

a bit about Rob...



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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.

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Background

3 most significant causes of atiliticantest performed

- 70% diag show road dat Failing to retrieve a test 10-30% unnecessary

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· Misinterpreting a test result



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Trends in Healthcare



NCLS Publication

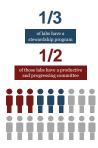


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	SPECIAL REPORT
Transforming Laborat Laboratory Stewardsh PLUGS National Comr Stewardship	tory Utilization Review into hip: Guidelines by the mittee for Laboratory
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Creating Successful Laboratory Stewardship



Success Factors

Data Analysis Formal Governance Evidence-Based Recommendations IT Engagement and Support Project Management Measurement and Reporting

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Analytics & Monitoring: Utilization Dashboards



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Analytics & Monitoring: Utilization Dashboards







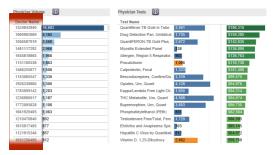


Analytics & Monitoring: **Utilization Dashboards** te Genetic Testing Excepts T > Facility (AI) amoeba and Naegleria - Primary Vieningoencephaitis (Brain-Eat) . Sundrome - Inchemic 10 54 000 ARUP UM Topics \$2,000 Physician Volume Physicia 0 Dects 1900 1751 69 22 130 \$1,571 \$1,260 ARP

Analytics & Monitoring: Utilization Dashboards

Doctor Name 1900992669	691	CRP, High Sensitivity	815	\$9,780	
1751477460	22	Myoglobin, Serum	130	\$1,571	
1781268937	19	Troponin-T	42	\$1,260	
1185670619	19	Interleukin 6	33	\$2,283	
1705926024	14	Troponin I	10	\$240	
1702455377	14	Creatine Kinase, MB	1	\$12	
1091547588	13				
1724812356	12				
1539295217	9				
1846818218	8				
1743787053	8				
1596550320	8				
1479327190	8				
1884820118	6				
1805996734	6				
1724231302	6				
1876767360	5				

Analytics & Monitoring: Utilization Dashboards



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Analytics & Monitoring: Utilization Dashboards

ctor Name		Test Name		
46371359	185	Quantiferon-TB Gold in Tube		\$186,315
31256495	157	Drug Detection Pan, Umbilical	735	\$159,285
82405910	102	QuantiFERON-TB Gold Plus,	\$72	\$142,835
99733356	40	Myositis Extended Panel	8	\$136,890
48156181	46	Allergen Region 5 Respirator	3	\$136.763
15273488	34	Procalcitonin 1.0	06	\$110,730
34032006	28	Calprotectin, Fecal	20	3101,496
91920143	27	Benzodiazepines, Confirm/Qu.	19	\$99,570
05142193	25	Opiates, Um, Quant 4.1	128	
45255325	21	Kappa/Lambda Free Light Ch	50	
79202068	20	THC Metabolite, Urn, Quant		\$94,074
42300045	17	Buprenorphine, Urn, Quant		
24379154	16	Phosphatidylethanol (PEth)	5	
81981684	12	Testosterone Free/Total, Fem., 11	29	\$66,595
85296573	12	Ehrlichia and Anaplasma Spe. 303		\$65,145
069745020	12	Hepatitis C Virus by Quantitati	2	\$64,972
346576921	11	Vitamin D, 1,25-Dihydroxy 2.6		\$59,709

