New Role for Medical Laboratory Scientists: Advising Physicians on the Selection and Correct Interpretation of Laboratory Tests

Michael Laposata, MD, PhD

Edward and Nancy Fody Professor of Pathology
Professor of Medicine
Vanderbilt University School of Medicine

I have no conflicts of interest relevant to this talk

Michael Laposata, MD, PhD

Objectives

1. Define what a diagnostic management team is and what it does – and describe the role of the medical technologist

2. Recognize the barriers to establishing a diagnostic management team

3. Associate the benefits in patient outcome and cost savings with diagnostic management team activity

A patient is taken to the operating room for removal of the right kidney because of renal cell carcinoma

The surgeon mistakenly removes the left kidney

What is the likelihood that this error will go unrecognized?

A patient with breast cancer is given 4 times a standard dose of chemotherapy as a result of a transcription error

The patient dies from the overdose of the chemotherapeutic agent

What is the likelihood that this error will go unrecognized?

A patient presents to the emergency room with shortness of breath

The emergency room physician believes the patient has asthma and discharges the patient with nebulizer treatment for asthma

The patient actually has a pulmonary embolism, and the emergency room physician fails to order a diagnostic test for pulmonary embolism, the D-dimer test

The pulmonary embolism increases in size and the patient collapses and dies in the parking lot because anticoagulation was not instituted

What is the likelihood that:

The patient's family is aware that this is a preventable death?

Other doctors in the hospital and risk management experts in the hospital recognized this is a preventable death?

The doctor who made the error recognizes that the death was preventable?

How often are errors in test selection and result interpretation major causes of morbidity and mortality?

Probably tens of thousands of times every year in America – and this presentation describes how to address this problem

Outline of the Presentation

1. Presentation of the Clinical Problem
2. The Diagnostic Management Team at Vanderbilt : What it does and how it was created
3. The Existing and Planned Diagnostic Management Teams at Vanderbilt
4. Concluding Thoughts

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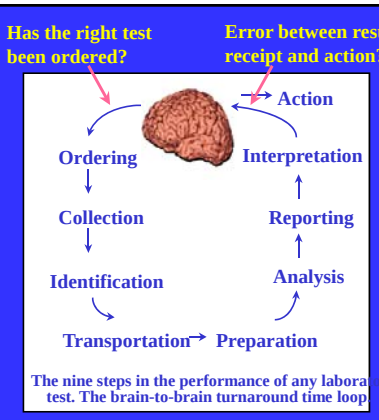

The nine steps in the performance of any laboratory test. The brain-to-brain turnaround time loop

Lundberg , 1981

Survey of US Medical Schools

Brian Smith MD, PhD and the CLIHC group at the CDC – Preliminary Data from the Survey

Number of hours spent by medical students learning anatomic pathology : 60 – 300 is the range

Mean number of hours spent by medical students learning laboratory medicine : 9

And there is most often no test for the laboratory medicine coursework, and the teaching is often done by individuals with no laboratory medicine training

An educational mismatch with medical practice competency which has long needed correction

What medical students are taught about the diagnostic tests they will use in practice ?

- Anatomic pathology tests
- Radiology tests
- Clinical laboratory tests

What diagnostic tests do doctors order in practice and are required to interpret the test results by themselves ?

- Anatomic pathology tests
- Radiology tests
- Clinical laboratory tests

2014

How challenging is it for the clinician to establish a diagnosis quickly and accurately?

Radiology: Dozens of imaging modalities

Lab Medicine: Test Menu > 2000 Assays without the impending thousands of genetic tests

Anatomic Pathology: Autopsy / Biopsy / Surgical Pathology / Cytopathology

Why not have all the diagnostic specialists convene and synthesize their findings and establish a diagnosis for the clinician – especially in complex cases?

Comparison of Clinical Laboratory Results to Anatomic Pathology and Radiology Results

Radiologists do not give an MRI image back to the ordering physician without an interpretation

Anatomic pathologists do not give biopsies back to surgeons without interpretation

Comparison of Clinical Laboratory Results to Anatomic Pathology and Radiology Results

Why is it acceptable for clinical laboratorians to give complex clinical laboratory test results back to physicians without interpretation –

When they know just as little about the test results -
beyond the most routine ones -
as they do about images in radiology and histopathology?

Laboratories make it even more difficult to because – they call the same test by many different names

Names for the test to measure the function of an important coagulation-related protein- *von Willebrand factor*	Abbreviations for the test to measure the function of an important coagulation-related protein- *von Willebrand factor*
Ristocetin cofactor	VWF activity
Von Willebrand factor	VWF: RCoF
Von Willebrand factor function	VWF function
Factor VIII-related activity	VWF, functional
Functional von Willebrand factor	F VIII – related act

A doctor wants to know if a patient has vitamin D deficiency – Which single test of all the ones listed below with the name vitamin D should be ordered?

Vitamin D
Vitamin D2
Vitamin D3

25 hydroxy vitamin D
25-OH vitamin D
25 hydroxy vitamin D2
25-OH vitamin D2
25 hydroxy vitamin D3
25-OH vitamin D3

1,25 dihydroxy vitamin D
1,25-diOH vitamin D
1,25 dihydroxy vitamin D2
1,25-diOH vitamin D2
1,25 dihydroxy vitamin D3
1,25-diOH vitamin D3

And these test names are also presented as abbreviations in multiple different ways !

