical operations that a firmer intervention was needed.
- ❧ They agreed, but...required a “break the glass” scenario in the event that a physician still wanted a duplicate study. (*Safe*)
- ❧ Duplicate tests were made available through the laboratory Client Services area

Testing, Inp A

Age: 77 year \* DOB: 7/21/1932 Allergies: **Pencillin, Captopril, Peanut\*** Bed: **2010-08** MyChart: **Inactive** Code: **History**  
Sex: **M** MRN: **55000123** PCP: **SALAY, ELIZABETH M (DrC)** Alert: **HM** Type: **NFR**

SnapShot

Patient Summary

Chart Review

Results Review

Problem List

History

Inpatient Notes

Demographics

Medications

Allergies

Order Entry

Order History

Imm/Injections

MAP

I/O Summary

Doc Flowsheet

Initial Assessments

Admission Nav

Rounding Nav

Transfer Nav

Discharge Nav

Order Set

Document List

Stroke CarePath

Hotkey List

Exit Workspace

SHIRLEY STAHL ITD

Place orders

New Order Interactions Providers Reports Pending/Held Pend Orders Sign & Hold Sign Orders Settings Order Set Treatment Team

Problem List

Selected Orders

Medications

Orders

New order: Search Next Edit Multiple...

Order mode: Standard Order defaults: Not using defaults

Procedures (1)

HGB A1C

Remove

ONCE First occurrence Today at 1400, Routine, Lab Collect, BLOOD

Order Validation

The following information is missing or may need your attention

Warning:

This lab test has been ordered in the last 24 hours; repeat testing is usually not warranted for this analyte within 24 hours. If you feel you need to override the alert please call Lab Client Services (216-444-5733).

HGB A1C was ordered on 5/13/10 at 1:10 PM by provider **KNOTT, PHILIP D**

Date/Time	Component	Result	Ref Range	Flag
5/13/10 1:37 PM	Hemoglobin A1C	7.2	4.0 - 6.0 %	H
5/13/10 1:37 PM	Estimated Average Glucose	160	mg/dL	

These orders cannot be accepted.

OK

F7- Prev Order F8- Next Order

order selected

1:45 PM

# Phased Implementation

## ❧ Hard Stop Implementation

### ❧ Phase 1:

- ❧ 12 tests that are NEVER needed more than once per day

### ❧ Phase 2:

- ❧ Added 78 tests (total 88)

### ❧ Phase 3:

- ❧ “Many more” tests added (>1,200 tests on the same-day Hard Stop list)

### ❧ Rapid review/removal process implemented

### ❧ One year review disclosed no untoward safety issues (*Safe*)

### ❧ Initially: Physicians only, then -> all

- ❧ (35% of orders were non-physicians in the 1<sup>st</sup> month)

## ❧ Very few caregivers called Client Services to have a duplicate order placed.

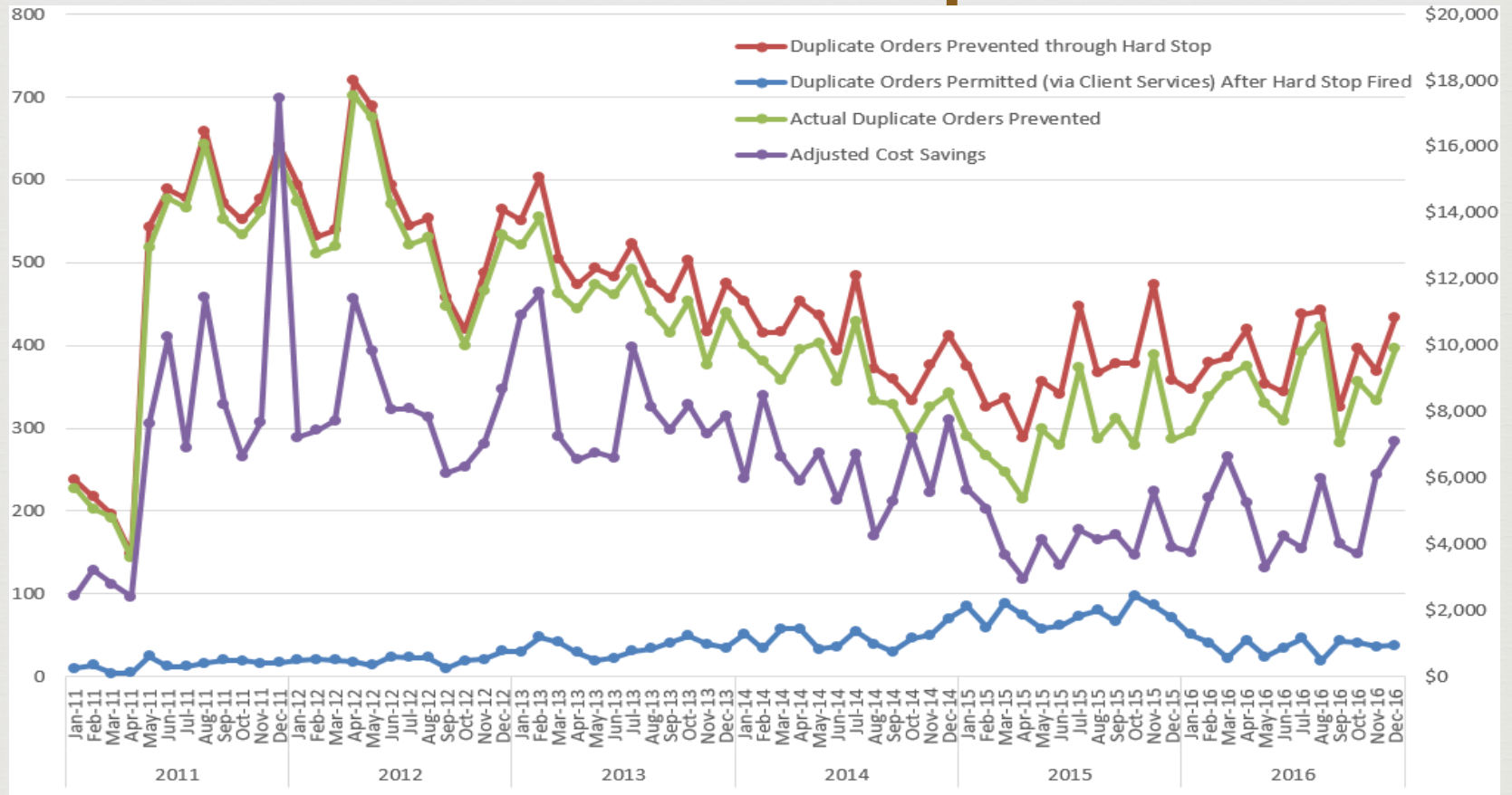
- ❧ Reasons for duplicate disclosed educational opportunities in most instances.