Analytics & Monitoring: Utilization Dashboards

Doctor Name	Test Name	
1692104044 359	Buprenorphine, Urn, Quant 30003	\$90,735
1661929405 90	Quantiferon-TB Gold in Tube 3.501	\$186,315
1631446547 54	ANA, IgG ELISA w/ Reflex to	\$16,930
1104166238 49	Benzodiazepines, Confirm/Qu. 3 313	\$99,570
1378656293 46	Lead, Blood (Capillary) 3,104	523,277
1428745217 42	Zinc, Serum or Plasma 20032	\$19,883
1153085547 35	ICE 4 with calculated 2 acces	104,753
1430921202 31	Vitamin D, 1,25-Dihydroxy 2,682	\$59,709
1534220413 30	Quant/FERON-TB Gold Plus, 21012	\$142,835
1950874961 30	Cancer Antigen-GI (CA 19-9) 2.613	\$20,904
1655818865 29	Vitamin B2 (Riboflavin) 2.441	\$49,900
1581930488 28	Copper, Serum or Plasma 2,143	\$12,858
1692420561 27	Cocaine Met, Urine, Quant 1.922	\$57,660
1734466133 24	Testosterone Free, Adult Male 1.905	\$11,684
1591665330 23	Triiodothyronine, Free (Free T., 1.867	\$11,356
1756698922 22	MMA Serum/Plasma, Vitamin 1.757	530,573
1301055247 22	Drug Detection Pan, Umbilical. 1735	\$159,285

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Creating Successful Governance Structure





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

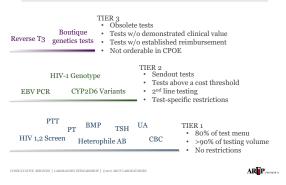
Free Phenytoin at Lab X\$106Free Phenytoin at Primary Lab vendor\$13
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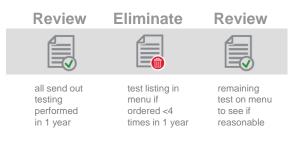




Test Formulary



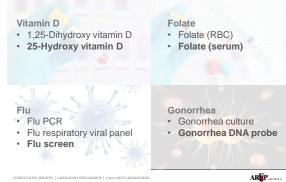
Test Formulary

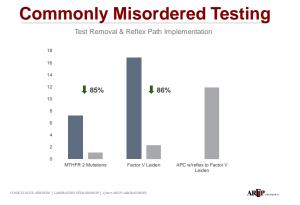


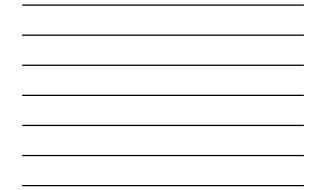


POE Optimization

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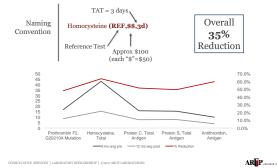
Clinical Decision Support in EMR

Ondered: Authorizing: Order Class: Start Time:	PERIODIC FEVER SYNDROMET 12:4/2014-11:37 BareideRofebalenen Nammal 12:54/14-	S PANEL (Z GENES Prissing: Ordering User:	UM 1 45558 (Dedect 4057448) Regime Jacobiols (Ottagosada-do	States	Completed	
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Test Price Transparency & More





POE Optimization

CELIAC SEROLOGY (REF, \$\$, 3d) MMUNOGLOBULIN E (IGE) (REF. \$\$.5d) LEVETIRACETAM LEVEL (REF, \$\$,2d)
 PROTEIN C/S PANEL, FUNCTIONAL (REF, \$\$,3d) RENIN (REF, \$\$, 2d) ALPHA-FETOPROTEIN (APP) (REF,\$\$,3d) B2 GLYCOPROTEIN I ABS IGG IGM (REF,\$\$,3d) BUPRENORPHINE and METABOLITES, URINE (REF,\$\$,5d) CARDIOLIPIN Abs (IoG, IoM, IoA) (REF.\$\$.2d) CRUDIALS IT NOS (GG, 1917, 1917) (CC 1927, 10)

GLUTAMIC ACID DECARBOXYLASE AB (REF, \$\$,4d)

ISLET CELL (REF, \$\$,4d) CXCARBAZEPINE (TRILEPTAL) (REF,\$\$,3d)
CXCARBAZEPINE (TRILEPTAL) (REF,\$\$,3d)
THYROID STIMULATING IMMUNOGLOB (REF,\$\$,3d) THYROXINE BINDING GLOBULIN (REF,\$\$,3d) TOPIRAMATE (TOPRAMAX) LEVEL (REF, \$\$, 3d) TPMT ENZYME (REF, \$\$,2d)
VON WILLEBRAND MULTIMERIC PANEL (REF, \$\$,4d) ACTIVATED PROTEIN C RESISTANCE (REF,\$\$,5d) ALDOSTERONE, SERUM (REF.\$\$.5d) ALDOSTERONE/RENIN ACT RATIO (REF, \$\$,6d)

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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 .
- 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 .