Why don't we make it easy for a doctor to select the one test which Indicates whether or not the patient is vitamin D deficient ?

Consequences of the Vast Array of Testing Options

Doctors pick unnecessary tests or miss the necessary ones

Dozens of approaches emerge for diagnosis of the same condition – some better than others

The correct diagnosis may be achievable promptly, but it is missed or very commonly delayed, with adverse clinical consequences to the patient and/or adverse financial consequences to the institution

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The landscape is changing rapidly

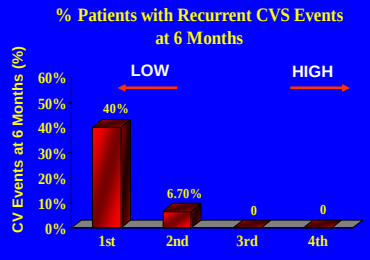
Is the interpretation for coagulation testing rarely needed ?
How many patients have coronary artery disease and have a stent placed?
Many thousands in the US!

Plavix keeps the stent open and the patient alive –
Is lab testing important?
Are the results complex?

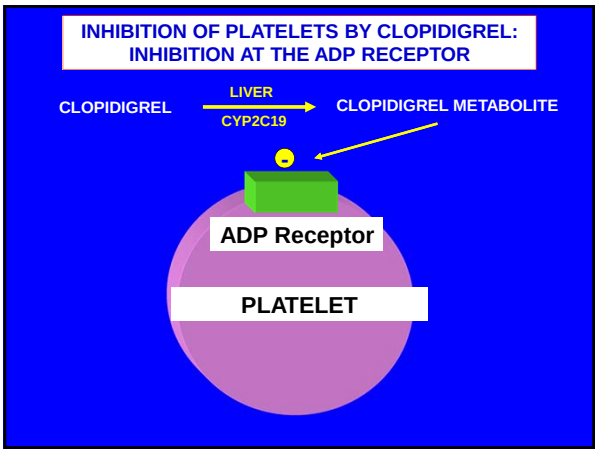
EFFECTIVENESS OF CHRONIC PLAVIX THERAPY

Response to Plavix

Clopidogrel nonresponsiveness is associated with increased risk of thrombotic events and correlates to poorer clinical outcomes



Matetzky et al. Circulation 2004; 109:3171-3175



Genetic Studies

for Cyp2C19 loss of function alleles in the liver –

that convert Plavix to its active metabolite – can identify patients who do not have an anti-platelet effect from Plavix

N Engl J Med 360: 363, 2009

Shouldn't we find out if the patient receiving Plavix will respond to the drug and reduce the likelihood of a second event?

For patients being treated with Plavix, there is a an opportunity to reduce the risk for thrombosis by performing pharmacogenomics testing to determine if Plavix is likely to be effective

and

the change to a more effective antiplatelet agent can be performed at no extra cost

Many Alleles for CYP 2C19 – Plavix metabolism May Be Difficult to Assess

Allele Name	Comments
CYP 2C19*1	Wild-type/normal
CYP 2C19*2	nonfunctional
CYP 2C19*2B	nonfunctional
CYP 2C19*3	poor metabolism of compounds like proguanil - with implications for malaria prophylaxis
CYP 2C19*4	nonfunctional
CYP 2C19*5	poor metabolizer
CYP 2C19*6	nonfunctional
CYP 2C19*7	nonfunctional
CYP 2C19*8	nonfunctional
CYP 2C19*17	ultra-rapid metabolizer

SNPedia, 2011

At Vanderbilt alone, there is a potential savings of over$1.5 million annually from avoidance of adverse events with Plavix – national savings in billions of dollars

Clopidogrel (Plavix) - What if only about 1 % of stented patients are poor Plavix metabolizers ?

6400 patients on medication x 60 adverse events avoided per year x $25,000 per adverse event = an estimated savings of $1.5 million – *far more than the cost of setting up pharmacogenomics*

We learned more than 10 years ago that practicing physicians greatly benefit from

patient specific, expert driven, and timely

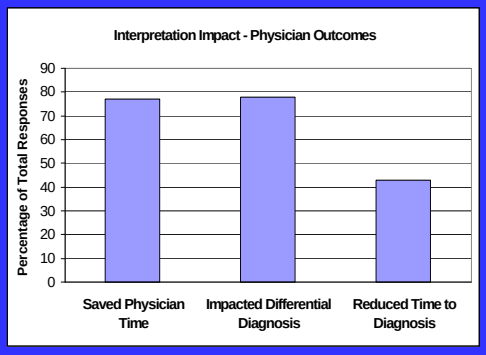
interpretations of coagulation tests

2000 Survey of MGH physician experience with narrative interpretations of complex laboratory evaluations in coagulation

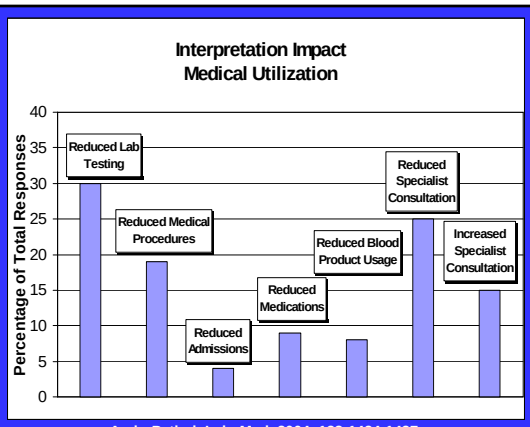
Ordering physicians electronically sent a narrative interpretation of one their own cases