# Cost Avoidance Based on Blocked Duplicates

	Test	Count	Tech Time	Prof Time	Supply Cost	Total Cost
Month 1	C. Difficile EIA (24219)	31	527	0	128.03	380.99
	CMV Detection Blood (24221)	2	16	0	75.28	82.96
	C-Reactive Protein (CRP) (23342)	22	44	0	27.94	49.06
	HEP Remote Panel BL (23593)	3	30	0	42.72	57.12
	HGB A1C (23607)	9	27	0	15.39	28.35
	Iron + TIBC (23655)	3	6	0	1.11	3.99
	Lipid Panel Basic (23683)	9	117	0	12.6	68.76
	Retic Count (23971)	19	19	0	18.43	27.55
		<b>98</b>	<b>786</b>	<b>0</b>	<b>321.5</b>	<b>696.78</b>
Month 2	C. Difficile EIA (24219)	11	187	0	45.43	135.19
	CMV Detection Blood (24221)	3	24	0	112.92	124.44
	C-Reactive Protein (CRP) (23342)	12	24	0	15.24	26.76
	HEP Remote Panel BL (23593)	1	10	0	14.24	19.04
	HGB A1C (23607)	5	15	0	8.55	15.75
	Iron + TIBC (23655)	3	6	0	1.11	3.99
	Lipid Panel Basic (23683)	6	78	0	8.4	45.84
	Retic Count (23971)	6	6	0	5.82	8.7
		<b>47</b>	<b>350</b>	<b>0</b>	<b>211.71</b>	<b>379.71</b>
Month 2	C. Difficile EIA (24219)	20	340	0	82.6	245.8
	CMV Detection Blood (24221)	3	24	0	112.92	124.44
	C-Reactive Protein (CRP) (23342)	17	34	0	21.59	37.91
	HEP Remote Panel BL (23593)	4	40	0	56.96	76.16
	HGB A1C (23607)	5	15	0	8.55	15.75
	Iron + TIBC (23655)	2	4	0	0.74	2.66
	Lipid Panel Basic (23683)	2	26	0	2.8	15.28
	Retic Count (23971)	4	4	0	3.88	5.8
		<b>57</b>	<b>487</b>	<b>0</b>	<b>290.04</b>	<b>523.8</b>
		<b>202</b>	<b>1623</b>	<b>0</b>	<b>823.25</b>	<b>1602.29</b>

# Hard Stops



2016: 4,193 unnecessary orders prevented;

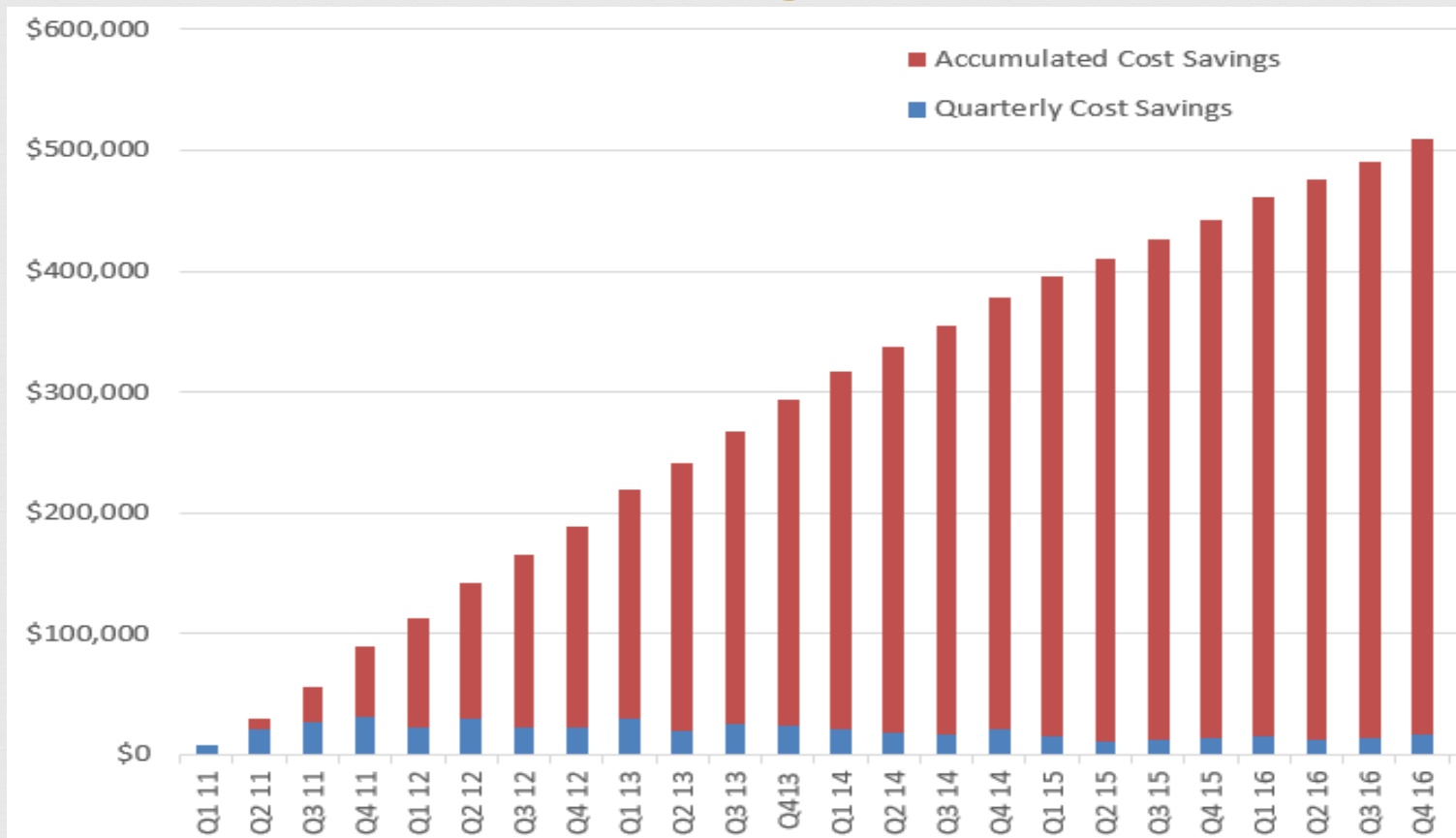
Full Program (1/11-12/16): 29,386 unnecessary orders prevented.

