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## **ASSESSMENT OF HAEMATOLOGICAL PARAMETERS**

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### **SOP: Measure - Complete Blood Count**

#### **DEFINITION**

A Complete Blood Count (CBC) is a standardized test to assess components of the blood (e.g., red blood cells, white blood cells, hematocrit, hemoglobin, platelets).

#### **PURPOSE**

Complete Blood Count (CBC) tests are performed to determine the overall health of an individual and may help identify underlying conditions. CBC test results may identify a broad range of common and rare diseases.

#### **SCOPE**

This procedure applies to any research studies conducted by collaborators in the Sickle Pan African Research Consortium and the Sickle Africa Data Coordinating Centre (SADaCC) project.

#### **DESCRIPTION OF PROTOCOL**

The Complete Blood Count (CBC) protocol is a standard blood panel from the National Health and Nutrition Examination Survey (NHANES) and performed on participants aged 1 and older. Blood is collected from participants via standard venipuncture in a 3 or 4 ml K<sub>3</sub> EDTA tube. The ambient blood sample is placed into a hematological analyzer for CBC and differential analyses. The blood should be tested as soon as possible after venipuncture and no later than 24 hours.

#### **SPECIFIC INSTRUCTION**

Blood should be drawn directly into an EDTA anticoagulated tube. Venipuncture is preferred rather than capillary blood draw although arterial blood may be used. The tube should be filled to the maximum volume stated.

Although this assay specifies the Coulter® HMX Hematology Analyzer, there are a number of different assays and instruments that are appropriate to perform the CBC analyses. Commercial laboratories perform CBC tests routinely, and they are inexpensive. Blood should be analyzed according to the instrument manufacturer's instructions and according to the laboratory's standard operating procedure and interpreted in the context of age specific normal values. Once an assay is chosen for a particular study, the Working Group recommends that no changes in the protocol be made over the course of the study. To aid comparability, the Working Group recommends that the investigator record the make and manufacturer of equipment used and the repeatability and coefficients of variation for the assay.

Investigators who want to include participants that have hemophilia or have received cancer chemotherapy in the last 4 weeks will need to implement special venipuncture procedures.

## **PROTOCOL**

### **Exclusion Criteria**

Persons will be excluded from this component if they:

- Report that they have hemophilia; or
- Report that they have received cancer chemotherapy in the last 4 weeks

*SP = Sample Person.*

1. Do you have hemophilia?

Yes

No

Don't know

If the SP answers, "Yes," the SP is excluded from the blood draw.

If SP answer "No" or "Don't Know," blood is drawn from the SP.

2. Have you received cancer chemotherapy in the past four weeks or do you anticipate such therapy in the next four weeks?

Yes

No

Don't know

If the SP answers, "Yes," the SP is excluded from the blood draw.

If SP answer "No" or "Don't Know," blood is drawn from the SP.

### **Venipuncture Procedures**

Venipuncture must be done by a qualified phlebotomist with the knowledge and skill required for this procedure. A full description of phlebotomy procedure is found on chapter 4 of the Laboratory Procedures Manual. Fill a 3 or 4 ml K<sub>3</sub> EDTA tube with blood.

### **Recording the Results of the Venipuncture Procedure**

Immediately after completing the venipuncture, record the results of the blood draw, the reasons for a tube not being drawn according to the protocol, and any comments about the venipuncture.

## **Perform CBC Analyses**

*Note: a full description of this procedure is found in the 2009-2010 NHANES Lab Procedures Manual.*

The following parameters and units are measured in the CBC panel test:

White blood cell count (1000 cells/uL)	Basophils number (1000 cells/uL)
Lymphocyte (%)	Red cell count (million cells/uL)
Monocyte (%)	Hemoglobin (g/dL)
Segmented neutrophils (%)	Hematocrit (%)
Eosinophils (%)	Mean cell volume (fL)
Basophils (%)	Mean cell hemoglobin (pg)
Lymphocyte number (1000 cells/uL)	MCHC (g/dL)
Monocyte number (1000 cells/uL)	Red cell distribution width (%)
Segmented neutrophils number (1000 cells/uL)	Platelet count (1000 cells/uL)
Eosinophils number (1000 cells/uL)	Mean platelet volume (fL)

## **Interpretation of the CBC Results**

The CBC results will be interpreted based on the machine being used in the specific laboratories.

## **Selection Rationale**

A complete blood count is done by a machine and the numbers and indices may suggest a range of underlying diagnoses. Examination of a blood smear or additional testing is likely to be necessary to confirm a specific diagnosis.

## **Personnel and Training Required**

Phlebotomist

Laboratory that can perform Complete Blood Count (CBC) test

## **Equipment Needs**

Phlebotomy supplies

Version No.	Date	Internal Reviewer(s)	Author	Details of changes