

# Effective Communication of Hematology Laboratory Results

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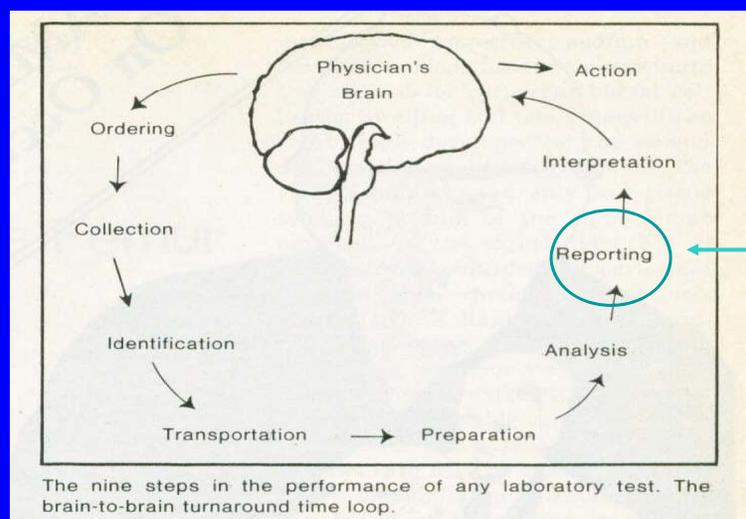
## Disclosures

- Honorarium – Speaker for the American Society of Clinical Pathology
- Honorarium – Speaker for Sysmex America, Inc.

## Learning Objectives

- Appreciate challenges in communicating hematology laboratory data effectively.
- Understand the importance of communicating directly with clinical care givers about new CBC parameters that might affect patient management.
- Recognize the importance of follow-up communication to clarify appropriate utilization of new tests.

## The “brain to brain turn-around loop”



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

Lundberg 1981

**For effective communication to occur, the information must be received by the intended recipients.**



**Too much information!**

## **Challenges to Effective Communication of Laboratory Results**

- There are more tests
- Some results have many components (eg. CBC).
- Changes in test methods lead to changes in how the results are reported (eg. automated differential counts).
- The results are transmitted in multiple systems and formats
  - Paper (“hard” copies)
  - LIS
  - HIS/EMR
  - Web-based
- Additional actions (clicks) may be required to access the entire report
- Changes in medical and hospital staff
- There are more recipients of laboratory reports
  - Physicians
  - Nurses, physician assistants, respiratory therapists, etc.
  - Patients

### **Hematopathology / Original Article**

#### **How Useful Are CBC and Reticulocyte Reports to Clinicians?**

**Linda M. Sandhaus, MD, and Pamela Meyer, MBA**

*Am J Clin Pathol* 2002;118:787-793

## **The Most Clinically Useful CBC/Diff Parameters**

- Hb
- Hct
- Platelet count
- WBC
- MCV
- DIFF%

## **Communicating Hematology Lab Results**

1. Automated absolute neutrophil counts (auto-ANC) in oncology out-patient clinics
2. Automated immature granulocyte counts (IG)
3. Blood and body fluid smear interpretive comments (“pathologist reviews”)

## 1. Reporting Diffs on Oncology Out-Patients

- **Clinical setting:** Decision to give chemotherapy is based on ANC.
- **Problem:** Waiting for manual WBC diffs was delaying decision to give chemotherapy.
- **“Work around”:** Lab tech gave nurses the print-outs from the hematology analyzer

## Why is this workaround not a “best practice?”

- If the auto-diff generated any interpretive flags on the analyzer, a manual diff would be done.
- The automated ANC and the manually-derived ANC might be different.
  - Which result is “correct”?
  - Which result should the chemotherapy decision be based on?
  - Which result will be in the medical record?

*Using the Absolute Neutrophil Count as a Stand-alone Test  
in a Hematology/Oncology Clinic:  
An Abbreviated Test Can be Preferable.*

**Jatoi A, Jaromin R, Jennings L, Nguyen PL.**  
*Clinical Laboratory Management Review,*  
**July/Aug 1998:256-260**

**A study from Massachusetts General Hospital**

**“More is not always better.”**

*“Our results suggest that it is the test’s  
relevance and not the volume of information  
provided that determines use. An  
understanding of the clinical utility behind  
each test... is essential in constructing a  
relevant test menu.”*

## Auto-ANC

- Add **auto-ANC** to CBC
- Report **auto-ANC** *if* neutrophils not flagged by analyzer.
- If neut\* flag is present, the auto-ANC is suppressed and a comment appears: “Unable to report automated ANC. See manual differential.”
- If any other WBC categories were flagged, a manual diff would also be done and reported.

## Explaining the Auto-ANC to Oncology Clinic Staff

- Memo to managers and medical directors of out-patient oncology clinics
- Met with nurses at each site to explain the test results
- FAQs about ANC
  - What is the ANC? (segs + bands)
  - Why is the ANC important for oncology patients?
  - If the auto-ANC and the manual ANC are both reported, which one is correct?
  - Why is the auto-ANC more precise than the manual ANC?

