Learning Objectives

1. Understand the environmental factors that make laboratory stewardship such an attractive and rewarding option for optimizing test utilization.

2. Identify the key factors and steps that will lead to the successful implementation of a laboratory stewardship initiative.

3. Learn from case studies how to avoid common mistakes in implementing and sustaining a laboratory stewardship effort.

a bit about Rob...
Background

3 most significant causes of patient harm:
- Ordering the wrong test
- Failing to retrieve a test result
- Misinterpreting a test result

13 billion test performed
70% decision caused
10-30% unnecessary

their patients ask for an unnecessary test or procedure at least once a week.
the average medical doctor prescribes an unnecessary test or procedure at least once a week.
that even if they know a medical test is unnecessary, they order it if a patient insists.
the frequency of unnecessary tests and procedures is a very or somewhat serious problem.

Trends in Healthcare

Pharmacy Utilization management
Antimicrobial Stewardship
Blood Utilization management
Laboratory Stewardship
Radiology Utilization management

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Creating Successful Laboratory Stewardship

Success Factors
- Data Analysis
- Formal Governance
- Evidence-Based Recommendations
- IT Engagement and Support
- Project Management
- Measurement and Reporting
Analytics & Monitoring: Utilization Dashboards

Creating Successful Governance Structure
Where to Start?

Three Initial areas of Focus

Test Consolidation
- How many reference labs do you use?

Test Formulary
- Creation & Implementation

In-House Testing
- Daily recurring labs
- Inappropriate test intervals

Test Consolidation

How many reference laboratories do you use?

1. Is there a primary Vendor?
2. Why are tests sometimes not consolidated?
   - Physician Request
   - Patient Request
   - Insurance requirement
   - Easier process for lab staff

Free Phenytoin at Lab X $106
Free Phenytoin at Primary Lab vendor $13
### Test Formulary

**TIER 3**
- Obsolete tests
- Tests w/o demonstrated clinical value
- Tests w/o established reimbursement
- Not orderable in CPOE

**TIER 2**
- Sendout tests
- Tests above a cost threshold
- 2nd line testing
- Test-specific restrictions

**TIER 1**
- 80% of test menu
- >90% of testing volume
- No restrictions

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### POE Optimization

**Vitamin D**
- 1,25-Dihydroxy vitamin D
- 25-Hydroxy vitamin D

**Folate**
- Folate (RBC)
- Folate (serum)

**Flu**
- Flu PCR
- Flu respiratory viral panel
- Flu screen

**Gonorrhea**
- Gonorrhea culture
- Gonorrhea DNA probe
Commonly Misordered Testing
Test Removal & Reflex Path Implementation

Clinical Decision Support in EMR

Test Price Transparency & More

<table>
<thead>
<tr>
<th>Naming Convention</th>
<th>TAT = 3 days</th>
<th>Overall 35% Reduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homocysteine (REF, $100)</td>
<td>Approx $100</td>
<td>$50 (each $ = $50)</td>
</tr>
</tbody>
</table>
Genetic Test Order Review

Consider hiring a laboratory-based genetic counselor:
- Routinely review complex genetic test orders for proper utilization, including once-in-a-lifetime genetic tests
- Available for consultation on proper test ordering and results interpretation
- Participate in Lab Stewardship Committee
- Work with payers to help promote insurance coverage for new tests
- Great PR opportunity for the Lab and Hospital with medical staff, patients, and families
- ROI is typically around 6 months or less

Outcome Data

Healthcare savings from molecular test modifications:
- 86 tests modified/month (includes test cancellations and additions)
- Average Cost Savings/Month >$48,000 (specifically from cancellation of erroneous tests)
- Savings to hospitals, insurers, and patients >$720,000 annually
Stewardship Interventions

Don't test for myoglobin or CK-Mb in the diagnosis of acute myocardial infarction. Instead, use troponin I or T.

Stewardship Interventions

OK-MB baseline pre-intervention: 1.315

**Intervention:** Remove CK-MB from all order sets

Post-intervention: OK-MB 2.20

**Results:** 83% reduction in CK-MB test orders

Where to Start?

**Three Initial areas of Focus**

- **Test Consolidation**
  - How many reference laboratories do you use?
- **Test formulary**
  - Creation & Implementation
- **In-House Testing**
  - Daily recurring labs
  - Inappropriate test intervals
Daily Orders

Don’t perform repetitive CBC and chemistry testing in the face of clinical and lab stability.

Don’t order diagnostic tests at regular intervals (such as every day), but rather in response to specific clinical questions.

Intervention Methods

**Proactive**
- Appropriate order sets
- Order management
- Preference list management
- Physician education
- Physician report cards

**Reactive**
- Duplicate alerts
- Formulary restriction alerts
- Best Practice Alerts
- Physician education

Daily Orders
**Test Interval Guidance Case Study**

**Project:** CPOE Duplicate Alert for 5 target tests identified as being potentially ordered too frequently

**Intervention:** CPOE duplicate alert

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Reduction in repeat testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSH</td>
<td>84.9%</td>
</tr>
<tr>
<td>Lipid Panel</td>
<td>70.8%</td>
</tr>
<tr>
<td>Hemoglobin A1c</td>
<td>67.5%</td>
</tr>
<tr>
<td>Iron</td>
<td>89.2%</td>
</tr>
<tr>
<td>Ferritin</td>
<td>75.3%</td>
</tr>
</tbody>
</table>

**Annualized Direct Cost Savings = $203,432**
Reference Lab Interventions

Summary

Justification for Stewardship
NCLS Recommendations
Three Initial areas of Focus:

Test Consolidation
- How many reference labs do you use?