80-95% Success Rate

Unnecessary phlebotomies avoided and blood saved: A lot.

# Hard Stop Financials

## by Quarter



2016: Cost Avoidance - \$59,316;

Total: (1/11 to 12/16): \$468,107



# Regional *Smart Alerts*



- ❧ Similar to Soft Stops.
  - ❧ But, with Previous Results Displayed.
- ❧ List includes: 752 of the 1,283 tests on Main.
- ❧ Considerations include:
  - ❧ Non-Cleveland Clinic Practitioners
  - ❧ Practitioner use of Computerized Physician Order Entry-availability
    - ❧ Written orders to unit clerks/nurses
  - ❧ No work-around infrastructure.

# Regional Smart Alert

Place orders

New Order Interactions Providers Reports Pended Orders Held Orders Pend Orders Sign & Hold **Sign Orders** Settings Order Set Pref List

New order:  Search

Order mode: Standard New order defaults Not using defaults

During visit (1 Order)

**LIPID PANEL BASIC (EU,FV,HL,LK,LU,MM,SP)**  
P Routine, ONCE Fil

**Order Validation**

The following information is missing or may need your attention

**Warning:**  
This lab test has been ordered in the last 24 hours; repeat testing is usually not warranted for this analyte within 24 hours.

**LIPID PANEL BASIC (EU,FV,HL,LK,LU,MM,SP)** was ordered on 9/20/12 at 12:53 PM by provider **AGARWAL, RAJESH**

If you are ordering **LIPID PANEL BASIC (EU,FV,HL,LK,LU,MM,SP)** at the same time as other orders, you must first remove **LIPID PANEL BASIC (EU,FV,HL,LK,LU,MM,SP)** from the order list before you can file the other orders.

Date/Time	Component	Result	Ref Range	Flag
9/20/12 1:58 PM	Triglyceride	333	30 - 149 mg/dL	H
9/20/12 1:58 PM	Cholesterol	222	100 - 199 mg/dL	H
9/20/12 1:58 PM	HDL Cholesterol	55	>55 mg/dL	L
9/20/12 1:58 PM	VLDL-Cholesterol	33	6 - 40 mg/dL	
9/20/12 1:58 PM	LDL Cholesterol	22	60 - 129 mg/dL	L
9/20/12 1:58 PM	Fasting Time	12	hrs	
9/20/12 1:58 PM	TC:HDL Ratio	11.00	1.00 - 5.00	H
9/20/12 1:58 PM	LDL:HDL Ratio	5.00	0.50 - 3.55	H
9/20/12 1:58 PM	Non HDL Cholesterol	6	90 - 159 mg/dL	L

Do you want to accept these orders anyway?