## **2. Introducing Immature Granulocytes (IG) in the XE-5000 6-Part Auto-Diff**

- Determine reference range
- Revise rules for smear review to include IG
- Decide how to report the IG
- Explain the new parameter to clinicians

## **Why is it important to explain IG to physicians?**

- Most physicians are familiar with band counts as an indicator of left shift.
- Physicians might not know which granulocyte precursors are included in IG.
- Non-physicians may not be familiar with stages of granulocyte maturation.

## Communication Plan

- Talk to the key groups of physicians and get their support
  - Adult hematology/oncology
  - Pediatric hematology/oncology
  - Neonatology
- Then communicate the change to everyone.
  - Clinical conferences
  - Lab or Hospital newsletters
  - Hospital committees
  - Electronic communication (EMR sign-on)

## Electronic Memo to Physicians

- Starting today, the Hematology Laboratory will report immature granulocyte counts (IG) as part of the automated leukocyte (WBC) differential count.
- Immature granulocytes are neutrophil precursors and their presence indicates a granulocytic left shift in the blood.
- The presence of immature granulocytes is a more objective criterion of clinically significant left shift than the poorly reproducible “band” count.

•**IMMATURE GRAN = promyelocytes + myelocytes + metamyelocytes**

•The reference range for IMMATURE GRAN in the WBC differential count is < 1%.

•**The IMMATURE GRAN count will only be reported if it is ≥ 1%.**

•An IMMATURE GRAN percentage ≥ 1% indicates that a **left shift** is present.

•BANDS are not included in the automated IMMATURE GRAN count. BANDS are included in the automated NEUTROPHIL count.

•If a **manual differential** count is performed, the lab will continue to report neutrophil segs, bands, metamyelocytes, myelocytes and promyelocytes as separate categories, if present.

## Other Changes in CBC Report

- Deleted MCH
- Deleted MPV
- Added ANC
- These changes were discussed in advance with adult and pediatric hematologists, but were not communicated to the general medical staff.

## **Impact of the CBC Report Changes**

- Short-term
  - Several nurses from clinical trials called about missing MCH
  - No calls from physicians about IG or any of the other CBC changes

## **Was the communication about IG successful?**

- Questions about IG came from pediatric residents and attending physicians more than one year later!!!

## Email message:

... many in our division are confused about what the [IG] results mean. What is included in the immature granulocyte count and how was the normal range determined? ***Are you aware of what is considered normal in a newborn infant?*** If bands are not included in the immature granulocyte count...are they included in the neutrophil count?  
Thanks so much for any help you can give!

## A flurry of emails ...

- “Different NICU attendings will say different things in regard to ... immature grans...”
- “I have been asked by an attending to order a manual diff...”
- “Please discuss with your team when a band count is needed before ordering a manual diff.”
- “An I:T [Immature/Total neutrophil] ratio of  $>0.2$  on a manual diff is a pretty standardized and agreed upon cutoff [for left shift]...”
- “It doesn’t matter if there are 5% bands or 40% bands if the IG is zero...”
- “It probably does matter if there are 40% bands!”

## Educational Conference

- Principles of automated differential counting
- Stages of granulocyte maturation
- Limitations of manual differential counts
  - Confidence intervals for 100 cell diffs
  - Subjectivity of band counts
- Illustrative case studies
- Question: If IG >1% in an otherwise healthy-appearing neonate, does the CBC need to be repeated?

## New Study

- Research objective
  - Determine reference range for IG in full-term neonates for the first 24 and 48 hours of life
- Quality improvement objective
  - Reduce unnecessary repeat CBC's in newborns

## **Lessons Learned**

- Electronic communication about new laboratory tests is not always effective.
- Engagement with clinicians is a good thing!

### **3. Pathologist Reviews (PRs) of Blood and Body Fluid Smears**

- Daily PRs performed by pathology residents and hematopathologists
- Pre-defined quantitative and qualitative criteria
- 20-40 per day
- Quality assurance
- Case finding
- Resident training
- Continuing education for lab techs

What is the “added value” of pathologist interpretations of blood and body fluid morphology?

**Study objective: Are pathologist reviews of hematology results clinically useful?**

- Methods: Physician survey
- Met with Pediatric and Medicine housestaff to explain the study and encourage participation
- Selected PRs most likely to have clinical significance
- Pathology residents paged the ordering MD the next day.

## Survey Questions

1. Did you see the PR on your patient?
2. Did the PR contribute to the clinical dx?
3. Did the PR affect patient management?
4. Did the PR lead to additional lab tests?
5. Did the PR lead to a clinical consult?