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Outcome Data

1158



Healthcare savings from molecular test modifications:

- · 86 tests modified /month (includes test cancellations and additions)
- Average Cost Savings/ Month >\$48,000 (specifically from cancelation of erroneous tests)
- Savings to hospitals, insurers, and patients ~\$720,000 dollars annually

https://onlinelibrary.wiley.com/doi/abs/10.1002/ajmg.a.36453

Stewardship Interventions



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Stewardship Interventions



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

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Daily Orders

6



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.

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Intervention Methods

Proactive

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Appropriate order sets Order management Preference list management Physician education Physician report cards



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Duplicate alerts Formulary restriction alerts Best Practice Alerts Physician education

Reactive



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Daily Orders



Scope of 1	DID STATULATING	RMONE
Hypothyroidism	Hyperthyroidism	Hypothyroidism in Pregnancy
change birth patient is """""""""""""""""""""""""""""""""""	Al, et al. Couldeline for the protreme of two and force university and university of the second transforce and the second second second secon	matemal serum monitored matemal serum monitored provid Association of the provision of the construction of the provision of the provide association of the provide of the provide association of the provide of the provide association of the provide of the provide of the provide association of the provide of the provide of the provide association of the provide of the provide of the provide association of the provide of the provide of the provide of the provide association of the provide of the provide of the provide of the provide association of the provide of the provide of the provide of the provide association of the provide of the provide of the provide of the provide association of the provide of the

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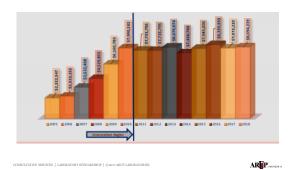
Test Interval Guidance Case Study

		cate Alert for 5 target te stentially ordered too fre	
	Intervention: CPOE	•	
	Test Name	Reduction In repeat testing	
	тѕн	84.9%	Order pl Order # Order# By: 2yt Result Collect
	Lipid Panel	70.8%	En.
	Hemoglobin A1c	67.5%	Continue ;
	Iron	89.2%	Ar
	Ferritin	75.3%	Sa
SULTATIV	E SERVICES LABORATORY STEWARDSHIP	© 2017 ARUP LABORATORIES	

Order placed for the procedu Order # 70548065 Orderet: 70548065 By: Zyne Cotopasi, MD Resulted: 02042205 15:47 Collected: 02042205 15:47		t 30 daya			
Component		Value	Units	Flag	
Thyroid Stimulating Hor	mone	4.0	IUm.		
Continue placing order?	Ye	98		No	

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

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13 Billion

laboratory tests performed annually in the U.S.

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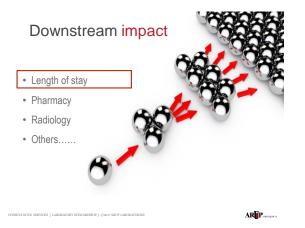
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of medical decisions are influenced by laboratory data

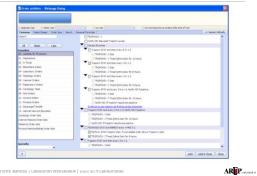
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3%

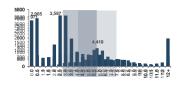
of U.S. healthcare expenditures spent on Laboratory Services



Troponin Orders and Chest Pain LOS

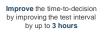


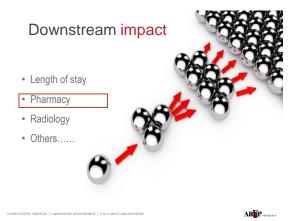
Troponin I



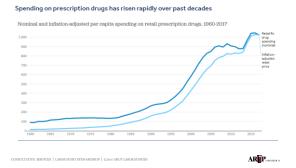


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Pharmacy costs keep rising...



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)



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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.