Clinicians asked to respond electronically to several questions about the interpretation

100 of 100 surveys returned



Arch. Pathol. Lab. Med. 2004. 128:1424-1427



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The Diagnostic Management Team at Vanderbilt :

What it does

How it was created

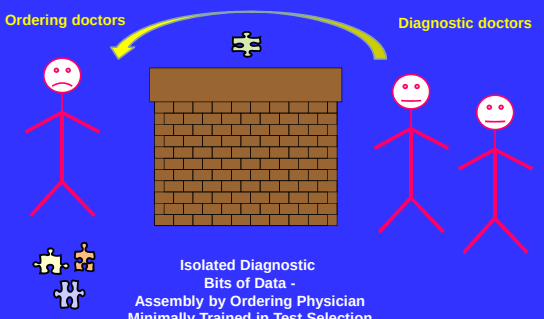
What does a diagnostic management team do ?

Conventional approach:

Tests are ordered and these bits of data are "tossed over the wall" to the physician who orders the tests

The physician who orders the tests is responsible for synthesizing clinical and laboratory data to achieve a diagnosis, often in a limited timeframe

Conventional Approach



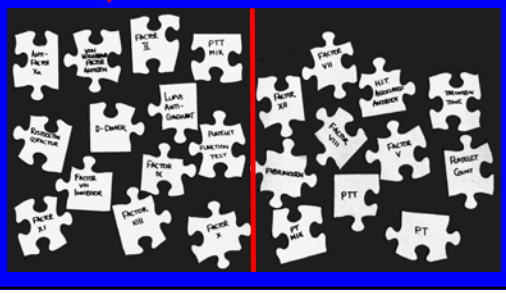
Isolated Diagnostic
Bits of Data -
Assembly by Ordering Physician
Minimally Trained in Test Selection
and Interpretation

Example : Treating physician has a patient with a prolonged PTT and must order the correct tests and no unnecessary tests to explain the prolonged PTT preoperatively –
with many tests from which to choose, some of which are expensive

The treating physician often fails to select the correct tests to complete the diagnostic puzzle

The doctor ordered these 13 tests but still has no diagnosis – puzzle incomplete

Delayed diagnosis increases expense and leads to poor patient outcome



What does a diagnostic management team do ?

The Diagnostic Management Team Approach:

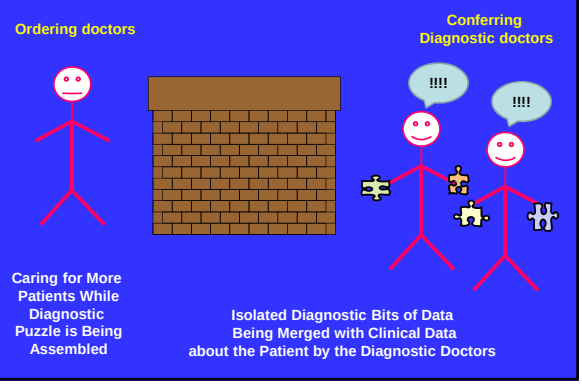
Physicians order tests by requesting evaluation of *abnormal screening test or clinical sign or symptom*

The expert physician and colleagues in the DMT synthesizes the clinical and laboratory data and provides a narrative interpretation based upon medical evidence –

not only when requested -

but for *every* case in that DMT

Diagnostic Management Team Approach



DMTs take all cases –

not only ones presented for consultation

For coagulation – *every* evaluation emerging from the special coagulation laboratory

For hematopathology – *every* case

For microbiology – *every* "sentinel" case

For transfusion medicine - *every* case involving transfusion reactions, massive transfusion, errors in handling, and Rh incompatibility

Diagnostic Management Team Approach

Ordering doctors

Conferring Diagnostic doctors

Solved Diagnostic Puzzle

!!!!

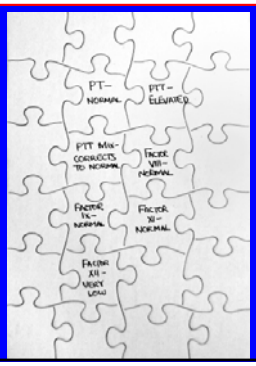
!!!!

There Is No Wall between the Ordering Doctors and the Diagnostic Doctors

Receives Accurate Diagnosis Quickly as a Completed Puzzle

The DMT receives the order to evaluate the prolonged PTT - The DMT decides that only 7 tests are needed to complete the diagnostic puzzle to explain the prolonged PTT

The DMT rapidly completes the diagnostic puzzle– Faster diagnosis translates to lower expense and better patient outcome



The treating doctor needs a diagnosis and not just test results – And now knows exactly what to do

This patient has Factor XII deficiency to explain the prolonged PTT value.

There is no predisposition to bleeding with deficiency of this coagulation factor.