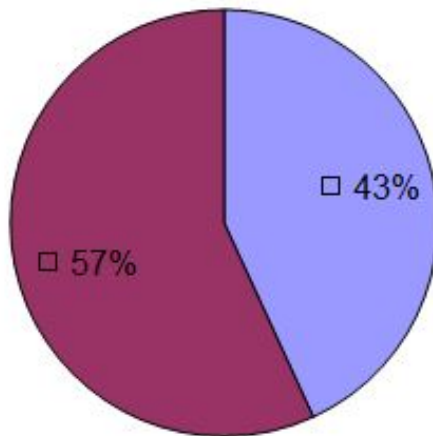
Yes No

# Regional Smart Alerts



Monthly calculation of alert compliance

Hillcrest Hospital Lab Soft-Stop  
October 2015 Report



■ Firing without Orders ■ Order placed within 30 minutes of firing

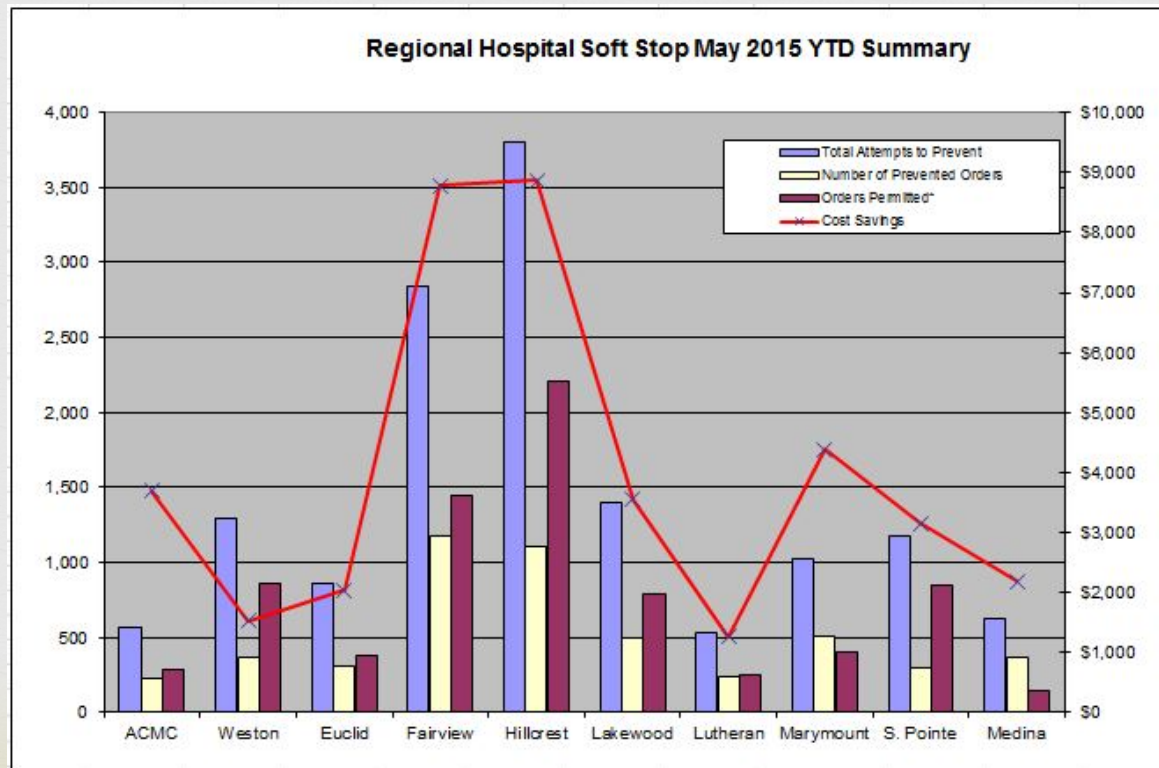


# Regional Smart Alerts



4,917 unnecessary tests averted in 2016

Total (10 m 2013 - 2016) : 21,260 tests averted

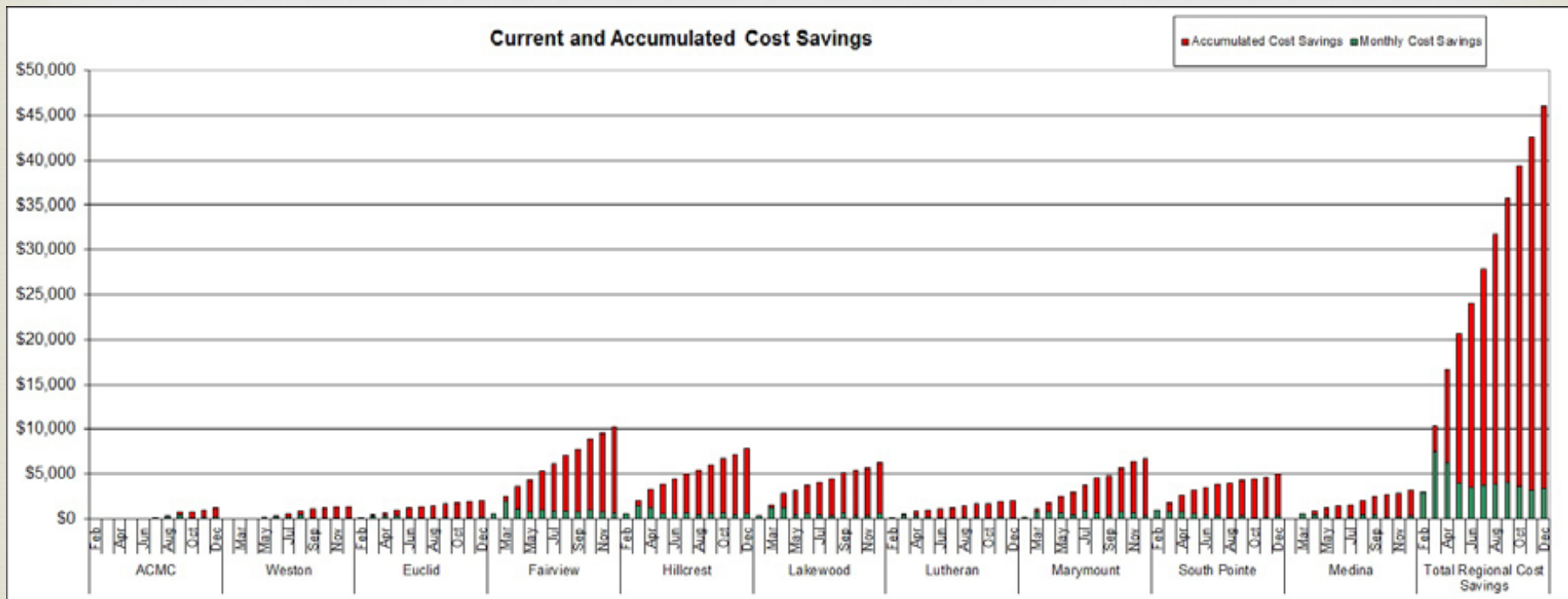


# Regional Smart Alert: Cost Avoidance



❧ Cost-Savings, 2016: \$39,871

❧ Total (10m 2013 - 2016): \$170,542



# Hard Stop versus *Smart Alert* Comparison

- ❧ One year comparison
  - ❧ Duplicate tests avoided and cost avoidance.
- ❧ The Hard Stop alert was significantly more *effective* than the Smart Alert (92.3% versus 42.6%, respectively;  $p < 0.0001$ ).
- ❧ The cost savings realized per alert activation was \$16.08/alert for the Hard Stop alert versus \$3.52/alert for the Smart Alert.



# Optimizing Molecular Genetic Testing



## ❧ Restricting Testing

- ❧ Specialized tests not on standard menu “Lab Order Only”
- ❧ Restriction to Users Groups

## ❧ Genetic Guidance

- ❧ Laboratory-Based Genetics Counselor
  - ❧ With Molecular Genetic Pathologist Oversight.
- ❧ Resident/Fellow Involvement
  - ❧ Educational/Not “Thrown to the wolves.”

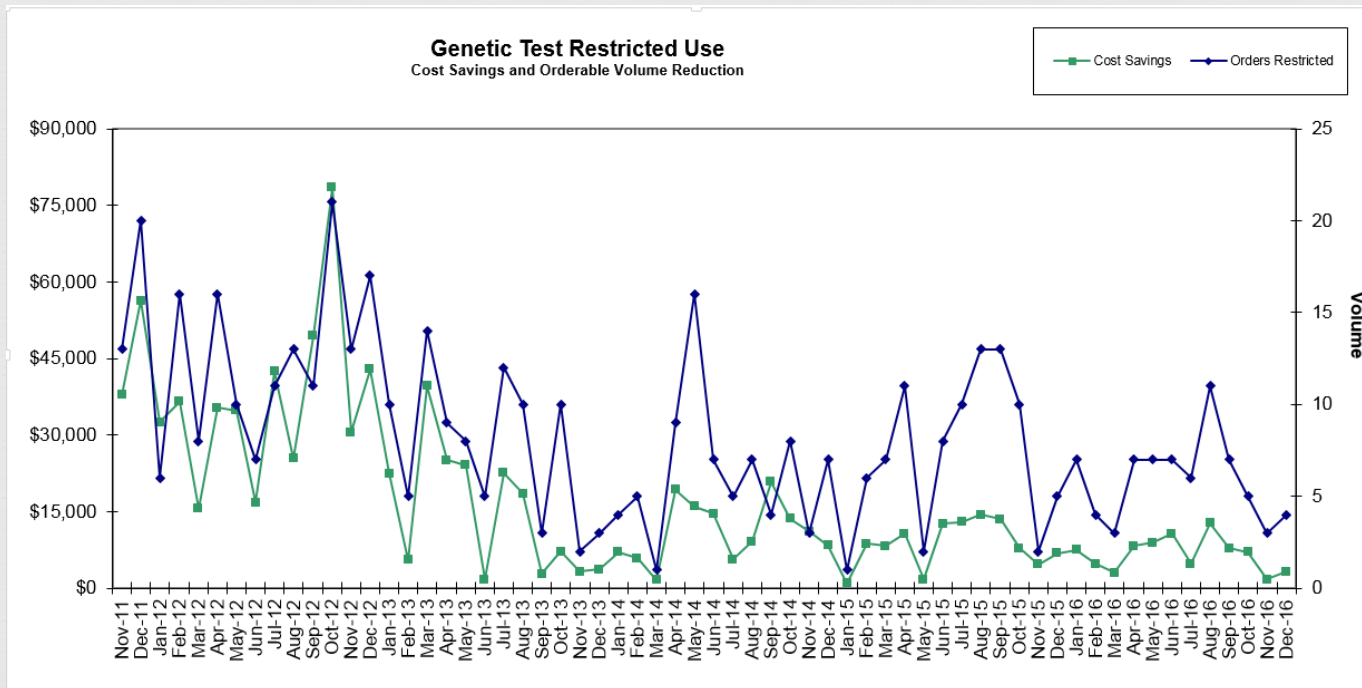
## ❧ Algorithmic Testing

- ❧ Collaborative Development (Clinician/Pathologist) of Algorithms
- ❧ Extract/Hold -> Sequential Testing
  - ❧ Requires infrastructure & engagement.