Reference test formulary
- Creation & Implementation

In-House Testing
- Daily recurring labs
- Inappropriate test intervals

13 Billion
- Laboratory tests performed annually in the U.S.

70%
- Of medical decisions are influenced by laboratory data

3%
- Of U.S. healthcare expenditures spent on Laboratory Services
Downstream impact

- Length of stay
- Pharmacy
- Radiology
- Others......

Troponin Orders and Chest Pain LOS

1. Identify order mechanisms that drive the repeat interval
2. Modify the repeat time to be 3-6 hours after

Troponin I

Improve the time-to-decision by improving the test interval by up to 3 hours
Downstream impact

- Length of stay
- Pharmacy
- Radiology
- Others......

Pharmacy costs keep rising...

Spending on prescription drugs has risen rapidly over past decades

Downstream Impact on Pharmacy

Humira (adalimumab)
Remicade (infliximab)

Humira annual cost per patient rose from $19K (2012) to $38K (2018)
Humira total sales = $18.4 billion (2017)
Adalimumab Activity & Neutralizing Antibody

About this test
This test assesses the effectiveness of adalimumab drug therapy. The test measures the activity of TNF-α, which is inhibited by adalimumab, and also detects anti-drug antibodies.

50% of patients suffering from non-infectious inflammatory disorders experience treatment failure.
Detecting treatment failure of TNF-α inhibitors such as infliximab and adalimumab improves patient care and results in cost savings from halting ineffective drug therapy.

See www.aruplab.com/topics/TNF for additional information.

Downstream impact

• Length of stay
• Pharmacy
• Radiology
• Others......

Radiology Services
CT Scans

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Approximate effective radiation dose</th>
<th>Comparable to natural background radiation for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computed Tomography (CT) - Chest</td>
<td>7 mSv</td>
<td>2 years</td>
</tr>
<tr>
<td>Computed Tomography (CT) - Lung Cancer Screening</td>
<td>1.5 mSv</td>
<td>6 months</td>
</tr>
</tbody>
</table>

“A chest x-ray delivers 0.1 mSv, while a chest CT delivers 7 mSv — 70 times as much. And that’s not counting the very common follow-up CT scans.” Source: Harvard Health Publishing

“The average cost of a CT scan in the United States is $3,275” Source: New Choice Health

D-Dimer for DVT/PE (VTE)

Initial testing

- For patients with intermediate or low pretest probability by Clinical Prediction Rules (E.g. Wells Criteria)
- **Negative test rules out VTE**
- Cutoff >500 ng/mL fibrinogen equivalent units (FEUs) or age times 10 ng/mL if >50 years old (cutoffs in FEUs do not apply to results generated from assays in D-dimer units [DDUs])
- Test is not specific – patients with positive test require imaging, usually Doppler or compression ultrasound

Source: ARUP Consult
DVT/PE Algorithm

Clinical probability score

Low
Moderate
High

D-dimer test

Negative

No DVT or PE

Start anticoagulant therapy

Positive

Start anticoagulant therapy

Imaging testing for DVT or PE

Negative

Imaging testing for DVT or PE

Positive

D-Dimer and CT PE Protocol

D-Dimer Routine proc

Hoff's Criteria for Pulmonary Embolism

- Age over 40 years
- Alcohol dependency or heavy smoker
- Abnormal Coagulation Tests
- Previous History of Thrombosis

D-Dimer and CT PE Protocol
My Own DVT/PE Story...

- It all started with surfing in Hawaii (2012)
- A little toe injury (dislocation)
- Long plane ride back to Denver next day
- Months pass
- Acute R upper quadrant chest pain
- ED visit
- D Dimer: >2.5 times upper limit of normal
- CT of thorax performed two hours later
- Dx: Bilateral PE
- Doppler US performed next morning
- Dx: DVT (R knee area)
- Negative for hereditary coagulopathies
- 6 months of warfarin therapy
- Moral of the story: DVT/PE risk is real, common, and we are all probably at some risk when circumstances align
Downstream impact

- Length of stay
- Pharmacy
- Radiology
  - Others……

Other Stewardship Collaboration Opportunities

- Lab networking (both within and outside of health system)
- Inreach and Outreach
- Consolidation of purchased services
  - Couriers and transportation
  - Billing
- Cross-training of managers and other leaders
- Shadowing (inter and intradepartmentally)
- Quality Improvement interdepartmental projects
  - Blood stewardship, etc.
  - Organization excellence efforts (E.g. Malcolm Baldrige National Quality Award)
- Patient participation in staff meetings
- The list is probably endless…be creative to fill gaps

Are We Really All In This Together?
Your Homework Assignment

Search YouTube for:

“amazon echo snl”
(2 minutes 41 seconds)

Watch and enjoy!

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