There is no need to transfuse fresh frozen plasma prior to surgery.

The patient is cleared to undergo surgery.

Evidence based diagnostic conclusions and treatment recommendations are provided by the DMT, for each individual patient

It is not a diagnostic management team activity if <u>any</u> of the following are true

- **The interpretation does not consider clinical information**
- **The service does not meet on a regular schedule**
- **The interpretation is not written or not included in the medical record**
- **The interpretation is so self evident that it is not clinically valuable for the treating physician**

For example : The interpretation only provides a report of tests results as abnormal but fails to explain why

Barriers to Diagnostic Management Team Creation

And how they have been overcome at Vanderbilt

Why Are National Barriers Not Barriers At Vanderbilt?

Failure of institutions to recognize the clinical and financial benefits of advice on test selection and result interpretations on the total patient encounter.

Anatomic pathology interpretation **: Professional fee pays $300**
Clinical laboratory interpretation **: Professional fee is $0 and the savings from a more rapid and more accurate diagnosis is $3000**

Almost no one understands this in 2014

Why Are National Barriers Not Barriers At Vanderbilt?

The initial development of informatics that assists in the creation of the interpretations requires substantial expertise and resources from informatics, which is in most institutions inadequate.

Vanderbilt is a national leader in medical informatics, and informaticians are heavily invested in the development of enablers for this clinical service

If it takes too long to sign out a case, a DMT is impossible.

An informatics solution to efficiently and carefully review relevant clinical and lab data is absolutely necessary.

Why Are National Barriers Not Barriers At Vanderbilt?

Too few classically trained experts in laboratory medicine are to provide clinically useful advice.

Vanderbilt has made certain that there is a large group of local experts (doctoral and non-doctoral) in laboratory medicine for the DMT –

The main criterion for hiring a doctoral lab director is NOT the degree (MD, PhD, DCLS?) – it is the ability to increase the speed and accuracy of diagnosis – the professional fee for the interpretation is irrelevant to the DMT concept

If payment for the consult is less relevant than the savings from a quick and accurate diagnosis,

all qualified individuals should be invited to help establish the correct diagnosis

Why Are National Barriers Not Barriers At Vanderbilt?

The difficulty in quantifying financial benefit for advice of test selection and result interpretation, with underestimation of benefit.

Vanderbilt has involved health economists to determine the financial and clinical benefit of the diagnostic management team output

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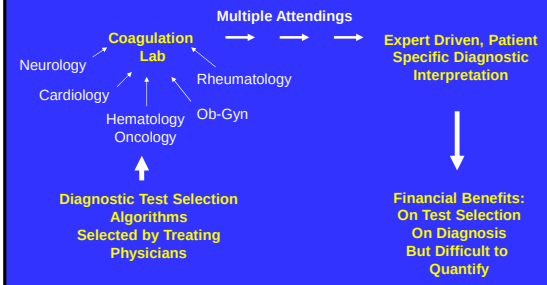
The Existing and Planned Diagnostic Management Teams --

at Vanderbilt

Coagulation Rounds



Coagulation Rounds

Logistics

Case Material

The Logistics of Coagulation Rounds

Early AM:
Resident on service confers with special coagulation technologist to identify cases for evaluation

Early AM till 4 PM:
Resident reviews lab data as it becomes available and clinical details for all patients being evaluated; follows up with clinical or laboratory questions for these cases as necessary; creates preliminary interpretation.

The Logistics of Coagulation Rounds

4 PM:

Laboratory director / coagulation specialist, coagulation resident, medical technologists, other trainees discuss each case -

with relevant teaching points made by attending and interpretation finalized.

Result into patient's electronic record *immediately.*

Data presentation in the medical record for coagulation studies prior to initiation of the patient specific, expert driven coagulation interpretations

JUNE 30, 2010 VANDERBILT UNIVERSITY

Pat-PT: 13.9 **PT-inr**: 1.1 **PTT-pt**: **43.6*** **PoolNP**: 28.1 **P+N0Hr**: 38.3 **P+N1Hr**: 36.2 **P+N2Hr**: 35.9 **Pat-TT**: 15 **F8Act**: 95 **F9Act**: 102 **RVVT**: **1.5*** **DRVVT**: Lupus Anticoagulant Confirmed **DMX**: 1.3 **F11Act**: 96 **F12Act**: 54

It evolved to this "canned" comment – Is this helpful ?

Unedited "canned" comment

The Dilute Russell Viper Venom time (dRVVT) is used for detection of Lupus Anticoagulant. Hemolysis, deficiencies or inhibitor of Factors II, V and X, high Factor VIII level (>200%), Heparin level >1 IU/ml, some LMWH, Coumadin and other Vitamin K antagonists may interfere with test results. In order to determine etiology of prolonged dRVVT, a mixing study was performed showing no dRVVT correction, indicating the presence of Lupus Anticoagulant.

NEVER AT VANDERBILT UNIVERSITY

Report in the medical record <u>after</u> initiation of the daily rounds to interpret all complex evaluations from the special coagulation laboratory

JULY 1, 2010 VANDERBILT UNIVERSITY

This patient has an elevated PTT, with a normal PT/INR and normal thrombin time.