# Restricted Use Initiative

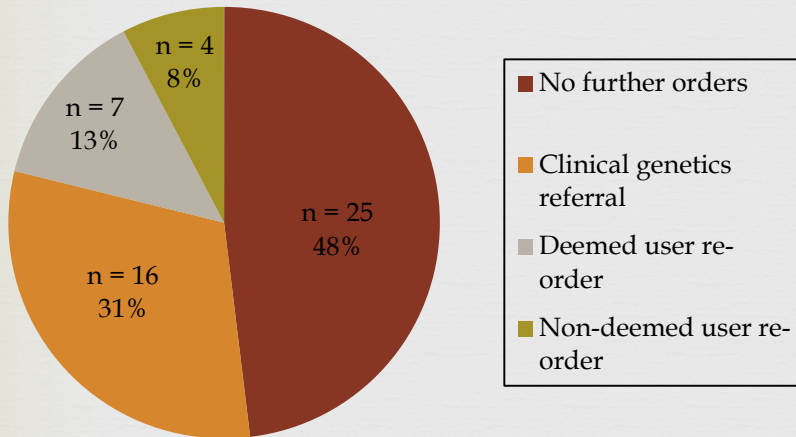


- ❧ Molecular Genetic Tests limited to “Deemed Users.”
- ❧ Inpatient testing requires a Medical Genetic Consult

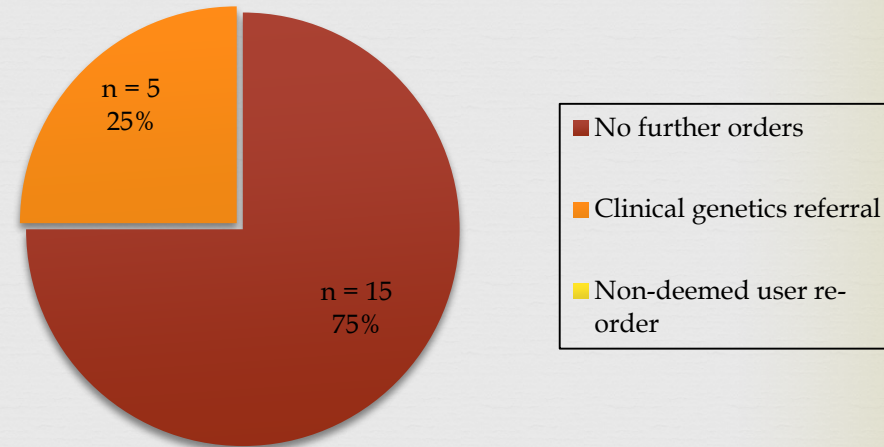


2016: 71 Tests; \$80,293; Total (11/11 - 12/16): 508 Tests; \$1,027,397

# Follow-up to Restricted Orders



Ambulatory



Inpatient

*Efficient* – Not doing unnecessary testing;

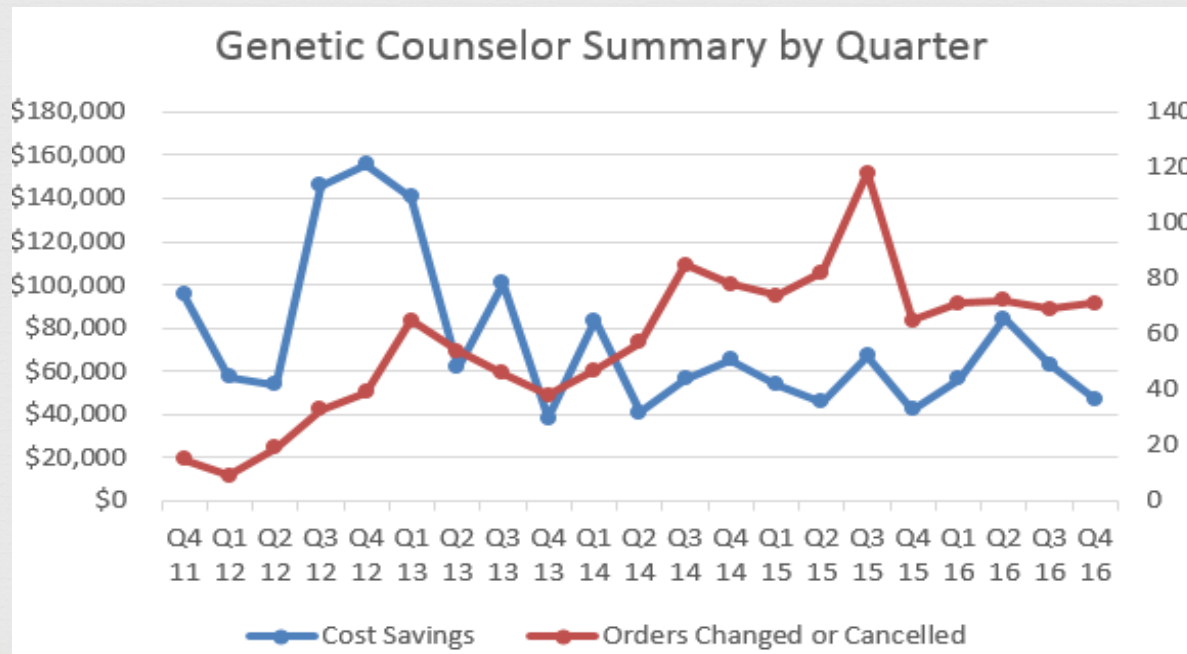
*Effective* - Directing patients to subspecialists, who need subspecialists