## PR Criteria for Study

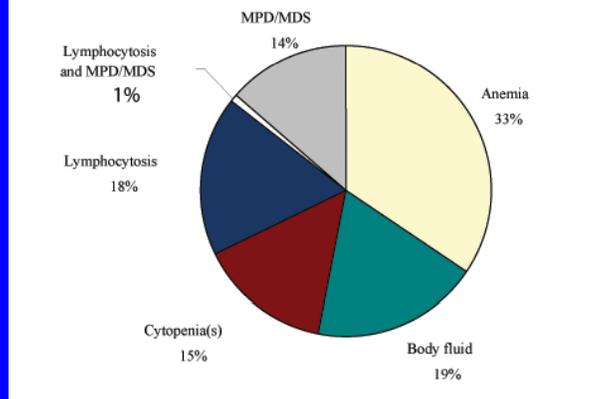
- Anemia: MCV  $< 70$  or  $> 110$ , or spherocytes, or RBC fragments
- Lymphocytosis s/o viral infection or lymphoproliferative disorder
- Findings s/o MPD, MDS, or leukemia not previously diagnosed
- Cytopenias in a non-oncology patient
- Any body fluid with cells s/o malignancy
- CSF with leukocytosis

## Measuring the Clinical Impact of Pathologist Reviews of Blood and Body Fluid Smears: A Laboratory Outcome Study

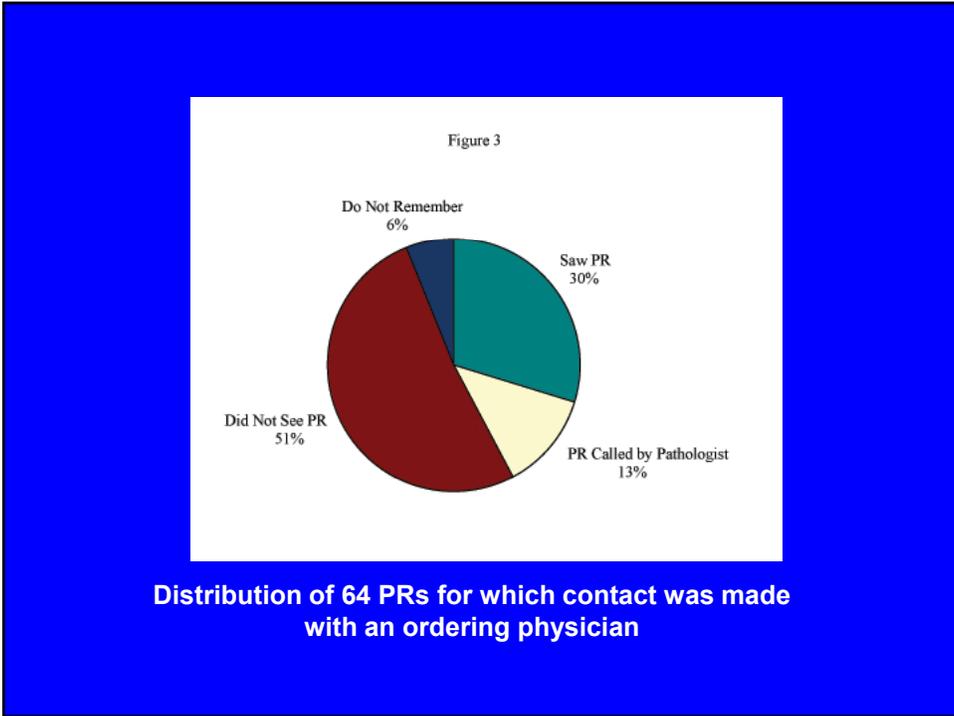
L. Sandhaus, D. Wald, K Sauder, E. Steele, H. Meyerson

*Arch Pathol Lab Med* 2007;131:468-472

Figure 2



Distribution of 96 PRs by diagnosis category



## Clinical Effects of 27 Pathologist Reviews

PR Type	Affected Diagnosis	Add. Tests Ordered	Clinical Consultation
Anemia	3/5	2	0
Body Fluid	7/7	1	1
MPD/MDS	5/5	3	2
Cytopenias	6/7	0	0
Lymphocytosis	2/3	0	0
<b>Total</b>	<b>23/27 (85%)</b>	<b>6</b>	<b>3</b>

## Conclusions

- 85% of PRs that were seen by a clinician were rated clinically useful.
- High proportion of PRs that were not seen raises concerns about clinician awareness of lab results.

## Finding the Comments is not always easy!

- Pathologist reviews appear after the initial CBC results have already been issued, sometimes more than 24 hours later.
- Comments are separated from the results they modify in the EMR.
- Additional click is required to view the comment.
- Comments appear in different places in different electronic record systems.

## Conclusions

- An initial communication by the laboratory to the clinicians about new tests is important.
- Use multiple forms of communication. Do not rely on electronic communication alone.
- Use face to face communication whenever possible to allow opportunities to ask questions.
- Use repeated communications to reinforce the message.

## Questions?