A PTT mixing study failed to correct into the normal range. These results were consistent with the presence of an inhibitor (such as a lupus anticoagulant) in the sample.

The Dilute Russell Viper Venom time (dRVVT) is used for detection of Lupus Anticoagulant, and the test was positive, indicating the presence of Lupus Anticoagulant.

Taken together, this is a patient with a prolonged PTT based upon the presence of a lupus anticoagulant.

Attendees at the Coagulation DMT and their responsibility

- **The trainee(s) – usually a pathology resident and occasionally a hematology-oncology fellow or a medical student under the guidance of a resident or fellow**

Reviews the medical record for each case to collect information relevant to coagulation issues

And provide a draft patient specific interpretation of the laboratory test results <u>in clinical context</u>

Attendees at the Coagulation DMT and their responsibility

- **The laboratory director / coagulation specialist**

Reviews presented cases and interpretations drafted by the trainee,

For immediate inclusion into the medical record when finalized at rounds

Attendees at the Coagulation DMT and their responsibility

- **The Medical Technologist**

  Provides input on interpretation of test results when there is a relevant question such as :

  Result is influenced by the methodology

  Sample was partially compromised

  Attendees require education about assay

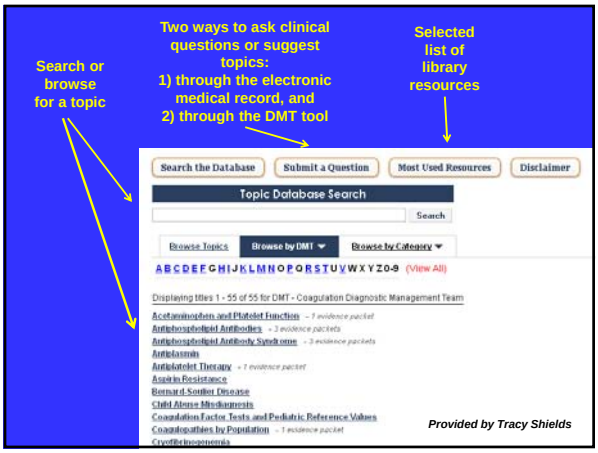
  A series of suspicious results suggest the possibility of a laboratory error

Role of the Information Scientist in the DMTs

- The activity is to provide patient-centered, expert-driven, evidence-based medicine literature support to the DMTs when relevant clinical questions arise

- DMT database tool contains the answers to questions posed at the DMT rounds and is constructed for reuse and distribution of information to others

Provided by Tracy Shields



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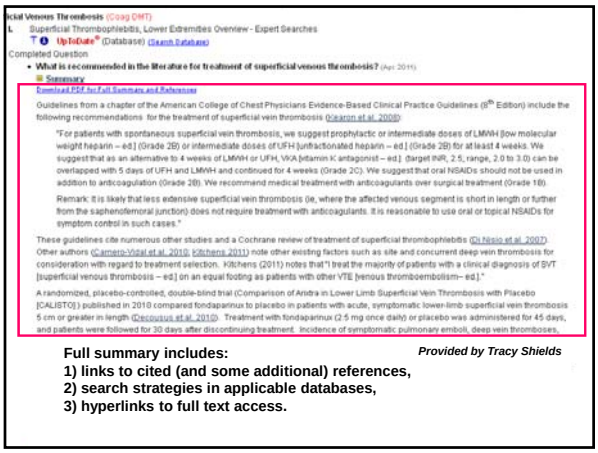


icial Venous Thrombosis (Coag DMT)
1 Superficial Thrombophlebitis, Lower Extremities Overview - Expert Searches
UpToDate® (Database) (Search Database)
Completed Question
• What is recommended in the literature for treatment of superficial venous thrombosis? (Apr 2011)
Summary
Download PDF for Full Summary and References
Guidelines from a chapter of the American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th Edition) include the following recommendations for the treatment of superficial vein thrombosis (Kearon et al. 2008):
"For patients with spontaneous superficial vein thrombosis, we suggest prophylactic or intermediate doses of LMWH [low molecular weight heparin – ed.] (Grade 2B) or intermediate doses of UFH [unfractionated heparin – ed.] (Grade 2B) for at least 4 weeks. We suggest that as an alternative to 4 weeks of LMWH or UFH, VKA [vitamin K antagonist – ed.] (target INR, 2.5; range, 2.0 to 3.0) can be overlapped with 5 days of UFH and LMWH and continued for 4 weeks (Grade 2C). We suggest that oral NSAIDs should not be used in addition to anticoagulation (Grade 2B). We recommend medical treatment with anticoagulants over surgical treatment (Grade 1B).
Remark: It is likely that less extensive superficial vein thrombosis (ie, where the affected venous segment is short in length or further from the saphenofemoral junction) does not require treatment with anticoagulants. It is reasonable to use oral or topical NSAIDs for symptom control in such cases."
These guidelines cite numerous other studies and a Cochrane review of treatment of superficial thrombophlebitis (Di Nisio et al. 2007). Other authors (Camero-Vidal et al. 2010; Kitchens 2011) note other existing factors such as site and concurrent deep vein thrombosis for consideration with regard to treatment selection. Kitchens (2011) notes that "I treat the majority of patients with a clinical diagnosis of SVT [superficial venous thrombosis – ed.] on an equal footing as patients with other VTE [venous thromboembolism– ed.]."
A randomized, placebo-controlled, double-blind trial (Comparison of Arixtra in Lower Limb Superficial Vein Thrombosis with Placebo [CALISTO]) published in 2010 compared fondaparinux to placebo in patients with acute, symptomatic lower-limb superficial vein thrombosis 5 cm or greater in length (Decousus et al. 2010). Treatment with fondaparinux (2.5 mg once daily) or placebo was administered for 45 days, and patients were followed for 30 days after discontinuing treatment. Incidence of symptomatic pulmonary emboli, deep vein thromboses,

Full summary includes:
1) links to cited (and some additional) references,
2) search strategies in applicable databases,
3) hyperlinks to full text access.