# Laboratory-Based Genetics Counselor



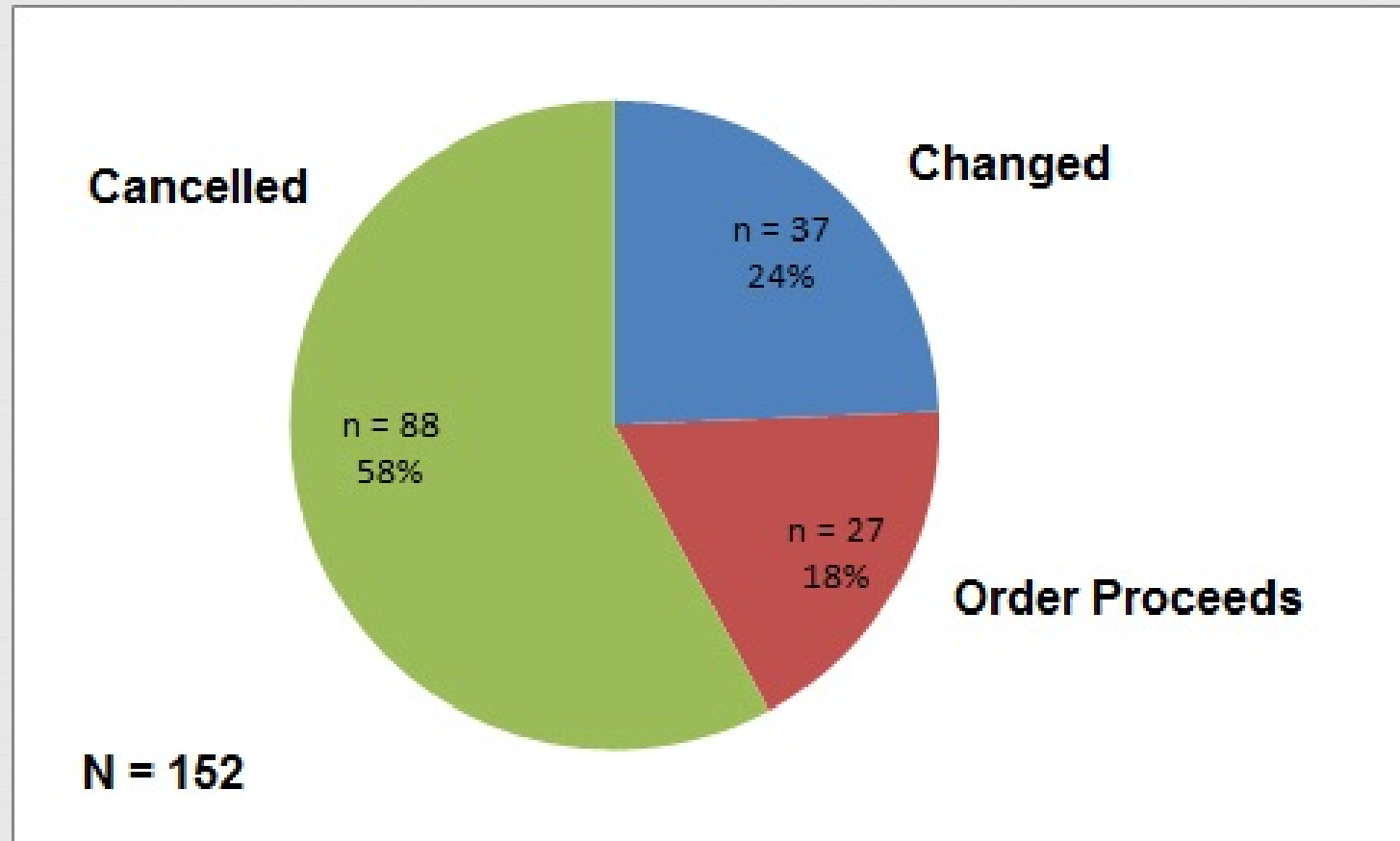
- Pre-Analytic Test Guidance and Post-Analytic Assessment
  - Triage, Decreased panel use and assistance in selecting the appropriate test



2016: 212 tests for \$250,543;

Total (9/11 - 12/16): 918 tests for \$1,526,588

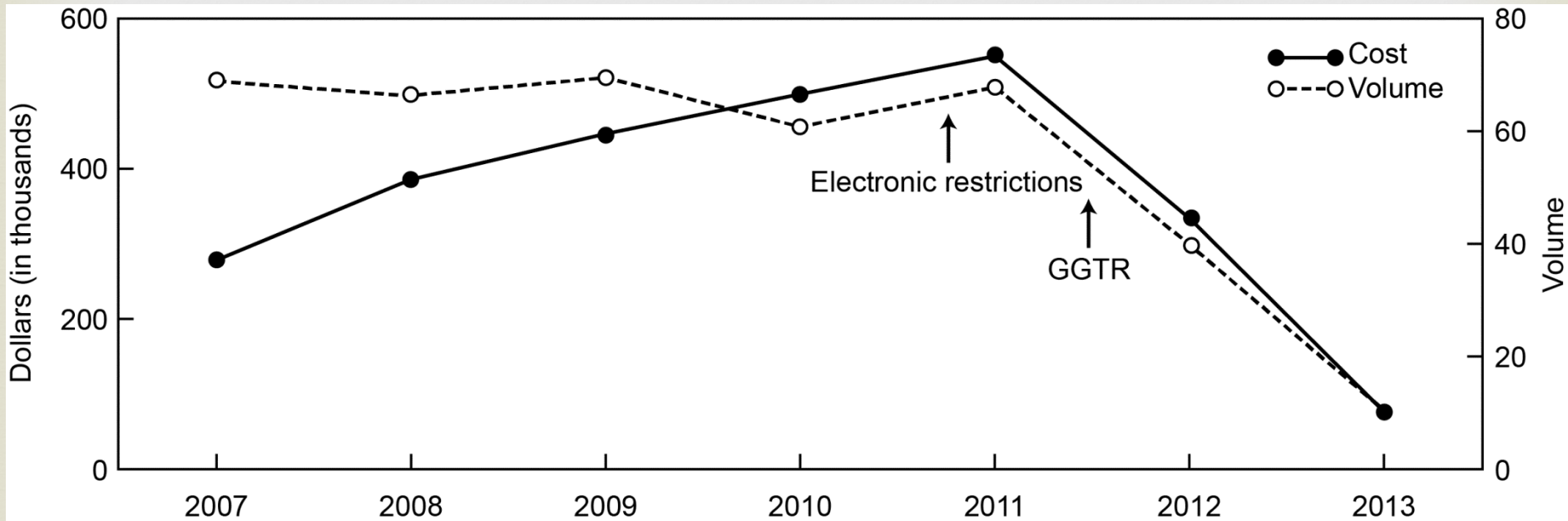
# Follow-up of Genetic Counselor Triage



*Efficient* – Not doing unnecessary testing;

*Effective and Patient-Centered* - Directing providers to the correct test

# Impact of Restricted Use and Genetic Counselor/MGP Triage Interventions



*Effective*



# What have We Established in Phase I ?



Patient-Centered, Evidence-Based Approach Works

Confidence

Trust

Team-Approach  
(Not Alienated Our Providers)

Systems-Alignment

Cost Savings



# Phase II

# Expensive Test Notification




2016: 158 tests averted; \$224,435

Cumulative (9 m.2013 - 2016):

514 tests averted; \$787,834

**Order Validation**

 The following information is missing or may need your attention

The test(s) below costs the institution >\$1000 to perform. Please consider carefully if this test is absolutely necessary, as charges, which may be substantially greater than costs, not covered by the insurance provider may be billed directly to the patient.