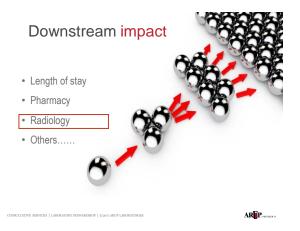
50% of patients suffering from non-infectious inflammatory disorders experience treatment failure.

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 <u>www.aruplab.com/topics/TNF</u> for additional information.

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Radiology Services



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Don't perform chest computed tomography (CT angiography) to evaluate for possible pulmonary embolism in patients with a low clinical probability and negative results of a highly sensitive D-dimer assay.

Clinical practice publishes for publications were assured to a substrate the second se

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CT Scans

Procedure	Approximate effective radiation dose	Comparable to natural background radiation for:
Computed Tomography (CT)–Chest	7 mSv	2 years
Computed Tomography (CT)–Lung Cancer Screening	1.5 mSv	6 months

"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

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D-Dimer for DVT/PE (VTE)

Initial testing

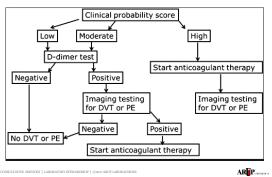
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- · For patients with intermediate or low pretest probability by Clinical Prediction Rules (E.g. Wells Criteria)
- Negative test rules out VTE
- Cutoff >500 ng/mL fibrinogen equivalent units (FEUs) or age times 10 ng/mL if >50 years old (cutoffs in 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

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DVT/PE Algorithm





D-Dimer and CT PE Protocol

Ordered By Por Dock (999)	55)	- Doctor's Name (Last First M)			West Thomas	
Performing LAB	• -	Order Bource PCE Modifier	~	Tarpet Cesigner		* _
Esternit Dy Poe Dool		Of 08/12/2015 - 19:28	Crose 6	74588612	Stratus Active	
D-DIMER Routine on	:e					
	Well's Criter	ia for Pulmonary E	mbolism			
			Symptoms of DVT	• yes +3		
		PE is #1 Dispres	is, or Equally Likely	• ## 0 ### +3		
			Heart Rate > 100	• m0 0 yes +1.5		
	Immobilizatio	n at least 3 days, or Surgery is		yes +15		
	5	Previous, objectively du	agnosed PE or DV1	• no 0 yes +1.5		
			Hemophysia	• no 0 yes +1		
	A	falignancy wi Treatment within	s 6 me, or pelkative	• ma 0 yes +1		
		Well's Criteria S	icore for PE	3		

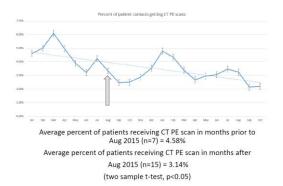
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D-Dimer and CT PE Protocol

Ordered By Poe Dock (992	151 .	- Dathry Name			MAR TOP	10
Performing UID	* -	Order Source Hoe No other	٣	Tarpet Coskgner		w
Entered BoPos Doca		OK0812/2015 19:28	T Onen	4568612	Tinhui Active	
DIMER Routine on						
	P Informational Message Webpage Dialog				121	
	 Moderal 	te probability of PE - 16.2%; to rule out PE: however, faise	prevalence. A ne	gative D-dimer n	wy be	
	advance	ed age, trauma, recent surge	ry, hospitalized	patients, liver de	ease,	
	high the	eumatoid factor, inflammation	i, and malignance	F-		
		Cos				
			manageryant			
			Contraction of the second	yes +1		
		talignancy or Treatment written 6	mo, or pellative	• co 0 198 +1		
			ore for PE			

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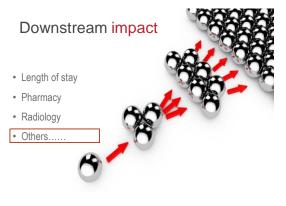
My Own DVT/PE Story...

- It all started with surfing in Hawaii (2012)
 R 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

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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

Are We Really All In This **Together**?



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Your Homework Assignment

Search YouTube for:

"amazon echo snl" (2 minutes 41 seconds)

Watch and enjoy!

Contact Information

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