Provided by Tracy Shields

Explanations from Coagulation Rounds

Why the patient is bleeding

Why the patient is clotting

Does the patient have an immediate risk of catastrophic thrombosis from selected coagulation disorders

Why the woman cannot carry a pregnancy to term

How to manage and monitor anticoagulant therapy

Is there an underlying bleeding disorder in a bruised child

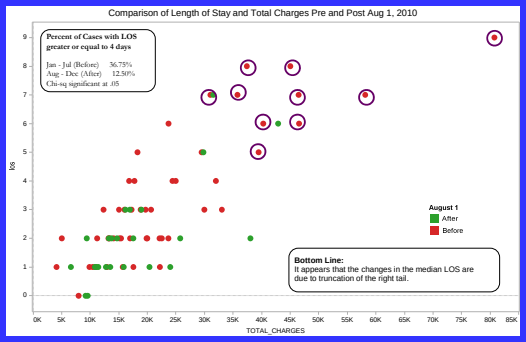
And many more

Before and After Coagulation DMT –

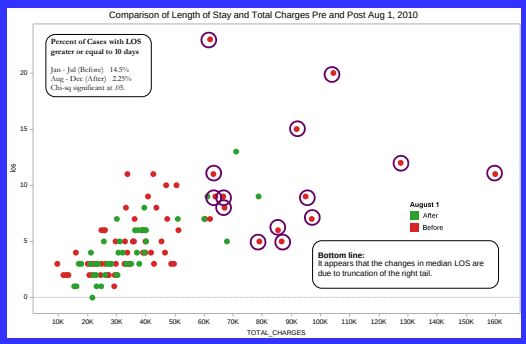
What is the Impact of Length of Stay in the Hospital for Pulmonary Embolism and Intracranial Hemorrhage ?

R. Lawrence Van Horn, Ph.D, MPH, MBA
Assoc. Prof. of Economics and Management
Exec. Dir. Of Health Affairs
The Owen Graduate School of Business Administration
Director, Office of Sustainable Health Care Finance
Institute of Medicine & Public Health
School of Medicine

MSDRG 176: PE



MSDRG 65 Intracranial Hemorrhage



"Diagnostic Latency" - I

- Tests ordered when patient admitted on Monday.
- Results back Tuesday with several abnormal results.
- Action taken on Wednesday with further evaluation.

"Diagnostic Latency" - II

- Diagnosis and discharge plan on Thursday. Patient gone by 3 PM.

Length of Stay: 4 days

No Diagnostic Latency - I

- Tests ordered when patient admitted on Monday.
- Results to coagulation rounds with preliminary interpretation by coagulation resident Monday at 4:00 p.m.
- Patient specific, expert driven narrative completed by 6:00 p.m. Monday and into medical record.

No Diagnostic Latency - II

- Further evaluation Tuesday.
- Discharge on Wednesday.

Length of Stay: 3 days

Limiting factor for some evaluations: Not all assays done daily Monday-Friday, delaying narrative and increasing length of stay.

If There Truly Is a Decrease in Length of Stay for Coagulation Related DRG's, Is It Because…

- Diagnostic latency is decreased?
- A dialogue between diagnostic and therapeutic experts has been created?
- Expert diagnostic doctors and technologists increase visibility with increased continuing medical education of doctors in medical center?

Transfusion Medicine Rounds

Transfusion Medicine Rounds

The expert driven consult is provided as a note in the chart for the majority of these cases-

And the technologist is essential to fully describe findings at the lab bench

Transfusion Medicine Rounds – Predominant Case Material

- Transfusion Reactions
- RBC Antibody Identifications
- Massive Transfusion Protocol Review
- Case discussions about patients receiving out of group platelet transfusions to determine the need for Rh Immune globulin
- Real time review of errors related to cases with transfusions

Microbiology Rounds

Multiple Attendings

Microbiology Laboratories (Including Virology and Molecular Infectious Disease) → → → Expert Driven, Patient Specific Interpretations (With Regular Follow Up by DMT) For Clinically or Diagnostically Complex Cases – Define Ad Hoc Now and Formally With Increased Experience

↑↑↑↑↑

All Clinical Services Evaluating Patients for Infectious Disease – With Infectious Disease Division as Prominent User