NEUROFIB TYPE 2 DNA [SQNEUFIB] >\$3000

Do you want to accept these orders anyway?



# Extended Hard Stop



- ⌘ Time extended hard stop.
- ⌘ Went live 11/2014 (after more than a 12 month build).
- ⌘ 2015 Expanded to Regional Hospitals

- ⌘ *C. difficile* PCR
  - ⌘ Once/ 7 days

- ⌘ HbA1c
  - ⌘ Once/month

- ⌘ HCV Genotyping
  - ⌘ Once-twice per lifetime.

- ⌘ Constitutional Genetic Tests
  - ⌘ Once/lifetime

14,749 Duplicate Tests Prevented in 2016; \$118,963 Cost Avoidance

11/2014-2016: 24,327 Duplicate Tests Prevented; \$220,917

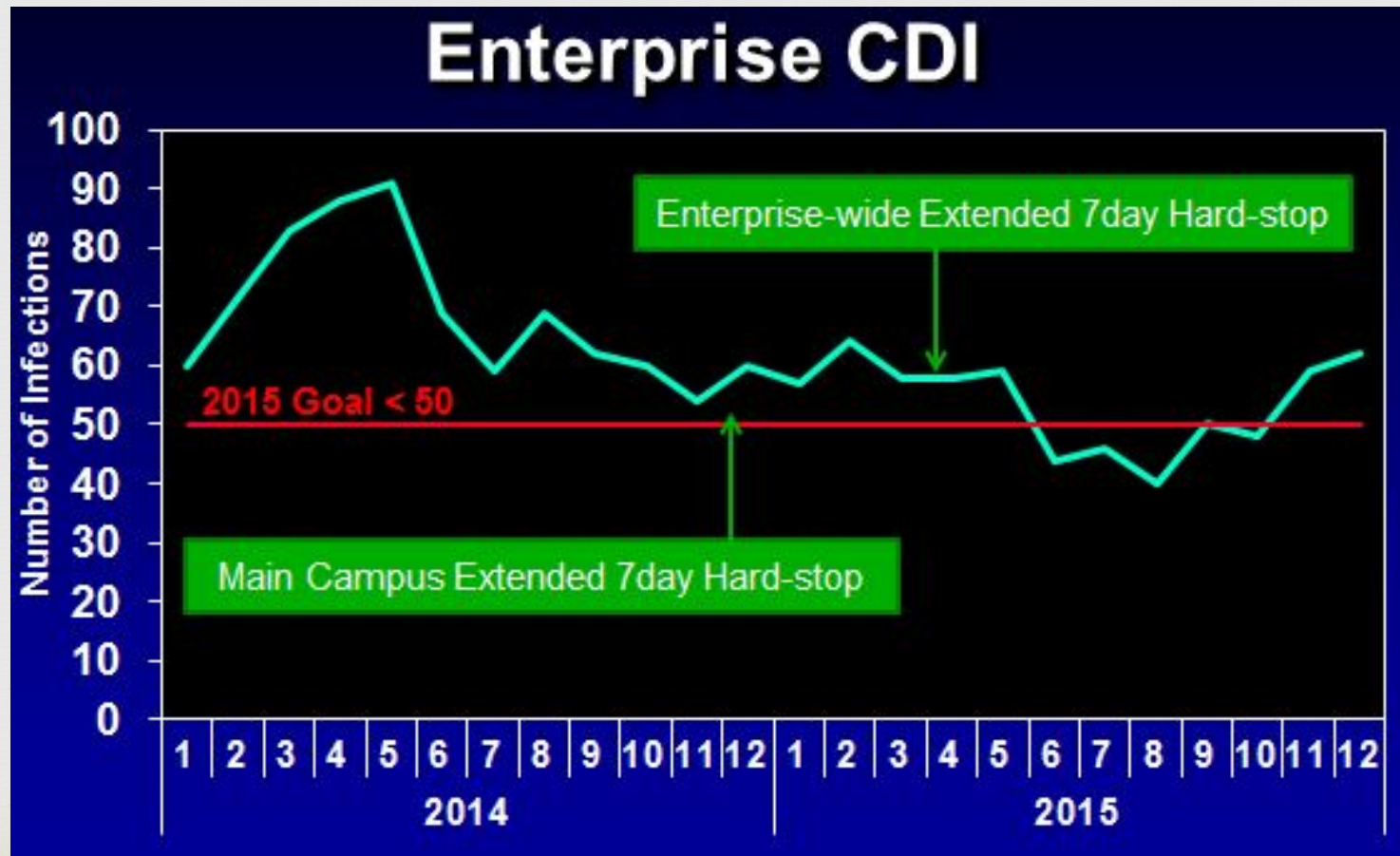
# Monthly Once in a Lifetime Intervention Activity

