

Answering your questions

Cell counts and differentials of CSF

Q Regarding cerebrospinal fluid (CSF) counts, at what lower limit should a white blood cell (WBC) or red blood cell (RBC) count *not* be reported? (Counts are performed manually and smears are cytospin preps.)

A Cell counts and differentials of CSF have become a routine process in labs, and for good reason: The number and type of cells present in CSF can provide extremely useful information regarding a patient's health status. Excess neutrophils in CSF can indicate an infection, such as bacterial meningitis; whereas excess lymphocytes can suggest a viral infection. In addition, morphologic examination is vital for identifying central nervous system involvement by a lymphoma/leukemia or other type of malignancy.¹

A normal CSF WBC count in neonates ranges from 0 cells/ μ L to 30 cells/ μ L. This number decreases as a child ages, to 0 cells/ μ L to 5 cells/ μ L in adults. WBCs in normal CSF should consist mainly of lymphocytes (70%) and monocytes (30%), with only rare neutrophils. Normal CSF should not have any red blood cells. Increased RBCs are most often seen in traumatic taps (though they can indicate pathology, such as hemorrhage), and the number of RBCs can indicate the degree of dilution from peripheral blood. Peripheral blood contamination can artificially change a cell count and differential.¹

Cell counts should be performed on fresh, undiluted CSF specimens that were obtained in non-glass specimen tubes (cells stick to the glass, which gives a falsely lower cell count) using a manual counting chamber (newer flow-cytometric machines may also provide a more accurate count). For a differential count, air-dried cyto centrifuge preparations with Wright's staining are preferred,^{1,2} as the most number of cells can be concentrated from the CSF specimen, and the Wright's stain gives the best morphology.

There are no specific guidelines for when and how to report cell counts and differentials in CSF, with very little

literature on the subject beyond suggesting that a cell count and differential are important.^{1,2,3,4} CAP's Hematology/Clinical Microscopy Resource Committee suggests all CSF specimens should have a cyto centrifuged Wright's-stained slide made for analysis, regardless of cell count — always reporting a differential if abnormal cells are identified and always requiring a pathologist review of CSF slides if organisms or malignant cells are identified. CAP also suggests reporting differentials in children, regardless of cell count.⁴

There is no specific recommended guideline. In our lab, we report all cell counts for RBCs and WBCs, with our lowest category resulted as ">1 cell per μ L." We prepare a cytospin slide for all CSF specimens, and perform morphologic examination and differentials regardless of cell count, since leukemia or other types of neoplastic cells may be seen in a low cell count CSF specimen. To report a differential percentage, we require at least 10 WBCs though, admittedly, the precision of this information when the cell count is so low is poor. If there are fewer than 10 WBCs in the specimen, we give a comment specifying precisely what was identified, such as "four lymphocytes and two monocytes." Documenting the number of cells counted to obtain the differential is important. Any abnormal cells, of course, are reported regardless of count or differential.

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References

1. McPherson R, Pincus M, eds. Cerebrospinal Fluid. In: *Henry's Clinical Diagnosis and Management by Laboratory Methods*, 21st ed. Philadelphia, PA: Saunders Elsevier; 2007.
2. Rabinovitch A, Cornbleet J. Body Fluid Microscopy in U.S. Laboratories. *Arch Pathol Lab Med*. 1994;118:13-17.
3. Deisenhammer F, Bartos A, Egg R, Gilhus NE, et al. Guidelines on routine cerebrospinal fluid analysis. Report from an EFNS task force. *Eur J Neurol*. 2006;13:913-922.
4. Nelson B. Necessity of differential cell count for CSF samples with normal cell counts. *CAP Today*. 2008;3:09.

What does the CBC include?

Q What do labs include as a part of a complete blood count (CBC)? Do they always include a differential?

A Examine the difference between a CBC and a CBC with automated differential WBC count at several points in the testing process.

Ordering: Prior to the 2003 revision of the CPT coding book, Medicare carriers attempted to limit the use of CBCs in favor of individual parameters. Since 2003, The National Coverage Determination which supersedes any existing local medical review policies concerning hematology procedures, does not recommend the use of CBC parameters for specific diseases or conditions, except for the use of Hgb or Hct to assess the oxygen-carrying capacity of blood.¹

Testing: The automated blood-cell counters in many labs perform a differential WBC count on every sample, whether there is an order for it or not.

Reporting: Depending on how the CBC was ordered, the cell counter or laboratory computer can suppress the differential count if it was not ordered.

Billing: There are two CPT codes: 85025 — blood count; complete CBC, automated, and automated differential WBC count; and 85027 — blood count; complete CBC automated.

The CPT coding manual defines CBC: complete blood count includes Hgb, Hct, RBC, WBC, and platelet count.¹ In a Medicare audit, a lab would be vulnerable if CBCs were billed as 85025 when the physician's order was for a CBC. □

—Daniel M. Baer, MD (deceased)

Reference

1. CodeMap Wheaton Partners. <https://www.codemap.com/content.cfm?id=500> Accessed January 3, 2009.



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