↓

Financial Benefits:
Improved Use of Antibiotics Could be Quantified

Less Easily Quantifiable for Improved Diagnostic Speed and Accuracy

Interpretations by the Microbiology Diagnostic Management Team

- Clinically significant combinations of pathogen and site of detection
- Unusually virulent pathogen or strain
- MDR antimicrobial susceptibility pattern
- Unexpected antimicrobial susceptibility or resistance
- Findings suggestive of treatment failure
- Infection control or public health issues
- Findings suggestive of underlying pathology
- Concern for rapid disease progression
- Conflicting, confusing, or ambiguous results
- Any result that a technologist considers atypical or concerning with respect to patient well-being

From Dr. Jim Chappell

The National Fungal Meningitis Outbreak

Caused by injections of steroid preparations contaminated with *Aspergillus Fumigatus*

- 730 cases in 20 states
- 51 deaths
- Index case identified at Vanderbilt

The Microbiology DMT – including the technologist in mycology - at Vanderbilt helped terminate this huge outbreak

Drs. Carol Rauch, Jim Chappell, and Chuck Stratton, along with others

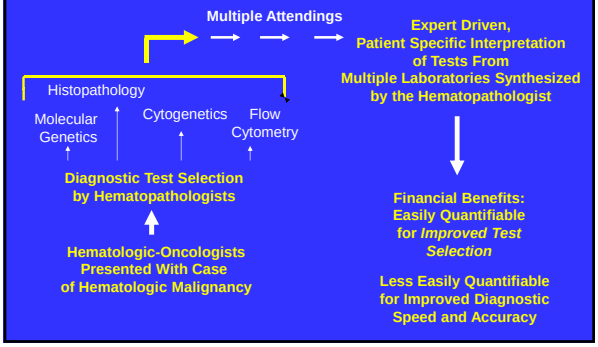
The National Fungal Meningitis Outbreak

- The DMT started with a diagnosis of meningitis and promptly identified that the source of the problem was contaminated steroid preparations. The DMT promptly determined that the cause of the meningitis was *Aspergillus Fumigatus*
- The DMT learned that the patient was not immunocompromised, had just received epidural steroid injections and had lumbar level abscesses
- The DMT determined that it was a true infection of the steroid preparation and not a laboratory contaminant

The National Fungal Meningitis Outbreak

- The DMT initiated and completed antigenic and other tests to support the conclusion that the pathogenic agent was *Aspergillus*
- The DMT worked closely with the Tennessee Department of Health which ultimately led to announcements and recalls of the infected steroid preparations
- The DMT participants were invited by the *New England Journal of Medicine* to prepare a publication to document the case and raise awareness of the national problem, and this paper was finalized within 1 month of the DMT discussions at Vanderbilt

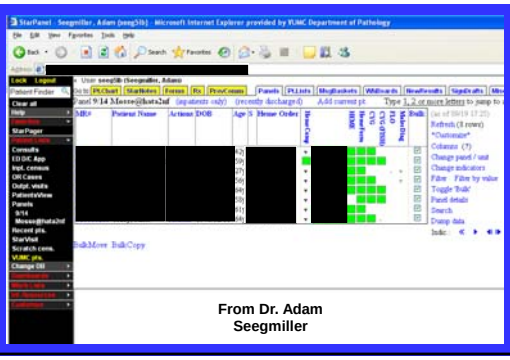
Hematopathology Rounds



Hematopathology Dashboard: Pre-historic (ca. 2010)

From Dr. Adam Seegmiller

Hematopathology Dashboard: Modern Version

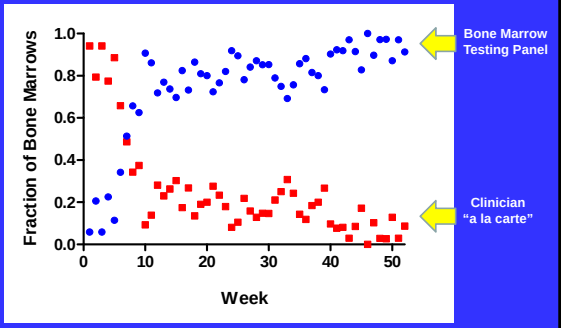


From Dr. Adam Seegmiller

Reflex Testing in Hematopathology

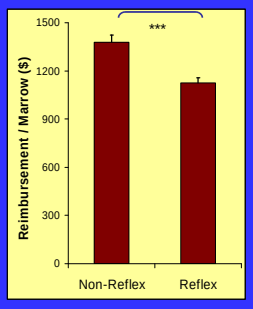
- At the time of bone marrow biopsy, the oncologist orders "bone marrow testing panel"
- Pathologist:
  - Consults electronic medical record and patient flowsheet for history and previous test results
  - Reviews bone marrow morphology
  - Orders appropriate cytogenetic and molecular tests
- The oncologist retains the option to order tests "a la carte"

Fractional weekly utilization of the bone marrow testing panel vs. a la carte ordering - after Hematology DMT implementation



Courtesy of Dr. Adam Seegmiller and colleagues

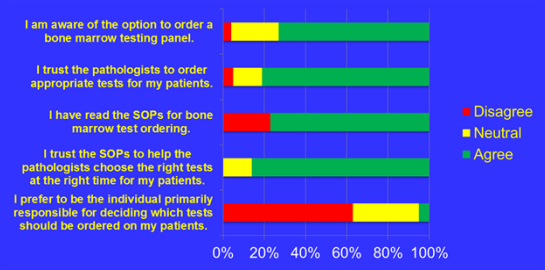
Significant Savings with Reflex Testing in Hematopathology



- Cost per marrow is $284 less for reflex testing.
- Yearly savings (>1800 bone marrows) exceeds $800,000 at Vanderbilt alone.