Procedure Name
FACTOR V LEIDEN/PCR [SQFVLEID] ... review result from: 2/22/2016 10:46 AM
PROTHROMBIN GENE PCR [SQPTGENE] ... review result from: 2/25/2016 9:40 PM
HFE (HEMOCHROMATOSIS) [SQHEMDNA] ... review result from: 3/1/2016 6:00 PM
FACTOR V LEIDEN/PCR [SQFVLEID] ... review result from: 2/23/2016 6:11 PM
CYSTIC FIBROSIS SCR139 VARIANT ASSAY [SQCFNGS] ... review result from: 2/10/2016 12:38 PM
CHROM ANALY PERIPH [SQCHRBLD] ... review result from: 9/3/2014 12:30 PM
HFE (HEMOCHROMATOSIS) [SQHEMDNA] ... review result from: 12/10/2014 7:52 AM
HEPATITIS C GENOTYPE [SQHEPGEN] ... review result from: 5/1/2006 1:50 PM
TPMT GENOTYPE (PRO-PREDICTR TPMT BL) [SQPPTMPT] ... review result from: 2/2/2005 5:01 PM
CELIAC ASSOC HLA-DQ GENOTYPE [SQCELIA] ... review result from: 1/28/2016 5:30 PM
MTHFR BY PCR [SQMTHFR] ... review result from: 1/21/2015 8:45 AM
MTHFR BY PCR [SQMTHFR] ... review result from: 10/24/2013 1:00 PM
CELIAC ASSOC HLA-DQ GENOTYPE [SQCELIA] ... review result from: 2/2/2009 5:21 PM
FAMIL MEDITERR FEVER [SQFAMMED] ... review result from: 7/13/2015 7:52 PM
HLA B5701 [SQB5701] ... review result from: 4/18/2014 4:00 AM
PROTHROMBIN GENE PCR [SQPTGENE] ... review result from: 3/17/2016 6:02 PM
FACTOR V LEIDEN/PCR [SQFVLEID] ... review result from: 3/17/2016 6:02 PM
HEPATITIS C GENOTYPE [SQHEPGEN] ... review result from: 5/29/2015 9:52 AM
PROTHROMBIN GENE PCR [SQPTGENE] ... review result from: 3/19/2016 3:44 PM
FACTOR V LEIDEN/PCR [SQFVLEID] ... review result from: 3/19/2016 3:44 PM
HEPATITIS C GENOTYPE [SQHEPGEN] ... review result from: 5/29/2015 9:52 AM
MTHFR BY PCR [SQMTHFR] ... review result from: 2/14/2012 3:37 PM
MTHFR BY PCR [SQMTHFR] ... review result from: 10/26/2015 7:39 AM
HEPATITIS C GENOTYPE [SQHEPGEN] ... review result from: 1/17/2016 4:00 PM
MTHFR BY PCR [SQMTHFR] ... review result from: 1/3/2014 11:43 AM
FACTOR V LEIDEN/PCR [SQFVLEID] ... review result from: 1/27/2014 9:09 AM
MTHFR BY PCR [SQMTHFR] ... review result from: 6/4/2014 2:56 PM
FACTOR V LEIDEN/PCR [SQFVLEID] ... review result from: 9/26/2008 11:06 AM
PROTHROMBIN GENE PCR [SQPTGENE] ... review result from: 9/26/2008 11:06 AM

$$(\$87,560 / \$133,357) * 100 = 65.7\%$$

Due to constitutional genetic tests that had *already* been ordered

# Impact on *C. difficile* Rate





# 3 Day Rule:

## Stool Cultures and O&P Examinations



❧ Limit Ordering of Stool Culture and O&P examinations for patients that are hospitalized >3 days.

❧ 2016

❧ 58 unnecessary orders stopped.

❧ \$2,440 Cost Avoidance

❧ 6/2014 - 2016

❧ 545 unnecessary orders stopped.

❧ \$16,952 Cost Avoidance





# Education



## ❧ Graduate Medical Education Initiative

❧ Information on GME Website

❧ Infographic produced.

❧ General

❧ Introduction to the most over utilized tests.

❧ Infographics for Individual Tests

❧ ANA

❧ *C. difficile* testing

❧ TSH

❧ Etcetera,

❧ How to capture impact?



### Why reduce inappropriate lab testing?

- Increases patient satisfaction
- Increases patient safety (the more tests performed, the greater the potential for error (i.e. There is a false-positive rate associated with any test that has a specificity less than 100 percent))
- Decreases unnecessary phlebotomy and potentially iatrogenic anemia
- Reduces financial burdens (lower tests = dollar savings) for:
  - hospitals
  - patients
  - third-party payers

### How are we doing this at Cleveland Clinic?

- Pop-up notifications
- Hard stops
- Education on over-ordering

### Results since 2010



Patient care *has not* been interrupted or compromised



Want more background on this initiative?  
Read Strategies for Appropriate Test Utilization  
[http://portals.ccf.org/Portals/71/strategies\\_test\\_utilization.pdf](http://portals.ccf.org/Portals/71/strategies_test_utilization.pdf)

An education initiative from the Tensich Pathology & Laboratory Medicine Institute, Cleveland Clinic, Test Utilization Committee, Education Institute, and Medical Art & Photo

<b>2016 Initiative Summary</b>	<b>Orders Prevented</b>	<b>Cost Savings</b>
24 Hour Hard Stop	4193	\$59,316
Extended Hard Stop	14405	\$75,356
Once in A Lifetime	344	\$43,607
Genetic Counselor	212	\$250,543
Genetic Test Restricted	71	\$80,293
Expensive Test Audit	158	\$224,435
3 Day Stool	58	\$2,440
Regional Soft Stop	4917	\$39,871
<b>Total</b>	<b>24358</b>	<b>\$775,860</b>
<b>2011 - 2016 Initiative Summary</b>	<b>Orders Prevented</b>	<b>Cost Savings</b>
24 Hour Hard Stop	29386	\$468,107
Extended Hard Stop	24834	\$133,357
Once in A Lifetime	590	\$87,560
Genetic Counselor	918	\$1,526,588
Genetic Test Restricted	508	\$1,027,397
Expensive Test Audit	514	\$787,834
3 Day Stool	545	\$16,952
Regional Soft Stop	21260	\$170,542
<b>Total</b>	<b>78555</b>	<b>\$4,218,337</b>

# Conclusion



- ❧ A Strategic Phased Approach Builds Trust and Future Support
- ❧ Improvements in Test Utilization can address each issue highlighted by the Institute of Medicine for Quality Health Care
  - ❧ *Safe*: Interventions that facilitate the right test at the right time.
  - ❧ *Effective*: Demonstrable results.
  - ❧ *Patient-Centered*: Employment of best practice guidelines.
  - ❧ *Timely*: Interventions at the point of order entry.
  - ❧ *Efficient*: Decreasing waste by not doing unnecessary testing.
  - ❧ *Equitable*: Interventions are activated for all.
- ❧ Improved Test Utilization produces Opportunities in the Era of ACOs, MACRA and Integrated Care.
  - ❧ Participate in your Laboratory Stewardship Committee today,
  - ❧ Become active at the systems level in your institution.



# Conclusion



- ❧ A Phased, Strategic Approach to Laboratory Stewardship:
  - ❧ *Builds Trust and Confidence*
  - ❧ *Allows for Learning and Backtracking, if necessary*
  - ❧ *Demonstrates alignment with both patient care goals and affordability*
  - ❧ *Builds relationships with both senior leadership and providers*
  
- ❧ Pathologists and other Laboratorians have an Opportunity in the Era of ACOs, MACRA and Integrated Care.
  - ❧ Participate in your Laboratory Stewardship Committee today,
  - ❧ Become active at the systems level in your institution.