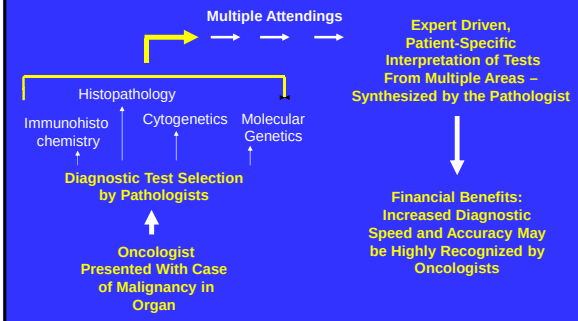
From Adam Seegmiller

Survey of 22 clinicians who Interacted with the Hematopathology DMT at Vanderbilt – Positive Response



Courtesy of Dr. Adam Seegmiller and colleagues

On The Drawing Board For Anatomic Pathology: The Diagnosis of Cancer in Multiple Organs and Tissues



The landscape within the current vision at Vanderbilt – a 3 year plan for the anatomic pathology DMTs

- **Hematopathology**
- **Breast Cancer**
- **Neuropathology**
- **Renal Pathology**
- **Lung Cancer**
- **Other cancers – GI, Prostate, Others with valuable molecular and genetic testing that directs therapy**

The landscape within the current vision at Vanderbilt – a 3 year plan for the clinical laboratory DMTs

- Coagulation
- Transfusion Medicine
- Microbiology
- Endocrinology
- Toxicology
- Autoimmunity

To reduce diagnostic error and save money while improving patient outcomes -

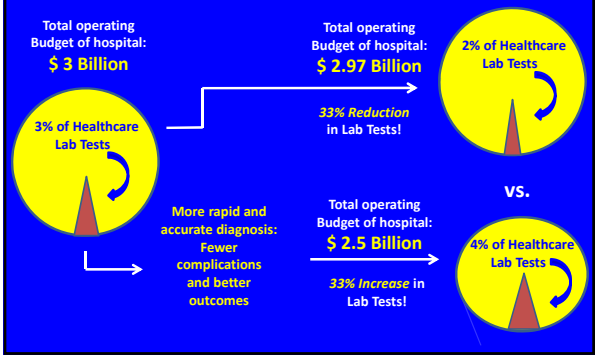
“ Just DMT all of the Pathology Services “

Outline of the Presentation

1. Presentation of the Clinical Problem
2. The Diagnostic Management Team at Vanderbilt : What it does and how it was created
3. The Existing and Planned Diagnostic Management Teams at Vanderbilt
4. Concluding Thoughts

Overutilization or Underutilization of the Laboratory :

Which works better for the hospital ?



If You Only Reduce What You Can Measure -

You reduce the number of laboratory tests, especially costly tests sent to outside labs

The number of medications

But what if an informative additional laboratory test shortens the length of stay? Or a more expensive medicine produces a cure faster?

There is much skepticism about the impact of improved test ordering and result interpretation-

Often, the shortened length of stay – for a pulmonary embolism (PE) for example – is instead attributed to:

- **A new radiological instrument used to diagnose PE**
- **A new radiologist who is better at identifying small PEs**
- **An increased use of contrast enhanced CAT scans in the emergency department for evaluating possible PE**

But rarely is the better use and understanding of diagnostic laboratory tests credited with the shortened length of stay!

Annual Savings for Clinical Situations Presented

1. Pharmacogenomics testing for Plavix : 1.5 million dollars
2. Unnecessary testing for leukemia : 0.88 million
3. Reduced length of stay for Pulmonary Embolism : 200 cases per year and $2000 reduction is 0.4 million
4. Oncologists seeing 1000 more patients annually with revenue of (minimum) $300 per visit : 0.3 million

The total for just these examples is about 3 million dollars at Vanderbilt

These are 4 examples involving 3 diseases –
But there are hundreds of diseases where such reductions are possible – collecting the information for each case requires dozens of hours

And the savings from Improved Test Ordering and Result Interpretation are Hard to Measure

If the cost savings comes from the operations budget of the hospital, it can be unmeasurable because saving 50 million out of 3 billion – reduces the operational budget to 2.95 billion, which seems minor

But 50 million is often the size of the financial gap at the end of the fiscal year,
so the number is very meaningful
for operational savings – while improving the quality of care

But what is an approximation for US healthcare savings?

50 million dollars per academic medical center with 150 academic medical center hospitals

1. 50 Million $ x 150 hospitals = 7.5 Billion $
2. Thousands of non – academic hospitals ??
3. Benefits of a more rapid and accurate diagnosis not yet recognized ??

THIS IS BILLIONS OF DOLLARS SAVED NATIONALLY WHILE GREATLY IMPROVING CARE

If you are seriously ill with an unknown diagnosis, you want -

An expert in the field

With current knowledge

Directing your evaluation in real time and explaining it all to you

This is the diagnostic management team – which needs to serve all those in need, not just those in a place where it exists

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Nearly 20 to date

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